DIPLOMAWING

RAJIVGANDHIPROUDYOGIKIVISHWAVIDYALAYA,BHOPAL

SCHEMEOFSTUDIES&EXAMINATIONS(IMPLEMENTEDFROMSESSION:JULY-2023)

FIRSTSEMESTER-GROUP'A'

: NAMEOFTHE PROGRAMME:

Agriculture,Aircraft Maintenance,Automobile,Chemical,CSE,CHM,Electronics & Tele.,Electronics & Inst., Electrical&ElectronicsEngg.,Electrical&Mech.Engg.,ElectronicsEngg.,IT,Mechanical,OptoElectronics,RAC

S.N.	PAPER CODE	SUBJECT CODE	SUBJECTNAME	THEORYCOMPONENT								PRACTICALCOMPONENT					TOTALCREDITS	TOTALMARKS
				HRSPERWEEK	CREDITS	TERMWORK				THEORYPAPER		HRSPERWEEK	CREDITS	LABWORK	PRACTICAL EXAM/VIVA			
						QUIZ/ASSIGNMENT	MID TERM TEST*		TOTAL	MARKS	DURATION				MARKS	DURATION		
							I	II										
1	7350	101	MATHEMATICS-I	4	4	10	10	10	30	70	03Hrs.	0	0	0	0	0	4	100
2	7351	102	APPLIEDPHYSICS-I	3	3	10	10	10	30	70	03Hrs.	4	2	20	30	3Hrs.	5	150
3	7352	103	APPLIEDCHEMISTRY	4	4	10	10	10	30	70	03Hrs.	4	2	20	30	3Hrs.	6	150
4	7353	104	COMMUNICATION SKILLS IN ENGLISH	4	4	10	10	10	30	70	03Hrs.	2	1	20	30	3Hrs.	5	150
5			ENGINEERINGGRAPHICS	0	0	0	0	0	0	0	0	4	2	40	60	3Hrs.	2	100
6			ENGINEERINGWORKSHOP PRACTICE	0	0	0	0	0	0	0	0	4	2	40	60	3Hrs.	2	100
7			SPORTSANDYOGA	0	0	0	0	0	0	0	0	2	1	20	30	3Hrs.	1	50
8			LIBERARY	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
TOTAL				15	15				120	280		21	10	160	240		25	800

NOTE- (1) *Two Best,out of Three MidTermTests(ProgressiveTests)Marks should be entered here.

(2) Mandatory Induction Program,right at thes tart of the first year.

GRAND TOTAL OF CREDITS
25

GRAND TOTAL OF MARKS
800

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

DIPLOMA WING

SEMESTER I

COURSE TITLE	:	MATHEMATICS-I
PAPER CODE	:	7350
SUBJECT CODE	:	101
TREORY CREDITS	:	4
PRACTICAL CREDITS	:	0

Course Objective:

This course is designed to give a comprehensive coverage at an introductory level to the subject of Trigonometry, Differential Calculus and Basic elements of algebra.

Course Content:

Unit	Topics and Sub-topics	Hours	Marks
Unit 1 **Trigonometry**	• Concept of angles, measurement of angles in degrees, grades and radians and their conversion. • T-ratios of allied angles (without proof) • Sum, difference formulae (without proof) and related problems. • Product formulae (transformation of product to sum, difference and vice versa) • T-rations of multiple angles (2A,3A)	12	23
Unit 2 **Differential Calculus**	• Definition of function, concept of limits, Two standard limits $\lim_{x\to a}\frac{x^n-a^n}{x-a}$, $\lim_{x\to 0}\frac{Sinx}{x}$ • Differentiation by definition of x^n, sinx,cos x, tan x, e^x and $\log_e x$. • Differentiation of sum, product and quotient of functions. • Differentiation of function of a function. Differentiation of trigonometric functions. • Logarithmic differentiation, Exponential functions.	14	23

Unit 3 **Algebra**	• Complex Numbers: Definition, real and imaginary parts of a Complex number, polar and Cartesian, representation of a complex number and its conversion from one form to other. conjugate of a complex number, modulus and amplitude of a complex number Addition, Subtraction, Multiplication and Division of a complex number. De-movier's theorem, related simple problems. • Partial fractions: Definition of polynomial fraction proper & improper fractions and definition of partial fractions. To resolve proper fraction into partial fraction with denominator containing non-repeated linear factors. • Permutations and Combinations: Value of ${}^{n}P_{r}$ and ${}^{n}C_{r}$. • Binomial theorem: Binomial theorem (without proof) for positive integral index (expansion and general form). Middle term.	14	24

BLUE PRINT OF QUESTION PAPER

TIME: THREE HOURS **MAXIMUM MARKS: 70**

Unit	Question-1	Question-2	Question-3	Question-4	Question-5	
	2 MARKS	2 MARKS	3 MARKS	4 MARKS	5 MARKS	
1- Trigonometry **2- Calculus.** **3- Algebra.**	**Pattern:** Objective type 5 questions. (At least 1 from each unit.)	**Pattern:** Match the column. 5 parts (At least 1 from each unit.)	**Pattern:** Short Numerical problems. (8 questions set, At least 2 from each unit. 5 questions are to be attempted.)	**Pattern:** Numerical problems. (8 questions set, At least 2 from each unit. 5 questions are to be attempted.)	**Pattern:** Numerical problems. (6 questions set, 2 from each unit. 3 questions are to be attempted.)	
TOTAL MARKS	**10**	**10**	**15**	**20**	**15**	**= 70**

Guidelines for Question Paper Design:

1. The question paper should be prepared on the basis of the blueprint.

2. The question paper should carry 70 marks and be of 3 hours duration.

3. There should be a total of five questions. All are compulsory for students to attempt.

4. No choice in question number-1 and 2.

5. Internal choice in Question number-3. It will contain total 8 questions and students will attempt 5 questions out of 8.

6. Internal choice in Question number-4. It will contain total 8 questions and students will attempt 5 questions out of 8.

7. Internal choice in Question number-5. It will contain total 6 questions and students will attempt 3 questions out of 8.

MODEL QUESTION PAPER -1

MATHEMATICS-I (7350)

Time: Three Hours **Maximum Marks: 70**

Note –

1) All questions are compulsory. Question no-1 is multiple choice type, Question no-2 is match the column type.
2) Internal choices are given in Question no- 3, 4 & 5.
3) In case of any doubt or dispute, the English version question should be treated as final.

Q1- Choose the correct answer (2 *each* $\times$ 5 $=$ 10 Marks)

(i) Value of $^{8}C_{2}$ is

(a) 28 (b) 26 (c) 11 (d) None of these

(ii) Total number of terms in the expansion of $(ax-by)^{11}$ is

(a) 13 (b) 24 (c) 12 (d) 0

(iii) The value of $i^4 + i^2 + 1$ is

(a) 1 (b) i (c) -i (d) -1

(iv) The value of $\frac{d}{dx}(logx)$ is

(a) $\frac{1}{x}$ (b) 0 (c) x (d) e^x

(v) The value of $cos\,30^{\circ}$ is

(a) $\frac{\sqrt{3}}{2}$ (b) 1 (c) $\frac{1}{2}$ (d) 0

Q2 - Match the column (2 *each* $\times$ 5 $=$ 10 Marks)

(i) $^{n}P_{r}$ =	(i) $T_{r+1} = {}^{n}C_{r}x^{n-r}a^{r}$
(ii) General term in expansion of $(x + a)^n$	(ii) $\cos 2x$
(iii) $(\cos\theta + i\,\sin\theta\,)^{n}$	(iii) $\frac{n!}{(n-r)!}$
(iv) $cos^2x - sin^2x =$	(iv) $1 + logx$
(v) $\frac{d}{dx}(xlogx) =$	(v) $\cos(n\theta) + i\sin(n\theta)$

Q3 - Attempt any five out of eight questions (3 $each$ $\times 5$ $= 15$ Marks)

(i) $If\ \ tan\theta\ = \frac{3}{4},\ then\ evaluate\ \ sin2\theta$

(ii) Find the value of $\lim_{x\to 3} \frac{(x^2-9)}{(x-3)}$

(iii) If $y = x^5 secx + 10^x$ then find the value of $\frac{dy}{dx}$

(iv) Find the multiplicative inverse of $3 + 2$ i

(v) Resolve into partial fractions $\frac{1}{(x+1)(x-2)}$

(vi) If $y = x\sin x$, then find the value of $\frac{dy}{dx}$

(vii) Evaluate $sin\,480^\circ$

(viii) If ${}^nP_{10} = {}^nP_{18}$ then find the value of n

Q4 - Attempt any five out of eight questions (4 $each$ $\times 5$ $= 20$ Marks)

(i) Prove that $\sqrt{\left(\frac{1+sinx}{1-sinx}\right)} = tanx + secx$

(ii) Find the 4th term in the expansion of $\left(\frac{2x}{3} - \frac{3}{2x}\right)^6$

(iii) If $x^n + y^n = a^n$, then find the value of $\frac{dy}{dx}$

(iv) If $tanA = \frac{5}{6}$ and $tanB = \frac{1}{11}$ then show that $A + B = 45^\circ$

(v) Resolve into partial fractions $\frac{x}{(x-1)(x+3)(x-5)}$

(vi) If $y = xe^x$, then prove that $\frac{1}{y}\frac{dy}{dx} = 1 + \frac{1}{x}$

(vii) Prove that $\left(\frac{1+\mathrm{i}}{1-\mathrm{i}}\right)^n = i^n$

(viii) Find Differential coefficient of e^x by first principles.

Q5 - Attempt any Three out of Five questions ($5\ each \times 3 = 15$ Marks)

(i) Prove that $2tan50° - tan70° + tan20° = 0$

(ii) Prove that $sin20°sin40°sin60°sin80° = \frac{3}{16}$

(iii) If $y = \sqrt{x}^{\sqrt{x}^{\sqrt{x}^{\sqrt{x}\text{-------}\infty}}}$, then find the value of $\frac{dy}{dx}$

(iv) Find the middle term in the expansion of $\left(\frac{4x^2}{3} - \frac{3}{2x}\right)^9$

(v) If $siny = x\ sin(a + y)$ then prove that $\frac{dy}{dx} = \frac{sin^2(a+y)}{sina}$

Module Question Paper

Mathematics-1

Time: Three Hours | Maximum Marks: 70

All parts are mandatory (सभी भाग अनिवार्य हैं।)

Parts-1

Q.1) Choose the correct answers. $2\ each \times 5 = 10\ Marks$

सही उत्तर का चयन कीजिए।

1(A) If $\sin A = \frac{3}{5}$, then sin2A is equal to

यदि $\sin A = \frac{3}{5}$ हैं तो sin2A का मान होगा

(a) $\frac{6}{5}$ (b) $\frac{12}{13}$

(c) $\frac{24}{25}$ (d) $\frac{9}{25}$

1(B) The value of 60^0 in radian

60^0 का रेडियन में मान होगा

(a) $\left(\frac{\pi}{4}\right)^c$ (b) $\left(\frac{\pi}{5}\right)^c$

(c) $\left(\frac{\pi}{6}\right)^c$ (d) $\left(\frac{\pi}{3}\right)^c$

1(C) $\lim_{x\to a} \frac{x^2-a^2}{x-a}$ is equal to

$\lim_{x\to a} \frac{x^2-a^2}{x-a}$ का मान हैं

(a) $2a$ (b) $-2a$

(c) 0 (d) 1

1(D) Complex conjugate of $2-3i$ is

$2-3i$ का संयुग्मी सम्मिश्र रूप होगा

(a) $2+3i$ (b) $2-3i$

(c) $3-2i$ (d) $3+2i$

1(E) If ${}^{n}\mathrm{P}_{2}=12$ then the value of n is

यदि ${}^{n}\mathrm{P}_{2}=12$ हैं तो n का मान होगा

(a) 2 (b) 4

(c) 5 (d) 6

Parts-II

Q.2) Match the Column (सही जोड़ी का मिलान कीजिए) $2\ each \times 5 = 10\ Marks$

(A)	$\sin(180^0-\theta)$	(a)	11
(B)	$\frac{d}{dx}secx$	(b)	0
(C)	$f(x)=cos2x$ Then $f\left(\frac{\pi}{4}\right)$	(c)	$\sin\theta$
(D)	Total terms in $(2x+3y)^{10}$	(d)	1
(E)	${}^{n}\mathrm{C}_{n}$	(e)	$secxtanx$

Parts-III

$3\ each \times 5 = 15\ Marks$

(Attempt any five out of eight questions) 8 में से कोई 5 प्रश्न हल कीजिए।

3(A) Find the value of $(1+i)^2$

$(1+i)^2$ का मान ज्ञात करो

3(B) Prove that

सिध्द कीजिए

$$\sqrt{\frac{1-\sin A}{1+\sin}} = \text{Sec}A - \tan A$$

3(C) If $y = x.sinx$, then find $\frac{dy}{dx}$

यदि $y = x.sinx$, तब $\frac{dy}{dx}$ ज्ञात करो

3(D) If $x^2 + y^2 = a^2$, then find $\frac{dy}{dx}$

यदि $x^2 + y^2 = a^2$, तब $\frac{dy}{dx}$ ज्ञात करो

3(E) Resolve into partial fractions

आंशिक भिन्नो में विभक्त कीजिए

$$\frac{2x+5}{(x-1)(x-2)}$$

3(F) Prove that

सिध्द कीजिए

$$\tan(45^0 - A) = \frac{1-tan}{1+tan}$$

3(G) If $f(x) = x^2 - \frac{1}{x^2}$ then prove that $f(x) + f\left(\frac{1}{x}\right) = 0$

यदि $f(x) = x^2 - \frac{1}{x^2}$ तब सिध्द कीजिए $f(x) + f\left(\frac{1}{x}\right) = 0$

3(H) Find multiplicative inverse of $4 - 3i$

$4 - 3i$ का गुणन प्रतिलोम ज्ञात कीजिए

Parts-IV

$4\ each \times 5 = 20\ Marks$

(Attempt any five out of eight questions) 8 में से कोई 5 प्रश्न हल कीजिए।

4(A) Prove that $sin50^0 - sin70^0 + sin10^0 = 0$

सिद्ध कीजिए $sin50^0 - sin70^0 + sin10^0 = 0$

4(B) If $\sin A = \frac{2}{5}$, $\cos B = \frac{12}{13}$ then find $\sin(A+B)$ and $\cos(A-B)$

यदि $\sin A = \frac{2}{5}$, $\cos B = \frac{12}{13}$ तब $\sin(A+B)$ तथा $\cos(A-B)$ के मान ज्ञात कीजिए

4(C) If $y = x^x$, then find $\frac{dy}{dx}$

यदि $y = x^x$, तब $\frac{dy}{dx}$ ज्ञात करो

4(D) Find the value of $\lim_{x\to 0}\left(\frac{1-cosx}{x^2}\right)$

$\lim_{x\to 0}\left(\frac{1-cosx}{x^2}\right)$ का मान ज्ञात कीजिए

4(E) If $y = \frac{sinx}{1+cosx}$, then find $\frac{dy}{dx}$

यदि $y = \frac{sinx}{1+cosx}$, तब $\frac{dy}{dx}$ ज्ञात करो

4(F) Resolve into partial fractions

आंशिक भिन्नो में विभक्त कीजिए

$$\frac{x^2}{(x+2)(x+3)(x+4)}$$

4(G) If ${}^{n}C_8 = {}^{n}C_{12}$, then find ${}^{23}C_n$

यदि ${}^{n}C_8 = {}^{n}C_{12}$, तब ${}^{23}C_n$ का मान ज्ञात कीजिए

4(H) Find the 6th term in the expansion of $\left(x^2 - \frac{1}{x}\right)^{10}$

$\left(x^2 - \frac{1}{x}\right)^{10}$ के विस्तार में छटवां पद ज्ञात कीजिए

Parts-V

$5\ each \times 3 = 15\ Marks$

(Attempt any five out of eight questions) 6 में से कोई 3 प्रश्न हल कीजिए।

5(A) If $tanA = \frac{5}{6}$ and $tanB = \frac{1}{11}$, then prove that $A + B = 45^0$

यदि $tanA = \frac{5}{6}$ और $tanB = \frac{1}{11}$, तब सिध्द कीजिए $A + B = 45^0$

5(B) Prove that $sin20^0 sin40^0 sin60^0 sin80^0 = \frac{3}{16}$

सिध्द कीजिए $sin20^0 sin40^0 sin60^0 sin80^0 = \frac{3}{16}$

5(C) Find the differential coefficients of $sinx$ from the first principles.

$sinx$ का प्रथम सिध्दांत से अवकल गुणांक ज्ञात कीजिए

5(D) If $y = \sqrt{sinx + \sqrt{sinx + \sqrt{sinx + \sqrt{sinx + \cdots \infty}}}}$, then find $\frac{dy}{dx}$

यदि $y = \sqrt{sinx + \sqrt{sinx + \sqrt{sinx + \sqrt{sinx + \cdots \infty}}}}$, तब $\frac{dy}{dx}$ ज्ञात कीजिए

5(E) Find the middle term in the expansion of $\left(\frac{x}{2} + 2y\right)^6$

$\left(\frac{x}{2} + 2y\right)^6$ के विस्तार में मध्य पद ज्ञात कीजिए

5(F) Express $(1 - i)^4$ into $a + ib$ form.

$(1 - i)^4$ को $a + ib$ के रूप में व्यक्त कीजिए

Mathematics-1 Question Bank

Unit-1 Trigonometry

Part-I

Q.1) If $\cos\theta = \frac{4}{5}$, then $\cos 2\theta$ =

(a) $\frac{7}{25}$ (b) $\frac{9}{25}$ (c) $\frac{16}{25}$ (d) $\frac{24}{25}$

Q.2) If $\sin\theta = \frac{3}{5}$, then $\sin 2\theta$ =

(a) $\frac{7}{25}$ (b) $\frac{9}{25}$ (c) $\frac{16}{25}$ (d) $\frac{24}{25}$

Q.3) If $A + B = 45^0$; then the value of $(1 + \tan A)(1 + \tan B)$ is:

(a) 0 (b) 1 (c) 2 (d) 3

Q.4) Value of $2\sin 15^0 \cos 15^0$ will be:

(a) $\frac{1}{\sqrt{2}}$ (b) $\frac{1}{2}$ (c) $-\frac{\sqrt{3}}{2}$ (d) $\frac{\sqrt{3}}{2}$

Q.5) Value of $(\sin A - \cos A)^2$ is equal to:

(a) $1 + \sin 2A$ (b) $1 - \sin 2A$

(c) $\sin 2A$ (d) $\cos 2A$

Q.6) Value of $\sin(360^0 - \theta)$ is equal to:

(a) $\sin\theta$ (b) $-\sin\theta$

(c) $\cos\theta$ (d) $-\cos\theta$

Q.7) If $\sin A = \frac{3}{5}$ and $\cos B = \frac{12}{13}$; then $\sin(A + B)$ is equal to:

(a) $\frac{15}{18}$ (b) $\frac{56}{65}$ (c) $\frac{63}{65}$ (d) $\frac{36}{65}$

Q.8) If $\tan\theta = \frac{1}{2}$ and $\tan\emptyset = \frac{1}{3}$; Then $\theta + \emptyset$ is equal to:

(a) $\frac{\pi}{6}$ (b) π (c) $\frac{\pi}{4}$ (d) $\frac{\pi}{3}$

Q.9) If $\tan\theta = \frac{p}{q}$; then the value of $\frac{p\sin\theta - q\cos\theta}{p\sin\theta + q\cos\theta}$ is equal to:

(a) $\frac{p^2+q^2}{p^2-q^2}$ (b) $p^2 + q^2$

(c) $\frac{p^2-q^2}{p^2+q^2}$ (d) $p^2 - q^2$

Q.10) $\frac{\cos 11^0 + \sin 11^0}{\cos 11^0 - \sin 11^0}$ =

(a) $\tan 22^0$ (b) $\tan 56^0$

(c) $\tan 34^0$ (d) $\cot 11^0$

Q.11) $\sin 40^0 - \sin 20^0$ =

(a) $\sqrt{3}\sin 10^0$ (b) $\sqrt{3}\cos 10^0$

(c) $-\cos 10^0$ (d) $\sin 10^0$

Q.12) If $\sin A = \frac{1}{\sqrt{5}}$ and $\sin B = \frac{1}{\sqrt{10}}$;

then $A + B$ is equal to:

(a) $\frac{\pi}{6}$ (b) π (c) $\frac{\pi}{4}$ (d) $\frac{\pi}{3}$

Q.13) $\frac{\cos\theta}{\sin(90^0-\theta)} + \frac{\sin\theta}{\cos(90^0-\theta)}$ =

(a) 0 (b) 1 (c) -1 (d) 2

Q.14) $\sin^2 20^0 + \cos^2 20^0$ =

(a) 0 (b) 1 (c) -1 (d) 2

Q.15) $(1-\cos\theta)(1+\cos\theta)(1+\cot^2\theta) =$

(a) 0 (b) 1 (c) -1 (d) 2

Q.16) $\sin 30^0 . \cos 60^0 + \cos 30^0 . \sin 60^0 =$

(a) 0 (b) 1 (c) -1 (d) 2

Q.17) $\cos\theta . \cos(90^0-\theta) - \sin\theta . \sin(90^0-\theta) =$

(a) 0 (b) 1 (c) -1 (d) 2

Q.18) $\sec(90^0-\theta) =$

(a) $\sin\theta$ (b) $\operatorname{cosec}\theta$

(c) $\cos\theta$ (d) $\cot\theta$

Q.19) $\sqrt{\sec^2\theta - 1}$ =

(a) $\tan\theta$ (b) $\operatorname{cosec}\theta$

(c) $\cos\theta$ (d) $\cot\theta$

Q.20) $\frac{\cot A+\tan B}{\cot B+\tan A} =$

(a) $\tan A . \tan B$ (b) $\cot A . \tan B$

(c) $\cot A . \cot B$ (d) $\tan A . \cot B$

Q.21) $\frac{\sin\theta+\sin 2\theta}{1+\cos\theta+\cos 2\theta} =$

(a) $\tan\theta$ (b) $\operatorname{cosec}\theta$

(c) $\cos\theta$ (d) $\cot\theta$

Q.22) Value of $\sec^2 10^0 - \tan^2 10^0 =$

(a) 0 (b) 1 (c) -1 (d) 2

Q.23) Value of $\sqrt{\frac{1+\sin\theta}{1-\sin\theta}} =$

(a) $\sec\theta + \tan\theta$ (b) $\operatorname{cosec}\theta - \cot\theta$

(c) $\sec\theta - \tan\theta$ (d) $\operatorname{cosec}\theta + \cot\theta$

Q.24) Value of $\sqrt{\operatorname{cosec}^2\theta - 1} =$

(a) $\tan\theta$ (b) $\operatorname{cosec}\theta$

(c) $\cos\theta$ (d) $\cot\theta$

Q.25) $\sin(90^0 - \theta).\cos\theta + \cos(90^0 - \theta).\sin\theta =$

(a) 0 (b) 1 (c) -1 (d) 2

Q.26) $\sin(180^0 - \theta) =$

(a) $\sin\theta$ (b) $\operatorname{cosec}\theta$ (c) $\cos\theta$ (d) $\cot\theta$

Q.27) Value of $\frac{\tan\theta}{\sin\theta} =$

(a) $\sec\theta$ (b) $\operatorname{cosec}\theta$ (c) $\cos\theta$ (d) $\cot\theta$

Q.28) If $\sin A = \frac{3}{5}$, then cosA is equal to

(a) $\frac{6}{5}$ (b) $\frac{2}{3}$

(c) $\frac{4}{5}$ (d) $\frac{2}{5}$

Q.29) The value of 60^0 in radian

(a) $\left(\frac{\pi}{4}\right)^c$ (b) $\left(\frac{\pi}{5}\right)^c$

(c) $\left(\frac{\pi}{6}\right)^c$ (d) $\left(\frac{\pi}{3}\right)^c$

Part-II

Q.1) Match the column

(A)	$sin60^0$	(a)	$\frac{2}{\sqrt{3}}$
(B)	$\sec 30^0$	(b)	0
(C)	$\text{cosec}\, 45^0$	(c)	$\frac{\sqrt{3}}{2}$
(D)	$\cos 90^0$	(d)	$\sqrt{2}$
(E)	$\tan 30^0$	(e)	$\frac{1}{\sqrt{3}}$

Q.2) Match the column

(A)	$\frac{\pi}{4}$	(a)	120^0
(B)	$\frac{2\pi}{3}$	(b)	18^0
(C)	$\frac{\pi}{10}$	(c)	30^0
(D)	$\frac{\pi}{6}$	(d)	360^0
(E)	2π	(e)	45^0

Q.3) Match the column

(A)	$\cos(180^0 - \theta)$	(a)	$\cos\theta$
(B)	$\sin(90^0 - \theta)$	(b)	$-\sin\theta$
(C)	$\sin(180^0 + \theta)$	(c)	$-\cos\theta$
(D)	$\tan(90^0 - \theta)$	(d)	$\sin\theta$
(E)	$\sin(180^0 - \theta)$	(e)	$\tan\theta$

Q.4) Match the column

(A)	$1 + \tan^2 \theta$	(a)	$\cos 2\theta$
(B)	$\sin^2 \theta + \cos^2 \theta$	(b)	1
(C)	$\cos^2 \theta - \sin^2 \theta$	(c)	$\sec^2 \theta$
(D)	$2 \sin \theta cos\theta$	(d)	$\text{cosec}^2 \theta$
(E)	$1 + \cot^2 \theta$	(e)	$\sin 2\theta$

Q.5) Match the column

(A)	$\frac{\sin \theta}{\cos \theta}$	(a)	$\cot \theta$
(B)	$\frac{\cos \theta}{\sin \theta}$	(b)	$\text{cosec}\, \theta$
(C)	$\frac{1}{\sin \theta}$	(c)	$\tan \theta$
(D	$\frac{1}{\cos \theta}$	(d)	$\sin \theta$
(E)	$\frac{\tan \theta}{\sec \theta}$	(e)	$\sec \theta$

Q.6) Match the column

(A)	$\sin(A + B)$	(a)	$cosAcosB - sinAsinB$
(B)	$\cos(A + B)$	(b)	$sinAcosB - cosAsinB$
(C)	$\sin(A - B)$	(c)	$sinAcosB + cosAsinB$
(D	$\cos(A - B)$	(d)	$cosAcosB + sinAsinB$
(E)	$\sin A + sinB$	(e)	$2 \cos\left(\frac{A+B}{2}\right) \sin\left(\frac{A-B}{2}\right)$
(F)	$\sin A - sinB$	(e)	$2 \sin\left(\frac{A+B}{2}\right) \cos\left(\frac{A-B}{2}\right)$
(G)	$\cos A + cosB$	(e)	$2 \sin\left(\frac{A+B}{2}\right) \sin\left(\frac{B-A}{2}\right)$
(H)	$\cos A - cosB$	(f)	$2 \cos\left(\frac{A+B}{2}\right) \cos\left(\frac{A-B}{2}\right)$

Part-III

Q.1) If $\tan\theta = \frac{4}{5}$, find the value of $\frac{2sin\theta+3\cos\theta}{4cos\theta+3\sin\theta}$

Q.2) Find the value of $tan\theta$ If $cos\theta = \frac{9}{41}$

Q.3) If $\sin\theta = \frac{3}{5}$ then find the value of $sin2\theta$ and $cos2\theta$

Q.4) Find the value of following:

(i) $sin15^0$ (ii) $sin75^0$ (iii) $sin105^0$

(iv) $cos15^0$ (v) $cos75^0$ (vi) $cos105^0$

(vii) $tan15^0$ (viii) $tan75^0$ (ix) $tan105^0$

Q.5) If $\cos\alpha = \frac{5}{13}$, Then find the values of $\sin 2\alpha, \cos 2\alpha$ and $\tan 2\alpha$

Q.6) Prove that: $\tan(45^0 - A) = \frac{1-tanA}{1+tanA}$

Q.7) Prove that: $\frac{1+\sin 2\theta - \cos 2\theta}{1+\sin 2\theta + \cos 2\theta} = \tan\theta$

Q.8) If $\tan\theta = \frac{2}{3}$, then find the values of $sin\theta + cos\theta$ and $sec\theta + cosec\theta$.

Q.9) Prove that $\sqrt{\frac{1-sinA}{1+sinA}} = SecA - tanA$

Q.10) Prove that $\frac{cotA+tanB}{cotB+tanA} = cotAtanB$

Q.11) Find the value of following

(i) $tan135^0$ (ii) $sin210^0$ (iii) $cos330^0$

Q.12) Prove that $cotA + tanA = 2cosec2A$

Q.13) Prove that $cos80^0 + cos40^0 = cos20^0$

Part-IV

Q.1) Prove that: $\sin 50^0 - \sin 70^0 + \sin 10^0 = 0$

Q.2) Simplify: $\frac{\sin\theta}{\cos(90^0-\theta)} + \frac{\sin(-\theta)}{\sin(180^0-\theta)} - \frac{\tan(90^0-\theta)}{\cot\theta}$

Q.3) Prove that: $(\sin\theta + \operatorname{cosec}\theta)^2 + (\cos\theta + \sec\theta)^2 = 7 + \tan^2\theta + \cot^2\theta$

Q.4) If $\sin A = \frac{1}{\sqrt{5}}$ and $\sin B = \frac{1}{\sqrt{10}}$ then show that $A + B = 45^0$

Q.5) Prove that: $\frac{\sin A - \sin B}{\cos A + \cos B} + \frac{\cos A - \cos B}{\sin A + \sin B} = 0$

Q.6) If $\tan A = \frac{5}{6}$ and $\tan B = \frac{1}{11}$ then show that $A + B = 45^0$

Q.7) Prove that $\frac{1+sin2\theta-cos2\theta}{1+sin2\theta+cos2\theta} = tan\theta$

Q.8) Prove that $\frac{sin\theta+sin2\theta}{1+cos\theta+cos2\theta} = tan\theta$

Q.9) Prove that $\frac{cos11^0+sin11^0}{cos11^0-sin11^0} = tan56^0$

Q.10) If $A + B = 45^0$ then show that $(1 + tanA)(1 + tanB) = 2$

Q.11) If $\sin A = \frac{2}{5}$ and $\cos B = \frac{12}{13}$

then find the values of $\sin(A + B)$ and $\cos(A - B)$

Part-V

Q.1) Prove that: $\frac{\cos 2\theta}{1+\sin 2\theta} = \tan\left(\frac{\pi}{4} - \theta\right)$

Q.2) Prove that: $\cos 20^0 \cos 40^0 \cos 60^0 \cos 80^0 = \frac{1}{16}$

Q.3) Prove that: $\sin 20^0 \sin 40^0 \sin 60^0 \sin 80^0 = \frac{3}{16}$

Q.4) Prove that: $\sin(A + B)\sin(A - B) = \sin^2 A - \sin^2 B$

Q.5) Prove that: $\sin(A + B)\sin(A - B) = \cos^2 B - \cos^2 A$

Q.6) Prove that: $\sin^2\left(\frac{\pi}{8} + \frac{A}{2}\right) - \sin^2\left(\frac{\pi}{8} - \frac{A}{2}\right) = \frac{1}{\sqrt{2}}\sin A$

Q.7) Prove that: $\frac{\sin(A+B)-2sinA+\sin(A-B)}{\cos(A+B)-2cosA+\cos(A-B)} = tanA$

Q.8) Prove that: $2\tan 50^0 - tan70^0 + tan20^0 = 0$

Unit-2 (Differential Calculus)

Part-I

Q.1) Value of $\lim_{n\to\infty}\left(1+\frac{1}{n}\right)^n$ is:

(a) 1 (b) e

(c) $\frac{1}{n}$ (d) $\frac{1}{e}$

Q.2) Value of $\lim_{x\to 0}\frac{e^x-1}{x}$ is:

(a) e (b) 0

(c) 1 (d) $\frac{1}{2}$

Q.3) Value of $\lim_{x\to 0}\frac{sin3x}{x}$ is:

(a) 0 (b) 1

(c) 3 (d) $\frac{1}{3}$

Q.4) Value of $\lim_{x\to 0}\frac{\log(1+x)}{x}$ is :

(a) 1 (b) 2

(c) 3 (d) 0

Q.5) Value of $\lim_{x\to a}\frac{(x^n-a^n)}{(x-a)}$ is:

(a) n (b) 1

(c) a (d) $n\,a^{n-1}$

Q.6) Value of $\lim_{\theta\to\frac{\pi}{2}}\cos^2\theta$ is :

(b) 1 (b) 0

(c) 4 (d) 3

Q.7) Value of $\lim_{x\to 0}\frac{\sin 3x}{\tan 2x}$ is:

(b) 2 (b) 3

(c) 1 (d) $\frac{3}{2}$

Q.8) Value of $\lim_{x\to\infty} \frac{9x^2+3x+1}{5x^2+2x+1}$ is

(b) 0 (b) 1

(c) $\frac{9}{5}$ (d) $\frac{1}{3}$

Q.9) If f(x) = $\sqrt{x}$ then f(4) = ?

(b) 1 (b) 2

(c) 4 (d) 0

Q.10) If f(x) = $tanx$ then f($\frac{\pi}{4}$) = ?

(b) 1 (b) 4

(c) ∞ (d) 0

Part-II

Match the following

(A) $\lim_{x\to\infty} \frac{2x+1}{x}$ (i) $loga$

(B) $\lim_{x\to0} \frac{a^x-1}{x}$ (ii) 1

(C) $\lim_{x\to0} cosx$ (iii) 2

(D) $\lim_{x\to\infty} \{1+\frac{1}{x}\}^{5x}$ (iv) 3

(E) $\lim_{x\to0} \frac{e^{3x}-1}{x}$ (v) 5

Part-III

Q.1) if f($\boldsymbol{x}$) = x^2+1 , then find the value of f(a) - f(b)

Q.2) if f($\boldsymbol{x}$) = $\frac{1-x^2}{1+x^2}$, then prove that f(2) = $\frac{-3}{5}$

Q.3) if f($\boldsymbol{x}$) = $x^2 - \frac{1}{x^2}$, then prove that f(x) + f($\frac{1}{x}$) = 0

Q.4) Find the value of $\lim_{x\to 0} \frac{sin5x}{x}$

Q.5) Find the value of $\lim_{x\to 3} \frac{(x^2-9)}{(x-3)}$

Q.6) if f(x) = $x^2 - 9$, then find the value of f(-3)

Q.7) Find the value of $\lim_{\theta\to\pi} \frac{1+\cos\theta}{\sin^2\theta}$

Q.8) Find the value of $\lim_{x\to 0} \frac{tanax}{x}$

Q.9) Prove that $\lim_{x\to\infty} \frac{x+1}{x} = 1$

Q.10) Find the value of $\lim_{x\to 0} 7x^2 - 5x + 1$

Part-IV

Q.1) Find the value of $\lim_{x\to 0} \frac{Sinax}{Sinbx}$

Q.2) Find the value of $\lim_{x\to a} \frac{(x^2-a^2)}{(x-a)}$

Q.3) Find the value of $\lim_{x\to 0} \frac{(x-x^3)}{x}$

Q.4) Find the value of $\lim_{x\to 0} \frac{a^x-1}{b^x-1}$

Q.5) Find the value of $\lim_{x\to\infty} \frac{(3\,x^3\text{ -1})}{x^3}$

Q.6) Find the value of $\lim_{x\to 0} \frac{Sin3x}{5x}$

Q.7) Find the value of $\lim_{x\to 0} \frac{e^x-1}{sinx}$

Q.8) Find the value of $\lim_{x\to 0} \frac{Secx-1}{\tan^2 x}$

Q.9) Find the value of $\lim_{x\to 0} \frac{Sinax}{tanbx}$

Q.10) if f(x) = $x^2 - 1$, then find the value of f$(secx)$

Q.11) if f(x) = $sin^2x - 1$, then find the value of f$(\frac{\pi}{2})$

Part-V

Q.1) Find the value of $\lim_{x\to 2} \frac{\sin\pi x}{x-2}$

Q.2) Find the value of $\lim_{x\to 0} \frac{e^{x}-e^{-x}}{x}$

Q.3) Find the value of $\lim_{x\to 0} \frac{1-\cos x}{x^{2}}$

Q.4) Find the value of $\lim_{p\to 0} \frac{e^{-mp}-e^{-np}}{p}$

Q.5) Find the value of $\lim_{n\to 0} \frac{\sqrt{x+n}\ -\sqrt{x}}{n}$

Q.6) Find the value of $\lim_{p\to 0} \frac{\sqrt{4+p}\ -\sqrt{4-p}}{p}$

Q.7) Find the value of $\lim_{x\to \infty} \frac{16x^{2}+3x+1}{4x^{2}+2x+1}$

Q.8) Find the value of $\lim_{x\to 1} \frac{(x^{4}\text{ -1})}{(x^{2}-1)}$

Q.9) Find the value of $\lim_{x\to 1} \frac{(x^{3}\text{ -1})}{(x^{2}-1)}$

Q.10) if $f(x) = x^{3} - \frac{1}{x^{2}}$, then find the value of $f(x) + f(\frac{1}{x})$

Q.11) if $f(x) = 3\ sinx$ and $\varphi(x) = \cos^{2} x$, then find the value of $f(\frac{\pi}{6}) + \varphi(\frac{\pi}{6})$

Q.12) if $f(x) = \frac{1-x^{2}}{1+x^{2}}$, then prove that $f(\tan\theta) = \cos 2\theta$

Q.13) if $f(x) = \frac{2x}{1+x^{2}}$, then prove that $f(\tan\theta) = \sin 2\theta$

Unit – 2 Differentiation

Question Bank

Part –I

Q.1) $\frac{d}{dx}\log\sin x$ is equal to

(a) $\tan x$ (b) $\cot x$ (c) $\sec x$ (d) $\operatorname{cosec} x$

Q.2)) $\frac{d}{dx}\log\cos x$ is equal to

(a) - $\tan x$ (b) $\cot x$ (c) $\sec x$ (d) $\tan x$

Q.3) $\frac{d}{dx}\log\tan x$ is equal to

(a) - 2tan2x (b) 2cot2x (c) 2cosec2x (d) 2sec2x

Q.4) $\frac{d}{dx}\sin^{-1}x$ is equal to

(a) $\frac{1}{\sqrt{1-x^2}}$ (b) - $\frac{1}{\sqrt{1-x^2}}$ (c) $\frac{1}{\sqrt{1+x^2}}$ (d) - $\frac{1}{\sqrt{1+x^2}}$

Q.5 $\frac{d}{dx}a^x$ =

(a) a^x (b) 0 (c) xa^x (d) $a^x \log_e a$

Q.6) $\frac{d}{dx}\sqrt{x}$ =

(a) $x^{3/2}$ (b) $\frac{1}{2}x^{-1/2}$ (c) $-\frac{1}{2}x^{-1/2}$ (d) $\frac{1}{2}x^{3/2}$

Q.7) $\frac{d}{dx}\frac{1}{\sqrt{x}}$ =

(a) $\frac{1}{2}x^{-1/2}$ (b) $-\frac{1}{2}x^{1/2}$ (c) $\frac{1}{2}x^{3/2}$ (d) - $\frac{1}{2}x^{-3/2}$

Q.8) $\frac{d}{dx}10^x$ =

(a) 10^x (b) 0 (c) $x10^x$ (d) $10^x \log_e 10$

Q.9) $\frac{d}{dx}\tan^{-1}x$ =

(a) $\frac{1}{1+x^2}$ (b) - $\frac{1}{1+x^2}$ (c) $\frac{1}{\sqrt{1+x^2}}$ (d) - $\frac{1}{\sqrt{1+x^2}}$

Q.10) $\frac{d}{dx}\sqrt{\cot x}$ =

(a) - $\frac{cosec^2 x}{2\sqrt{\cot x}}$ (b) $\frac{cosec^2 x}{2\sqrt{\cot x}}$ (c) $\frac{cosec^2 x}{2\sqrt{\tan x}}$ (d) $\frac{cos^2 x}{2\sqrt{\cot x}}$

Part B

Q.1) **Match the column**.

(A) $\frac{d}{dx}e^x$	(a) $\sec^2 x$
(B) $\frac{d}{dx}\tan x$	(b) – $\operatorname{cosec}^2 x$
(C) $\frac{d}{dx}\cot x$	(c) $\frac{1}{x}$
(D) $\frac{d}{dx}\sec x$	(d) e^x
(E) $\frac{d}{dx}\log_e x$	(e) $\sec x \tan x\, x^2$

Q.2) **Match the column.**

(A) $\frac{d}{dx}\, e^{3x}$

(B) $\frac{d}{dx} \sin \log_e x$

(C) $\frac{d}{dx} \sin e^x$

(D) $\frac{d}{dx} \sec^{-1} x$

(E) $\frac{d}{dx} (\log_e x)^2$

(a) $\frac{\cos \log_e x}{x}$

(b) $e^x \cos e^x$

(c) $\frac{2\log_e x}{x}$

(d) $3e^{3x}$

(e) $\frac{1}{x\sqrt{x^2-1}}$

Part 3

Q.1 .If y = xe^x then find $\frac{dy}{dx}$.

Q.2. If y = $\frac{e^x}{sinx}$ then find $\frac{dy}{dx}$.

Q.3. If y = $\frac{e^x}{\log_e x}$ then find $\frac{dy}{dx}$.

Q.4. If y = $\sin x \,.\, e^x$ then find $\frac{dy}{dx}$.

Q.5. If y = $\frac{\sin x}{\log_e x}$ then find $\frac{dy}{dx}$.

Q.6. If y = $\text{cosec}\, x + 5^x$ then find $\frac{dy}{dx}$.

Q.7 If y = $cos^2 x$ then find $\frac{dy}{dx}$.

Q.8 If y = $\cos(\cos x)$ then find $\frac{dy}{dx}$.

Q.9 If y = $e^{x \log_e x}$ then find $\frac{dy}{dx}$.

Q.10 If y = $\log_e(\log_e \sin x)$ then find $\frac{dy}{dx}$.

Q.11 If y = $x^7 . \log_e x$ then find $\frac{dy}{dx}$.

Q.12 If y = $e^x . \log_e x$ then find $\frac{dy}{dx}$.

Q.13 If y = $x^5 . \cos x$ then find $\frac{dy}{dx}$.

Q.14 If y = $x^8 + 2 \sin x + e^x - 3 \log_e x + 7$ then find $\frac{dy}{dx}$.

Part-4

Q.1 If $x^n + y^n = 0$ then find $\frac{dy}{dx}$.

Q.2 If y = $\log_e(\sec x + \tan x)$ then find $\frac{dy}{dx}$.

Q.3 If y = $\sqrt{\sin x + \sqrt{\sin x + \sqrt{\sin x + \sqrt{\sin x +}}}}$……$\infty$ then find $\frac{dy}{dx}$.

Q.4 If y = $e^{x+e^{x+e^{x+\cdots\cdots\cdots\cdots\cdots\infty}}}$ then find $\frac{dy}{dx}$.

Q.5 If y =$\frac{e^x + \sin x}{1+\log_e x}$ then find $\frac{dy}{dx}$.

Q.6 If y = $\frac{\sin x}{1+\cos x}$ then find $\frac{dy}{dx}$.

Q.7 If y = $\frac{1+\tan x}{1-\tan x}$ then find $\frac{dy}{dx}$.

Q.8 If y = xe^x then show that $\frac{1}{y}\frac{dy}{dx}$ = 1 + $\frac{1}{x}$.

Q.9 If y = $\frac{1+\log_e x}{1-\log_e x}$ then find $\frac{dy}{dx}$.

Q.10 If y = $\frac{a\sin x}{b+a\cos x}$ then find $\frac{dy}{dx}$.

Q.11 If y = $e^{\tan^{-1}(1+x^2)}$ then find $\frac{dy}{dx}$.

Q.12 If y = sin[$\log_e(1 + x^2)$] then find $\frac{dy}{dx}$.

Q.13 If y = $\frac{1+\cos x}{1-\cos x}$ then find $\frac{dy}{dx}$.

Q.14 If y = $\sqrt{\cos x + \sqrt{\cos x + \sqrt{\cos x + \sqrt{\cos x \ldots\ldots\ldots\ldots\ldots}}}}\infty$ then find $\frac{dy}{dx}$.

Q.15 If y = $\sqrt{\tan x + \sqrt{\tan x + \sqrt{\tan x + \sqrt{\tan x}}}}$ ……∞ then find $\frac{dy}{dx}$.

Q.16 If y = $\sqrt{e^x + \sqrt{e^x + \sqrt{e^x + \sqrt{e^x + \cdots \ldots\ldots\ldots}}}}\infty$ then find $\frac{dy}{dx}$.

Q.17 If y = $\sqrt{x+\sqrt{x+\sqrt{x+\sqrt{x+\cdots\ldots\ldots\ldots\ldots\ldots}}}}\infty$ then find $\frac{dy}{dx}$.

Part – 5

Q.1 Differentiate $\sin x$ using first principle of differentiation.

Q.2 Differentiate $\cos x$ using first principle of differentiation.

Q.3 Differentiate $\tan x$ using first principle of differentiation.

Q.4 Differentiate e^x using first principle of differentiation.

Q.5 If y = $(\sin x)^{(\sin x)^{(\sin x)^{(\sin x)\ldots\ldots\ldots\infty}}}$ then find $\frac{dy}{dx}$.

Q.6 If Y = $(\cos x)^{(\cos x)^{(\cos x)^{(\cos x)\ldots\ldots\ldots\ldots\ldots\infty}}}$ then find $\frac{dy}{dx}$.

Q.7 If y = $x^{x^{x^{x^{\ldots\ldots\ldots\ldots\ldots\infty}}}}$ then find $\frac{dy}{dx}$.

Q.8 If $x^y = y^x$ then find $\frac{dy}{dx}$.

Q.9 If y = $(\sin x)^{\tan x}$ then find $\frac{dy}{dx}$.

Q.10 If $x^y = e^{x-y}$ then prove that

$\frac{dy}{dx} = \frac{\log_e x}{(1+\log_e x)^2}$

Q.11 If y = $\frac{\log_e x}{x} + x^5 \sec x + 10^x$ then find $\frac{dy}{dx}$.

Unit-3 (Algebra)

Part-I

Q.1) Total number of terms in the expansion of $(x+y)^6$ is

(a) 7 (b) 5 (c) 12 (d) 0

Q.2) Total number of terms in the expansion of $(ax-by)^{11}$ is

(a) 13 (b) 24 (c) 12 (d) 0

Q.3) Which term is middle term in expansion of $(x+y)^6$:

(a) 4^{th} (b) 2^{nd} (c) 3^{rd} (d) No middle term

Q.4) Number of middle terms in expansion of $(x+y)^5$:

(a) 1 (b) 2 (c) 3 (d) No middle term

Q.5) Which term is middle terms in expansion of $(x+y)^7$:

(a) 4^{th} and 5^{th} (b) 2^{nd} and 3^{rd} (c) 3^{rd} and 4^{th} (d) No middle term

Q.6) The value of $(1+i)^2$ is

(a) 3i (b) i (c) 2i (d) 1+ i

Q.7) The value of i^4+i^2+1 is

(a) 1 (b) i (c) -i (d) -1

Q.8) Complex conjugate of $\frac{7}{8}+i$ is

(a) $-\frac{7}{8}+i$ (b) $\frac{7}{8}-i$ (c) $-\frac{7}{8}-i$ (d) None of these

Q.9) Modulus of complex number $1-i$ is

(a) $\sqrt{2}$ (b) $\sqrt{3}$ (c)$\sqrt{5}$ (d) None of these

Q.10) Argument of complex number $1+i$ is

(a) $45°$ (b) $30°$ (c) $60°$ (d) $90°$

Q.11) Total number of permutations of a,b are

(a)1 (b) 2 (c) 3 (d) 4

Q.12) Total number of permutations of 3 different objects are-

(a)3 (b) 6 (c) 12 (d) 9

Q.13) ${}^8C_5$ is equal to –

(a) ${}^8C_2$ (b) ${}^8C_1$ (c) ${}^8C_3$ (d) ${}^8P_3$

Q.14) If $\frac{2}{(x+1)(x-1)} = \frac{A}{x+1} + \frac{2}{x-1}$ then A=

(a) 1 (b) 2 (c) -2 (d) -1

Q.15) If $\frac{2}{(x+1)(x-1)} = \frac{A}{x+1} + \frac{B}{x-1}$ then A+B =

(a)1 (b) -1 (c) 2 (d) -2

Part-II

Q.1) Match the column

(1) Value of $1 + i + i^2 + i^3$ is	(1) $T_{r+1} = {}^nC_r x^{n-r} a^r$
(2) Value of i^{33} is	(2) 0
(3) $(\cos\theta + i \sin\theta)^n =$	(3) -1
(4) Value of i^{30} is	(4) $\cos(n\theta) + i \sin(n\theta)$
(5) Value of i^{32} is	(5) i
(6) General term in expansion of $(x + a)^n$ is	(6) 6
(7) Total number of terms in the expansion of $(ax + \frac{3}{4})^5$	(7) 1

Part-III

Q.1) Find the multiplicative inverse of $3 + 2i$

Q.2) Find the real values of x and y for $2x + (3x + y)i = 4 + 10i$

Q.3) Express $-2 + 2i$ into polar form.

Q.4) Find the modulus and arguments of $(1 + 5i)^2$

Q.5) Find the 4^{th} term in the expansion of $(x - 2)^4$

Q.6) Evaluate $(101)^4$ using binomial theorem.

Q.7) Expand $(x + 2)^5$ using binomial theorem.

Q.8) Evaluate $(9)^7$ using binomial theorem.

Q.9) Express $1+ i$ into trigonometric or polar form.

Q.10) If ${}^nC_{12} = {}^nC_8$, then find the value of ${}^{22}C_n$

Q.11) If ${}^nC_{15} = {}^nC_{10}$ then find the value of ${}^nC_{22}$

Q.12) If ${}^{12}C_n = {}^{12}C_{n-2,}$ then find the value of ${}^{10}C_{n+1}$

Q.13) If ${}^{10}C_r = {}^{10}C_{8,}$ then find the value of ${}^{5}C_r$

Q.14) Find the value of ${}^{12}C_{10}$ and ${}^{12}C_{2,}$

Q.15 Find all the permutations of a,b and c.

Q.16 Find the Value of ${}^{12}P_3$

Q.17) Find the Value of ${}^{10}P_2$

Part-IV

Q.1) Find the 4th term in the expansion of $\left(\frac{2x}{3} - \frac{3}{2x}\right)^6$

Q.2) Prove that $\left(\frac{1+i}{1-i}\right)^n = i^n$

Q.3) Prove that $(1+i)^4\left(1+\frac{1}{i}\right)^4 = 16$

Q.4) Prove that $\left(\frac{1}{1-i}\right)^2 - \left(\frac{1}{1+i}\right)^2 = i$

Q.5) If $a^2 + b^2 = 1$, then prove that $\frac{1+b+ia}{1+b-ia} = -b + ia$

Q.6) Expand $\left(\frac{x}{2} + \frac{2}{x}\right)^5$ using binomial theorem.

Q.7) Find the square root of $3 + 4i$

Q.8) Find the value of ${}^{5}C_2 + {}^{5}C_3$ ${}^{5}C_4 + {}^{5}C_5$

Q.9) Resolve the given fraction into partial fraction- $\frac{1}{(x+1)(x+2)}$

Q.10) Resolve the given fraction into partial fraction- $\frac{2x+1}{(x-1)(x+2)}$

Q.11) Resolve the given fraction into partial fraction- $\frac{9}{(x+1)(x+3)}$

Q.12) Resolve the given fraction into partial fraction- $\frac{x}{(x+1)(x-4))}$

Q.13) Resolve the given fraction into partial fraction- $\frac{2x}{(x-2)(x+2)}$

Q.14) By how many ways 3 or more chairs can be choose out of 5 chairs.

Q.15) Find the value of ${}^5C_1 + {}^5C_4$

Part-V

Q.1) Find the middle term in the expansion of $\left(x^2 - \frac{1}{x}\right)^6$

Q.2) Find the constant term in the expansion of $\left(2x + \frac{1}{2x^2}\right)^9$

Q.3) Find the middle term in the expansion of $\left(\frac{a}{x} + \frac{x}{a}\right)^{10}$

Q.4) Find the constant term in the expansion of $\left(x^2 + \frac{1}{x}\right)^6$

Q.5) Express $\frac{2+5i}{4+3i}$ into $a + bi$ form.

Q.6) Express $\frac{(1-5i)^2}{2+3i}$ into $a + bi$ form.

Q.7) Find the value of ${}^5C_1 + {}^5C_2 + {}^5C_3 + {}^5C_4 + {}^5C_5$

Q.8) Resolve the given fraction into partial fraction- $\frac{9}{(x+1)(x+2)(x-3)}$

Q.9) Resolve the given fraction into partial fraction- $\frac{x}{(x+1)(x^2-4))}$

Q.10) Resolve the given fraction into partial fraction- $\frac{2x}{(x^2-1)(x+2)}$

Q.11 Resolve the given fraction into partial fraction- $\frac{2x}{(x^2+5x+6)}$

DIPLOMA WING

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL (M.P.)

SEMESTER– I

COURSE TITLE: APPLIED PHYSICS–I

SUBJECT CODE : 102

PAPER CODE: 7351 THEORY

CREDIT: 03

Course Objectives:

Applied Physics includes the study of a large number of diverse topics all related to materials/things that exist in the world around us. It aims to give an understanding of this world both by observation and by prediction of the way in which such objects behave. Concrete use of physical principles and analysis in various fields of engineering and technology are given prominence in the course content. The course will help the diploma engineers to apply the basic concepts and principles to solve broad based engineering problems and to understand different technology based applications.

Teaching Approach:

- Teachers should give examples from daily routine as well as, engineering/technology applications on various concepts and principles in each topic so that students are able to understand and grasp these concepts and principles. In all contents, SI units should be followed.
- Use of demonstration can make the subject interesting and develop scientific temper in the students. Student activities should be planned on all the topics.
- Activity- Theory - Demonstrate/practice approach may be followed throughout the course so that learning may be outcome and employability based.

Course Content:

Unit 1: Units and Measurements

Physical quantities: fundamental and derived, Units and systems of units (FPS, CGS, MKS and SI units), Dimensions and dimensional formulae of physical quantities, Errors in measurements (systematic and random), absolute error, relative error, error propagation, error estimation and significant figures.

Scalar and Vector quantities – examples, representation of vector, types of vectors. Addition and Subtraction of Vectors, Triangle and Parallelogram law (Statement only), Scalar and Vector Product, Resolution of a Vector.

Unit 2: Force and Motion

Force, Momentum, Conservation of linear momentum its statement and applications, Impulse and its applications.

Friction: concept, types, laws of limiting friction, coefficient of friction, reducing friction and its engineering applications.

Circular motion, definition of angular displacement, angular velocity, angular acceleration, frequency, time-period, Relation between linear and angular velocity, linear acceleration and angular acceleration, Centripetal and Centrifugal forces with live examples, Expression and applications such as banking of roads and bending of cyclist.

Unit 3: Work, Energy, Power and Rotational Motion

Work: Concept and units, examples of zero, positive and negative work.

Energy and its units, kinetic energy, gravitational potential energy with examples and derivations, mechanical energy, conservation of mechanical energy for freely falling bodies, transformation of energy (examples). Power and its units, Calculation of power.

Translational and rotational motions with examples, Definition of torque and angular momentum and their examples, Conservation of angular momentum (quantitative) and its applications. Moment of inertia and its physical significance.

Unit 4: Properties of Matter

Elasticity: definition of stress and strain, moduli of elasticity, Hooke's law, significance of stress-strain curve

Surface tension: concept and unit. Cohesive and adhesive forces, Angle of contact, Ascent Formula (No derivation), Applications of surface tension, Effect of temperature and impurity on surface tension.

Viscosity and coefficient of viscosity, Terminal velocity, Stoke's law, effect of temperature on viscosity, stream line and turbulent flow, Reynold's number Equation of continuity, Bernoulli's Theorem (only statement) and its applications.

Unit 5: Heat and Thermometry

Concept of heat and temperature, Mercury thermometer, scales of temperature and their relationship, specific heat, modes of heat transfer (conduction, convection and radiation with examples), Co-efficient of thermal conductivity and its engineering applications. Expansion of solids, coefficient of linear, surface and cubical expansions and relation amongst them.

Learning Outcome:

After undergoing this subject, the student will be able to:

- Identify physical quantities, select their units for use in engineering solutions, and make measurements with accuracy by minimizing different types of errors.
- Represent physical quantities as scalar and vectors and solve real life relevant problems.
- Analyse type of motions and apply the formulation to understand banking of roads/railway tracks and conservation of momentum.
- Define scientific work, energy and power and their units. Drive relationships for work, energy and power and solve related problems.
- Describe forms of friction and methods to minimize friction between different surfaces.
- Identify various forms of energy, and energy transformations.
- Compare and relate physical properties associated with linear motion and rotational motion and apply conservation of angular momentum principle to known problems.

- Describe the phenomenon of surface tension, effects of temperature on surface tension and solve statics problems that involve surface tension related forces.
- Describe the viscosity of liquids, coefficient of viscosity and the various factors affecting its value. Determine viscosity of an unknown fluid using Stokes' Law and the terminal velocity.
- Define stress and strain. State Hooke's law and elastic limits, stress–strain diagram, deter- mine; (a) the modulus of elasticity, (b) the yield strength (c) the tensile strength, and (d) estimate the percent elongation.
- Illustrate the terms; heat and temperature, measure temperature in various processes on different scales (Celsius, Fahrenheit, and Kelvin etc.)
- Distinguish between conduction, convection and radiation; identify different methods for reducing heat losses and mode of heat transfer between bodies at different temperatures.
- State specific heats and measure the specific heat capacity of solids and liquids.

References:

1. Text Book of Physics for Class XI& XII (Part-I, Part-II); N.C.E.R.T., Delhi

2. Applied Physics, Vol. I and Vol. II, TTTI Publications, Tata McGraw Hill, Delhi.

3. Concepts in Physics by HC Verma, Vol. I & II, Bharti Bhawan Ltd. New Delhi

4. अनुप्रयुक्त भौतिकी - I, अमित जैन एवम इन्दर कुमार सिंह, संजय पब्लिकेशन्स, जयपुर

5. Practical Physics by C. L. Arora, S. Chand Publication.

6. e-books/e-tools/ learning physics software/websites etc.

APPLIED PHYSICS – I LAB

Course Objectives

Study of Applied Physics aims to give an understanding of physical world by observations and predictions. Concrete use of physical principles and analysis in various fields of engineering and technology is very prominence. The course aims to supplement the factual knowledge gained in the lecture by first hand manipulation of apparatus. This will develop scientific temper and help to apply the basic concepts and principles in solving engineering and technology based problems. In addition, students get necessary confidence in handling equipment and thus learn various skills in measurement.

List of Practical's/Activities (To perform minimum 8 practical's).

1. To find volume of given object by using a Vernier caliper.

2. To determine radius of a given wire by using a screw gauge.

3. To determine radius of curvature of a convex or concave mirror/surface using a spherometer.

4. To verify triangle law of forces.

5. To verify parallelogram law of forces.

6. To find the co-efficient of friction between wood and glass using a horizontal board.

7. To determine force constant of a spring using Hook's Law.

8. To find the viscosity of a given liquid (Glycerin) by Stoke's law.

9. To find the coefficient of linear expansion of the material of a rod.

10. To measure room temperature and temperature of a hot bath using mercury thermometer and convert it into different scales.

SUGGESTED STUDENT ACTIVITES & STRATEGIES

Apart from classroom and laboratory learning following are the suggested student related

activities which can be undertaken to accelerate the attainment of various outcomes of the course

a. Make survey of different physical products and compare the following points

- Measurements of dimensions
- Properties
- Applications

b. Library survey regarding engineering materials/products used in different industries

c. Seminar on any relevant topic.

Teachers should use the following strategies to achieve the various outcomes of the course.

- Different methods of teaching and media to be used to attain classroom attention.
- Massive open online courses (MOOCs) may be used to teach various topics/sub topics.
- 15-20% of the topics which are relatively simpler of descriptive in nature should be given to the students for self-learning and assess the development of competency through classroom presentations.
- Micro-projects may be given to group of students for hand-on experiences.

Learning Outcome:

After undergoing this lab work, the student will be able to:

- Select right kind of measuring tools (Meter scale, Vernier caliper, Screw gauge, Spherometer etc.) for determining dimensions of physical quantities and make measurements with accuracy and precision.
- Differentiate various shapes and determine dimensions of plane, curved and regular surfaces/bodies.
- Apply and Verify laws of forces and determine resultant force acting on a body.
- Appreciate role of friction and measure co-efficient of friction between different surfaces.
- Describe and verify Hook's law and determine force constant of spring body.
- Understand Stoke's law for viscous liquids and determine viscosity of a given liquid.
- Understand how materials expand on heating and determine linear expansion coefficient for a given material rod.
- Understand use of thermometers to measure temperature under different conditions and different scales of temperature measurements.

References:

1. Text Book of Physics for Class XI& XII (Part-I, Part-II); N.C.E.R.T., Delhi

2. Comprehensive Practical Physics, Vol, I & II, JN Jaiswal, Laxmi Publications (P)Ltd.,

3. Practical Physics by C. L. Arora, S. Chand Publication.

4. e-books/e-tools/ learning physics software/YouTube videos/websites

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL (M.P.)

SEMESTER – I

COURSE TITLE: APPLIED PHYSICS – I

SUBJECT CODE: 102

PAPER CODE: 7351

THEORY CREDIT: 03

BLUE PRINT OF QUESTION PAPER

UNIT NO.	UNIT NAME	MARKS WISE NO OF QUESTIONS				TOTAL MARKS
		2 MARKS (Multiple choice type question)	2 MARKS (Fill in the blanks or match the column or very short answer type question)	4 MARKS (Short answer type question)	6 MARKS (Long answer type question)	
1	UNITS & MEASUREMENTS	1	1	1	1	**14**
2	FORCE AND MOTION	1	1	1	1	**14**
3	WORK, ENERGY, POWER & ROTATIONAL MOTION	1	1	1	1	**14**
4	PROPERTIES OF MATTER	1	1	1	1	**14**
5	HEAT AND THRMOMETRY	1	1	1	1	**14**
TOTAL MARKS		**10**	**10**	**20**	**30**	**70**

Guidelines for Question Paper Design:

1. The question paper should be prepared on the basis of the blueprint.
2. The question paper should carry 70 marks and be of 3 hours duration.
3. Each unit is given equal weightage (14 marks for each unit).
4. There should be a total of six questions. All are compulsory for students to attempt.
5. Question no. 1 should be of multiple-choice type and carry 10 marks. It has 5 sub-questions (one from each unit). Each sub-question is of 02 marks.
6. Other questions (from question no. 02 to question no.06), one from each unit, has three sub-questions like (a), (b) and (c).
7. Sub-question (a) has 2 marks. It can be of fill-in-the-blanks / match-the column / very short answer (VSA) type question. This question should be of cognitive type only.
8. Sub-questions (b) and (c) have 4 and 6 marks respectively. Sub-questions (b) should be of short answer (SA) type and Sub-questions (c) should be of long answer (LA) type. **Internal choices should be given to these sub-questions.**
9. Numerical questions can be asked only of 2 and 4 marks. Numerical questions can not be asked more than 10 marks.
10. Questions which are based on the same concept, law, fact etc. should not be repeated under different forms like MCQ. VSA, SA, LA.

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL (M.P.)

SEMESTER – I

MODEL QUESTION PAPER : APPLIED PHYSICS –I

SUBJECT CODE: 102 **PAPER CODE: 7351**

TIME: 3 hours **MAXIMUM MARKS: 70**

NOTE: (1) All questions are compulsory. Question no. 1 is of multiple choice type.
सभी प्रश्न अनिवार्य हैं। प्रश्न क्रमांक 1 बहुविकल्पीय प्रकार का है।

(2) Internal choices are given in 4 marks and 6 marks questions.
4 अंक तथा 6 अंक वाले प्रश्नों में आन्तरिक विकल्प दिए गए हैं।

(3) In case of any doubt or dispute, the English version question should be treated as final.
किसी भी संदेह अथवा विवाद की स्थिति में अंग्रेजी भाषा के प्रश्न को अन्तिम माना जायेगा।

Q.1 Choose the correct answer:
सही उत्तर का चयन कीजिए : **2x5 marks**

(i) 'light year' is the unit of -
(a) Time (b) Distance (c) Light (d) None of these

'प्रकाश वर्ष' मात्रक है -
(a) समय (b) दूरी (c) प्रकाश (d) इनमें से कोई नहीं

(ii) Friction between two surfaces depends on -
(a) Size of surface (b) Area of surface
(c) Shape of surface (d) Roughness of surface

दो सतहों के मध्य लगने वाला घर्षण निर्भर करता है -
(a) सतह के आकार पर (b) सतह के क्षेत्रफल पर
(c) सतह की आकृति पर (d) सतह के खुरदुरेपन पर

(iii) Which of the following is not a unit of energy?
(a) calorie (b) joule (c) electron-volt (d) watt

निम्न में से कौन सा मात्रक ऊर्जा का मात्रक नहीं है?
(a) कैलोरी (b) जूल (c) इलेक्ट्रॉन-वोल्ट (d) वाट

(iv) Rain drops are spherical in shape. It is due to -
(a) Viscosity (b) Surface tension (c) Gravity (d) Pressure

वर्षा की बूँदें गोल होती हैं। इसका कारण है -

(a) श्यानता (b) पृष्ठ तनाव (c) गुरुत्वाकर्षण (d) दाब

(v) Heat transfer in solids takes place by -

(a) Conduction (b) Convection

(c) Radiation (d) All of the above

ठोस पदार्थों में ऊष्मा स्थानान्तरण होता है -

(a) चालन द्वारा (b) संवहन द्वारा

(c) विकिरण द्वारा (d) उपरोक्त सभी के द्वारा

Q.2 a) Fill in the blank: 1x**2 marks**

(i) Total number of significant figures in 0.0050 m are ……

(ii) 1 nanometre = ……. metre.

रिक्त स्थान भरें:

(i) 0.0050 मीटर में सार्थक अंकों की कुल संख्या …… है

(ii) 1 नैनोमीटर = ……. मीटर

b) Define negative vector and unit vector. **4 marks**

ऋण सदिश तथा इकाई सदिश को परिभाषित कीजिए।

OR (अथवा)

If error in the measurement of side of a cube is 5% then calculate the percentage error in its volume.

यदि किसी घन की भुजा के मापन में 5% की त्रुटि होती है तो उसके आयतन में त्रुटि की गणना कीजिए।

c) Describe SI system of units. Write its merits. **6 marks**

मात्रकों की SI पद्धति का वर्णन करते हुए इसकी विशेषतायें लिखिए।

OR (अथवा)

What do you mean by error in measurement. Explain the types of error in brief.

मापन में त्रुटि से क्या तात्पर्य है? विभिन्न प्रकार की त्रुटियों का संक्षिप्त वर्णन कीजिए।

Q.3 a) A particle is moving along a circular path of radius 50 m. Calculate its angular speed if it makes 7 revolutions per second. **2 marks**

एक कण 50 m त्रिज्या के वृत्तीय मार्ग पर प्रति सेकण्ड 7 चक्कर लगा रहा है। कण की कोणीय चाल ज्ञात कीजिए।

b) What is limiting friction? Write its laws. **4 marks**

सीमान्त घर्षण क्या है? इसके नियम लिखिए।

OR (अथवा)

Define force and momentum.

बल तथा संवेग को परिभाषित कीजिए।

c) Define centripetal acceleration and obtain an expression of it. **6 marks**

अभिकेन्द्र त्वरण को परिभाषित करते हुए इसका व्यंजक प्राप्त कीजिये।

OR (अथवा)

Deduce an expression for the maximum safe speed of a car on a banked circular road.
वृत्ताकार बंकित सड़क पर किसी कार की अधिकतम सुरक्षित चाल के लिए सूत्र प्राप्त कीजिए।

Q.4 a) Arrange in proper pairs - **2 marks**

(i) Work	(a) watt-second
(ii) Energy	(b) kilogram-metre^2
(iii) Angular momentum	(c) newton-metre
(iv) Moment of inertia	(d) joule-second

सही जोडियाँ बनाइये -

(i) कार्य	(a) वाट-सेकण्ड
(ii) ऊर्जा	(b) किलोग्राम-मीटर^2
(iii) कोणीय संवेग	(c) न्यूटन-मीटर
(iv) जड़त्व आघूर्ण	(d) जूल-सेकण्ड

b) Explain positive, negative and zero work with one example of each. **4 marks**
धनात्मक, ऋणात्मक तथा शून्य कार्य को एक-एक उदाहरण सहित समझाइये।

OR (अथवा)

The power of a pump is 1 kW. How much water can this pump lift to a height of 50 m in I hour?
एक पम्प की शक्ति 1 kW है। यह पम्प 1 घंटे में कितना पानी 50 m की ऊँचाई तक उठा पायेगा?

c) Define kinetic energy and drive a formula of it. **6 marks**
गतिज ऊर्जा को परिभाषित करते हुए इसका सूत्र प्राप्त कीजिए।

OR (अथवा)

Define moment of inertia and explain its significance with an example.
जड़त्व आघूर्ण को परिभाषित करते हुए इसका महत्त्व एक उदाहरण सहित समझाइये।

Q.5 a) What is the effect of temperature on the viscosity of liquid? **2 marks**
द्रव की श्यानता पर ताप का क्या प्रभाव होता है?

b) Explain why Steel is more elastic than rubber. **4 marks**
रबर की तुलना में स्टील अधिक प्रत्यास्थ क्यों होती है ? समझाइये।

OR (अथवा)

Define angle of contact. Write the factors on which it depends.
स्पर्श कोण को परिभाषित कीजिए। इसका मान किन-किन कारकों पर निर्भर करता है?

c) What do you understand by terminal velocity. Obtain an expression for it. **6 marks**
सीमान्त वेग से क्या तात्पर्य है? इसके लिए सूत्र प्राप्त कीजिए।

OR (अथवा)

State Bernoulli's Theorem and explain magnus effect.
बरनौली प्रमेय का कथन लिखिए तथा मैगनस प्रभाव को समझाइये।

Q.6 a) Temperature of an object on Celsius scale is 70^{0}. What would be its temperature on Fahrenheit scale? **2 marks**

किसी वस्तु का सेल्सियस स्केल पर ताप 70^{0} है। फाह्रेनहाइट स्केल पर इसका ताप क्या होगा?

b) Define specific heat. Write a daily life use of specific heat of water. **4 marks**

विशिष्ट ऊष्मा को परिभाषित कीजिए। जल की विशिष्ट ऊष्मा का दैनिक जीवन में कोई एक उपयोग बताइए।

OR (अथवा)

Differentiate between heat and temperature.

ऊष्मा तथा ताप में अन्तर स्पष्ट कीजिए।

c) What is heat conduction? Explain the coefficient of thermal conductivity. **6 marks**

ऊष्मा चालन क्या है? ऊष्मा चालकता गुणांक को समझाइये।

OR (अथवा)

Define coefficients of linear and surface expansion of solid. Establish relation between them.

ठोस के रेखीय तथा क्षेत्रीय प्रसार गुणांकों को परिभाषित करते हुए उनमें सम्बन्ध प्राप्त कीजिए।

DIPLOMA WING
RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

SEMESTER I–GROUP'A'

COURSE TITLE	:	APPLIED CHEMISTRY
PAPER CODE	:	7352
SUBJECT CODE	:	103
TREORY CREDITS	:	04
PRACTICAL CREDITS	:	02

Course Objectives:

There are numerous number materials are used in fabricating and manufacturing devices for the comfort of life. The selection, characterization and suitability assessment of natural raw materials essentially requires principles and concepts of Applied Chemistry for technicians. On successful completion of this course content will enable technicians to understand, ascertain and analyse and properties of natural raw materials require for producing economical and eco-friendly finished products.

- Solve various engineering problems applying the basic knowledge of atomic structure and chemical bonding.
- Use relevant water treatment method to solve domestic and industrial problems.
- Solve the engineering problems using knowledge of engineering materials and properties.
- Use relevant fuel and lubricants for domestic and industrial applications.
- Solve the engineering problems using concept of Electrochemistry and corrosion.

Course Content:

Unit1: Atomic Structure, Chemical Bonding and Solutions

Rutherford model of atom, Bohr's theory(expression of energy and radius to be omitted), orbital concept. Shapes of s, p and d orbitals, Pauli's exclusion principle, Hund's rule of maximum multiplicity Aufbau rule, electronic configuration upto atomic number 30

Concept of chemical bonding – cause of chemical bonding, types of bonds: ionic bonding (NaCl example), covalent bond(H_2,F_2,HF hybridization in $BeCl_2$,BF_3,CH_4,NH_3,H_2O),coor-dination bond in NH_4

Solution – idea of solute, solvent and solution, methods to express the concentration of solution molarity (*M*= mole per liter), ppm,

Unit2: Water

Graphical presentation of water distribution on Earth(pie or bar diagram).Classification of soft and hard water based on soap test ,salts causing water hardness, unit of hardness and simple numerical on water hardness.

Cause of poor lathering of soap in hard water, problems caused by the use of hard water in boiler (scale and sludge, foaming and priming, corrosion etc), and quantitative measurement of water hardness by ETDA method, total dissolved solids (TDS) alkalinity estimation.

i. Water softening techniques– soda lime process, zeolite process and ion exchange process.

ii. Municipal water treatment (in brief only) – sedimentation, coagulation, filtration, ster-ilization.

Unit3: Engineering Materials

Brief account of general principles of metallurgy.

Extraction of-iron from haematite ore using blast furnace ,

Alloys – definition, purposes of alloying, ferrous alloys and non-ferrous with suitable examples, properties and applications.

General chemical composition, composition based applications (elementary idea only details omitted):

Portland cement and hardening and setting of cement.

Polymers–monomer, homo and copolymers, degree of polymerization, simple reactions involved in preparation and their application of thermoplastics and thermosetting plastics (using PVC, PS, nylon-6,6 and Bakelite), rubber and vulcanization of rubber.

Unit4: Chemistry of Fuels and Lubricants

Definition of fuel and combustion of fuel, classification of fuels, calorific values (HCV and LCV)

Proximate analysis of coal solid fuel.

Petrol and diesel-fuel rating(octane and cetane numbers),

Chemical composition, calorific values and applications of LPG, CNG, water gas, coal gas, producer gas and biogas.

Lubrication– function and characteristic properties of good lubricant, classification with examples, physical properties (viscosity and viscosity index, oiliness, flash and fire point, could and pour point only)

Unit5: Electro Chemistry

Electronic concept of oxidation, reduction and redox reactions.
Definition of terms: electrolytes, non-electrolytes with suitable examples, Faradays laws of electrolysis.
Industrial Application of Electrolysis–

- Electrometallurgy.
- Electroplating
- Electrolytic refining.
- Introduction to Corrosion of metals –
  Definition, types of corrosion (chemical and electrochemical), factors affecting rate of corrosion.

Corrosion preventive measures–
Surface coatings and Organic inhibitors.

Suggested Sessional Work:

Unit1: Atomic Structure, Chemical Bonding and Solutions

Assignments: Writing electronic configuration of elements up to atomic number 30 (Z= 30). Numerical on molarity, ppm,

Projects: Model of molecules $BeCl_2$, BF_3,CH_4, NH_3, H_2O.

Unit2: Water

Assignments: Simple problems on hardness calculation.

Seminar:1. Quality and quantity requirement of water in house and industry.

Projects: Collect water samples from different water sources and measure of hardness of water.

Unit3: Engineering Materials

Assignments: Preparation of table showing different ores of iron metals along with their chemical compositions

Seminar: Discuss the chemical reactions taking place in blast furnace in extraction of Fe

Projects: Make table showing place of availability of some important ores(Iron, Aluminium and Copper) in India and show places on India map.

Unit4: Chemistry of Fuels and Lubricants

Seminar: Chemical structure of fuel components influence on fuel rating.

Projects: Mapping of energy resources in India. Collection of data of various lubricants available in the market.

Unit5: Electro Chemistry

Assignments: Simple problems on Faradays laws of electrolysis

Learning Outcomes

At the end of the course student will be able to

1. Understand the classification and general properties of engineering materials such as metal, alloys, and cement using knowledge of chemical bonding.
2. Understand and assess the suitability of water source for domestic and industrial application, effluents and minimize water pollution.
3. Qualitatively analyze the engineering materials and understand their properties and applications.
4. Choose fuel and lubricants suitable for economical industrial processing to obtain eco-friendly finished products.
5. Ascertain construction, mechanism efficiency of electrochemical cells,
6. Understand corrosion and develop economical prevention technique.

References/ Suggested Learning Resources:

(a) Books:

1) Text Book of Chemistry for Class XI& XII (Part-I, Part-II); N.C.E.R.T. Delhi 2017-18.
2) Agarwal & Shikha Engineering Chemistry, Cambridge University Press New Delhi 2015.
3) C. N. R. Rao, Understanding Chemistry, Universities Press (India)Pvt.Ltd.,2011.
4) Dara S. S. & Dr. S. S. Umare, Engineering Chemistry, S. Chand Publication, New Delhi, New Delhi, 2015.
5) Jain & Jain, Engineering Chemistry, Dhanpat Rai and Sons; New Delhi 2015.
6) Dr. Vairam S., Engineering Chemistry, Wiley India Pvt. Ltd., New Delhi 2013.
7) Dr. G. H. Hugar & Prof A. N. Pathak, Applied Chemistry Laboratory Practices, Vol. I and Vol. II, NITTTR, Chandigarh, Publications, 2013-14.
8) Agnihotri Rajesh, Chemistry for Engineers, Wiley India Pvt. Ltd. 2014.

(b) Open source software and website address:

1 www.chemguide.co.uk/atommenu.html(Atomicstructureandchemicalbonding)
2 www.visionlearning.com(Atomicstructureandchemicalbonding)
3 www.chem1.com(Atomicstructureandchemicalbonding)
4 https://www.wastewaterelearning.com/elearning/(WaterTreatment)
5 www.capital-refractories.com(Metals,Alloys,Cement,andRefractoryMaterials)
6 www.em-ea.org/guide%20books/book-2/2.1%20fuels%20and%20combustion.pdf
7 www.chemcollective.org(Metals,Alloys)

APPLIED CHEMISTRY LAB

Course Objectives:

There are numerous number of materials used in fabricating and manufacturing devices for the comfort of life. The selection, characterization and suitability assessment of natural raw materials essentially requires principles and concepts of Applied Chemistry for technicians. The course aims to supplement the factual knowledge gained in the lectures by first hand manipulation of processes and apparatus. This will develop scientific temper and help to apply the basic concepts and principles in solving engineering problems.

LIST OF PRACTICALS:

Perform any 6 (six) Laboratory Practicals atleast two from each type

Volumetric and Gravimetric analysis:

1. Preparation of standard solution of oxalic acid or potassium permanganate.
2. To determine strength of given sodium hydroxide solution by titrating against standard oxalic acid solution using phenolphthalein indicator.
3. Standardization of $KMnO_4$ solution using standard oxalic acid and Determine the percentage of iron present in given Hematite ore by $KMnO_4$ solution.
4. Volumetric estimation of
    a) Total hardness of given water sample using standard EDTA solution.
    b) Alkalinity of given water sample using 0.01M sulphuric acid
5. Proximate analysis of coal
    a) Gravimetric estimation moisture in given coal sample
    b) Gravimetric estimation ash in given coal sample

Instrumental analysis

6. Determine the conductivity of given water sample.
7. Determination of the Iron content in given cement sample using colorimeter.
8. Determination of viscosity of lubricating oil using Redwood viscometer.
9. Determination of flash and fire point of lubricating oil using Able's flash point apparatus.
10. To verify the first law of electrolysis of copper sulfate using copper electrode.

Teacher should use the following strategies to achieve the various outcomes of the course.

- Different methods of teaching and media to be used to attain classroom attention.
- Massive open online courses (MOOCs) may be used to teach various topics / subtopics.
- 15-20% of the topics which are relatively simpler of descriptive in nature should be given to the students for self-learning and assess the development of competency through classroom presentations.
- Micro-projects may be given to group of students for hand-on experiences.
- Encouraging students to visit to sites such as Railway station and research establishment around the institution.

Learning Outcomes:

At the end of the course student will be able to

- To express quantitative measurements accurately.
- To practice and adapt good measuring techniques.
- To use various apparatus for precise measurements.
- To understand and differentiate different methods of quantitative analysis.
- To know and understand principles of quantitative analysis using instruments.
- To understand and appreciate methods of corrosion abetments.

Reference Books:

1. TextBookofChemistryforClassXI&XII(Part-I,Part-II);N.C.E.R.T.,Delhi,2017-18.
2. Dr. G. H. Hugar and Prof A. N. Pathak, Applied Chemistry Laboratory Practices, Vol. I and Vol. II,NITTTR, Chandigarh, Publications, 2013-14.
3. Agnihotri, Rajesh, Chemistry for Engineers, Wiley IndiaPvt.Ltd.,2014.
4. Jain& Jain, Engineering Chemistry, Dhanpat Rai and Sons;NewDelhi,2015.

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RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL (M.P.)

SEMESTER – I

COURSE TITLE: APPLIED CHEMISTRY

SUBJECT CODE: 103

PAPER CODE: 7352

THEORY CREDIT: 04

BLUE PRINT OF QUESTION PAPER

UNIT NO.	UNIT NAME	MARKS WISE NO OF QUESTIONS				TOTAL MARKS
		2 MARKS (Multiple choice type question)	2 MARKS (Fill in the blanks or match the column or very short answer type question)	4 MARKS (Short answer type question)	6 MARKS (Long answer type question)	
1	**Atomic Structure, Chemical Bonding and Solutions**	1	1	1	1	**14**
2	**Water**	1	1	1	1	**14**
3	**Engineering Materials**	1	1	1	1	**14**
4	**Chemistry of Fuels and Lubricants**	1	1	1	1	**14**
5	**Electro Chemistry**	1	1	1	1	**14**
TOTAL MARKS		**10**	**10**	**20**	**30**	**70**

Guidelines for Question Paper Design:

1. The question paper should be prepared on the basis of the blueprint.
2. The question paper should carry 70 marks and be of 3 hours duration.
3. Each unit is given equal weightage (14 marks for each unit).
4. There should be a total of seven questions. All are compulsory for students to attempt.
5. Question no. 1 should be of multiple-choice type and carry 10 marks. It has 5 sub-questions (one from each unit). Each sub-question is of 02 marks.
6. Question no. 2 should be fill-in-the-blanks / match-the column / very short answer (VSA) type question. and carry 10 marks. It has 5 sub-questions (one from each unit). Each sub-question is of 02 marks.
7. Other questions (from question no. 03 to question no.07), one from each unit, has two sub-questions like (a), and (b).
8. Sub-questions (a) and (b) have 4 and 6 marks respectively. Sub-questions (a) should be of short answer (SA) type and Sub-questions (b) should be of long answer (LA) type. **Internal choices should be given to these subquestions.**
9. Numerical questions can be asked only of 2 and 4 marks. Numerical questions can not be asked more than 6 marks.
10. Questions which are based on the same concept, law, fact etc. should not be repeated under different forms like MCQ. VSA, SA, LA.

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL (M.P.)

SEMESTER – I

MODEL QUESTION PAPER : APPLIED CHEMISTRY

SUBJECT CODE: 103 **PAPER CODE: 7352**

TIME: 3 hours **MAXIMUM MARKS: 70**

NOTE: (1) All questions are compulsory. Question no. 1 is of multiple choice type.

सभी प्रश्न अनियार्य है। प्रश्न क्रमांक 1 बहुविकल्पीय प्रकार का है।

(2) **Internal choices are given in 4 marks and 6 marks questions.**

4 अंक तथा 6 अंक वाले प्रश्नों भें आतंरिक विकल्प दिए गए हैं।

(3) **In case of any doubt or dispute, the English version question should be treated as final.**

किसी भी संदेह अथवा विवाद की स्थिति में अंग्रेज़ी भाषा के प्रश्न को अंतिम माना जायेगा ।

Q.1 Choose the correct answer:

सही उत्तर का चयन कीजिये | 2x5 marks

i) Gradual cooling of glass products is called :

(a) Tempering

(b) Annealing

(c) Quenching

(d) Galvanising

काँच की वस्तुओं को धीरे-धीरे ठंडा करने को कहते हैं:

(अ) टेम्परिंग

(ब) तापानुशीलन

(स) क्वेंचिंग

(द) गेल्वेनीकरण

(ii) Temporary hardness is caused by:

(a) Bicarbonates of Ca and Mg

(b) Carbonates of Ca and Mg

(c) chlorides of Ca and Mg

(d) Nitrates of Ba and Zn

अस्थाई कठोरता का कारण है :

(अ) कैल्सियम और मैग्नीशियम के बाईकार्बोनेट

(ब) कैल्सियम और मैग्नीशियम के कार्बोनेट

(स) कैल्सियम और मैग्नीशियम के सल्फेट

(द) बेरियम और जिंक के क्लोराइड

(iii) The alloy used in construction of Air bus and aeroplanes is

(a) Magnalium
(b) Duralumin
(c) Y-alloy
(d) Aluminium Bronze

एयरबस एवं वायुमान बनाने में उपयोग में लाई जाने वाली मिश्रधातु है

(अ) मैग्नेलियम

(ब) ड्युरेल्युमिन

(स) Y-मिश्रधातु

(द) एल्यूमीनियम कांस्य

(iv) which type of bond/bonds present in NH_4Cl –

(a) Ionic bond
(b) Covalent Bond
(c) Co-ordinate bond
(d) all of the above

NH_4Cl में किस तरह का/ के आबंधन है -

(अ) आयनिक बंध

(ब) सहसंयोजी बंध

(स) उप सहसंयोजी बंध

(द) उपरोक्त सभी

(v) At 25 C pH value of pure water is:

(a)1
(b) 6
(c) 7
(d) 14

25 C पर जल का pH मान होगा :

(अ) 1

(ब) 6

(स) 7

(द) **14**

Q.2 (a) Arrange in proper pairs **4 marks**

(i)	soda lime process	(a) hematite
(ii)	zeolite process	(b) bauxite
(iii)	Iron ore	(c) sodium carbonate
(iv)	Aluminium ore	(d) sodium aluminosilicate

सही जोडिया बनाइए

(i) अम्लीय उच्चतापसह पदार्थ (a) हीमेटाईट

(ii) क्षारीय उच्चतापसह पदार्थ (b) बॉक्साइट

(iii) लोह अयस्क (c) सोडियम कार्बोनेट

(iv) एल्युमीनियम अयस्क (d) सोडियम एल्युमिनो सिलिकेट

(b) write electronic configuration of calcium (20) 2 **marks**

कैल्सियम (20) का इलेक्ट्रोनिक विन्यास लिखिए

(c) define calorific values 2 **marks**

उष्मीय मान को परिभाषित कीजिये

(d) rusting is a example of …….. 2 **marks**

लोहे पर जंग लगना ..... का उदाहरण है

3 (a) Describe the Rutherford Scattering Experiment and atomic model with its drawback **6 marks**

रदरफोर्ड प्रकीर्णन प्रयोग तथा परमाणु मॉडल का कमियों सहित वर्णन कीजिए

Or अथवा

Explain cause of chemical bonding and types of bonds.

रासायनिक बंधन के कारण और रासायनिक बंधो के प्रकार की व्याख्या करें।

(b) Write short notes on any two of the following: 2X2 **marks**

(i) Aufbau law

(ii) shapes of orbitals

(iii) covalency

(iv) molarity

निम्नलिखित में से किन्ही दो पर संक्षिप्त टिप्पणीयां लिखिये :

(i) आफबाऊ नियम

(ii) ऑर्बिटल्स के आकार

(iii) सहसंयोजकता

(iv) मोलरता

4. (a) Describe the zeolite method to removal of hardness of water with diagram.

जल की कठोरता दूर करने की जिओलाइट विधि का सचित्र वर्णन कीजिये । 6 marks

Or अथवा

Explain EDTA method to determination of hardness of water

जल की कठोरता ज्ञात करने की EDTA विधि का वर्णन कीजिये

(b) Explain the disadvantages of hard water in boiler 4 **marks**

बायलर में कठोर जल से होने वाली हानियों को समझाइए

Or अथवा

Explain different types of hardness of water

जल की विभिन्न प्रकार की कठोरताओ को समझाइए

5 (a) Describe extraction of iron from haematite using blast furnace. **6 marks**

वात्या भट्टी द्वारा हेमेटाइट से लोहे के निष्कर्षण का वर्णन कीजिए।

Or अथवा

Explain polymer and polymerization process and describe the preparation, properties and uses of Bakelite and polystyrene.

बहुलक एवं बहुलीकरण प्रक्रिया को समझाइए तथा बेकेलाइट तथा पॉलीस्टाइरीन का निर्माण, गुणधर्म तथा उपयोग बताइए |

(b) Write short notes on any two of the following: 2X2 **marks**

(i) vulcanization of rubber.

(ii) Alloys

(iii) hardening and setting of cement.

(iv) name of ores of iron

निम्नलिखित में से किन्ही दो पर संक्षिप्त टिप्पणीयां लिखिये :

(i) रबर का वल्कनीकरण।

(ii) मिश्रधातुएँ।

(iii) सीमेंट का कठोरीकरण और जमना।

(iv) लौह के अयस्को के नाम

6 (a) Explain the properties of a good lubricant and explain flash and fire point. **6 marks**

एक अच्छे स्नेहक के गुणधर्मो को समझाते हुये फ्लैश और फायर प्वाइंट को समझाइए|

Or अथवा

Illustrate the theories of lubrication.

स्नेहन के सिद्धांतों को समझाइए|

(b) Explain octane and cetane numbers **4 marks**

ऑक्टेन और सीटेन संख्याओं को समझाइए |

Or अथवा

Differentiate HCV and LCV

HCV **और** LCV **में अंतर समझाइए |**

7(a) Explain oxidation, reduction and redox reaction with examples.. **6 marks**

आक्सीकरण, अपचयन तथा रेडॉक्स अभिक्रिया को उदाहरण सहित समझाइए |

Or अथवा

Explain the affecting corrosion and describe the methods to prevention against corrosion

संक्षारण को प्रभावित करने वाले कारको को समझाइए और संक्षारण से बचाव के उपायों का वर्णन कीजिए

(b) Describe the electroplating of copper **4 marks**

कॉपर के विधुत लेपन का वर्णन कीजिये

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL
SEMESTER-I
MODEL QUESTION PAPER: APPLIED CHEMISTRY

Subject code:103 Paper code: 7352

Time :3 hours Maximum Marks: 70

Note:-1. Attempt all questions. Question No.1 is objective type.
कुल छ प्रश्न हल कीजिए । प्रश्न क्रमांक-1 वस्तुनिष्ठ प्रकार का है।
2. Internal Choices are given in 4 marks and 6 marks questions.
4 नंबर एवं 6 नंबर के प्रश्नों में आंतरिक विकल्प दिए गए हैं।
3. In case of any doubt or dispute, the English version question should be treated as final.
किसी भी प्रकार के संदेह अथवा विवाद की स्थिति में अंग्रेजी भाषा के प्रश्न को अंतिम माना जायेगा।

Q.no.			Marks
1		Choose the correct answer.	2 each
		सही उत्तर का चुनाव कीजिये।	
	i	The maximum no.of electrons in 'p' sub-shell is	
		a. 2 b. 6 c. 10 d. 14	
		'p' उपकोश मे इलेक्ट्रोनो की अधिकतम संख्या होती है	
		a. 2 b. 6 c. 10 d. 14	
	ii	Which of the following salt is responsible for temporary hardness of water	
		a. Calcium sulphate b. Calcium bicarbonate	
		c. Sodium chloride d. Calcium carbonate	
		निम्नमें से कौनसा लवण जलकी अस्थाई कठोरता केलिए उत्तरदायी है	
		a. कैल्शियम सल्फेट b. कैल्शियम बाइकार्बोनेट	

		c. सोडियमक्लोराइड d. कैल्शियमकार्बोनेट	
	iii	Hematite is an ore of	
		a. Al b. Cu c. Fe d. Zn	
		हेमेटाइट निम्न में से किसका अयस्क है	
		a. Al b. Cu c. Fe d. Zn	
	iv	The octane number of isooctane is	
		a. 0 b. 10 c.50 d. 100	
		आइसोऑक्टेन की ऑक्टेन संख्या होती है	
		a. a. 0 b. 10 c.50 d. 100	
	v	Which type of reaction occurs at anode	
		a. Reduction b. Oxidation c. both a and b d. none of these	
		एनोड पर किस प्रकार की अभिक्रिया होती है	
		a. अपचयन b. आक्सीकरण c. दोनों a और b d. इनमेंसे कोई नहीं	
2	a	Write the electronic configuration of following atoms: a. Ca-20 b. Cr-24	2
		निम्नलिखित परमाणुओंके इलेक्ट्रॉनिक विन्यास लिखिए: a. Ca-20 b. Cr-24	
	b	Explain Aufbau rule with example.	4
		ऑफबौ नियम कीव्याख्या उदाहरण सहित कीजिए।	

		Or	
		Define orbital. Draw the shape of s, p ,and d orbitals	
		कक्षक को परिभाषित कीजिये । s,p,एवं d ऑर्बिटल के चित्र बनाइये।	
	c	Describe Rutherford's experiment with neat diagram. Explain Rutherford's Nuclear Model and its Drawback	6
		रदरफोर्ड के प्रयोग का वर्णनस्वच्छ चित्र सहित कीजिए । रदरफोर्ड नाभिकीय मॉडल को समझाइए एवं इसके दोष भी लिखिए ।	
		Or	
		Write short notes on electrovalent bond and covalent bond.	
		विद्युत्संयोजक बंध एवं सहसंयोजक बंध पर संक्षिप्त टिप्पणिया लिखिए ।	
3	a.	Full form of EBTis ……..	2
		EBTका पूरा नाम..... है l	
	b.	Describe any two harmful effects of hard water in a boiler.	4
		बॉयलर में कठोर जल के कोई दो हानिकारक प्रभाव का वर्णन करिए ।	
		Or	
		Differentiate between scale and sludge	
		स्केल एवं स्लज □□□□□□□□□□□□	
	c.	ExplainEDTA method of determination of hardness of waterwith necessary chemical reactions.	6
		जल की कठोरता दूर करने की EDTAविधि को आवश्यक रासायनिक समीकरणों सहित समझाइए l	
		Or	
		What is hardness of water?Explain Ion exchange method with suitable diagram.	

		जलकी कठोरता किसे कहते हैं? आयन विनिमयविधि का चित्रसहित वर्णन कीजिए।	
4	a	Define Cement .	2
		सीमेंट को परिभाषित कीजिये l	
	b	Write the composition, properties and applications of duralumin and stainless steel.	4
		ड्यूरेलुमिन एवं स्टेनलेस स्टील का संघटन, गुण एवं उपयोग लिखिए l	
		Or	
		What are alloys ?Write the purpose of making alloys.	
		मिश्र धातुएं क्या है? मिश्र धातु बनाने के उद्देश्य समझाइए l	
	c	Write the method of preparation, properties and uses of the following polymers: 1. Nylon-6,6 2. Polystyrene	6
		निम्नलिखित बहुलको के निर्माण की विधि, गुण एवं उपयोग लिखिए l 1. नायलॉन-6,62 पालीस्टाइरीन	
		Or	
		What do you mean by vulcanization of rubber. Compare the properties of raw rubber and vulcanized Rubber	
		रबर के वल्कनीकरण से आप क्या समझते हैं l प्राकृतिक रबर एवं वल्कनीकृत रबर के गुणों में तुलना कीजिये l	
5	a	Graphite is an example of …….. lubricant.	2
		ग्रेफाइट..... स्नेहक का उदाहरण है l	
	b	Define Fuels. Classify them and write characteristics of a good fuel.	4
		ईंधन को परिभाषित कीजिए। इनका वर्गीकरण कीजिये एवं एक अच्छे ईंधन के अभिलाक्षणिक गुण लिखिए ।	
		Or	
		Write short notes on biogas and water gas	

		बायोगैस एवं जल गैस □□□□□□□□□□□□□□□□□□□□□□□□ ll	
	c	Describe theproximate analysis of coal and write its significance.	6
		कोयले के निकट विश्लेषण को विस्तार से समझाइए एवं इसका महत्व लिखिए l	
		Or	
		What is lubricant? Classify them. Describe thecloud point and pour point and write its significance.	
		स्नेहककिसे कहते है?इसे वर्गीकृत कीजिये l स्नेहक के मेघ बिंदु एवं बहाव बिंदु को विस्तार से समझाइए एवं इसका महत्व लिखिए l	
6	a	Define Oxidation and Reduction.	2
		आक्सीकरण एवं अपचयन को परिभाषित कीजिये l	
	b	Write Short notes on electrolyticrefining.	4
		विद्युत् अपघटनी परिशोधन पर संक्षिप्त टिपण्णी लिखिए।	
		Or	
		Define electroplating. Describe the principle of electroplating with a neat diagram.	
		विद्युतलेपन को परिभाषित कीजिए। विद्युतलेपन के सिद्धांत को स्वच्छ चित्रसहित समझाइए ।	
	C	Explain corrosionwithexample. Explain the different factors affecting the corrosion.	6
		□□□□□□□□□□उदाहरण सहित समझाइए। □□□□□□□□ को प्रभावित करने वाले विभिन्न कारको को □□□□□□ l	
		Or	
		Write Faraday's laws of electrolysis. During electrolysis, If 0.4 ampere current is passed for 25 minutes from the electrolytic solution, then 0.1978 grams of metal is deposited on the cathode. Calculate the electrochemical equivalent of metal. .	

		फैराडे के विद्युत अपघटन के नियम लिखिए l यदि विद्युत अपघटन के दौरान विद्युत अपघटय के विलयन में से 0.4एंपियर की विद्युत धारा 25मिनट के लिए प्रवाहित की जाती है तो कैथोड पर 0.1978ग्राम धातु जमा होती हैl धातु के विद्युत रासायनिक तुल्यांक की गणना कीजिए l	

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL
SEMESTER-I
MODEL QUESTION PAPER
APPLIED CHEMISTRY

Subject code:103 Paper code:7352

Time :3 hours Maximum Marks: 70

Note:-1. Attempt all questions. Question No.1 is objective type.
कुल छ प्रश्न हल कीजिए । प्रश्न क्रमांक-1 वस्तुनिष्ठ प्रकार का है।
2. Internal Choices are given in 4 marks and 6 marks questions.
4 नंबर एवं 6 नंबर के प्रश्नों में आंतरिक विकल्प दिए गए हैं।
3. In case of any doubt or dispute, the English version question should be treated as final.
किसी भी प्रकार के संदेह अथवा विवाद की स्थिति में अंग्रेजी भाषा के प्रश्न को अंतिम माना जायेगा।

Q.no.			Marks
1		Choose the correct answer.	2 each
		सही उत्तर का चुनाव कीजिये।	
	i	Which of the following is not an example of ionic bond	
		a. NaOH b. NaCl c. CH_4 d. $AlCl_3$	
		निम्न में से कौन आयनिक बंध नहीं	
		a. NaOH b. NaCl c. CH_4 d. $AlCl_3$	
	ii	Which of the following salt is responsible for permanent hardness of water	
		a. Calcium sulphate b. Calcium bicarbonate	
		c. Sodium chloride d. Calcium carbonate	
		निम्न में से कौन सा लवण जल की स्थायी कठोरता के लिये उत्तरदायी है ।	
		a. केल्शियम सल्फेट b. कैल्शियम बाइकार्बोनेट	

		c. . सोडियम क्लोराईड d **कैल्शियम कार्बोनेट**	
	iii	Brass is an alloy of following metals	
		a. Cu and Zn b. Cu and Sn	
		c. Al and Pb d. Pb and Sn	
		पीतल निम्नधातुओं की मिश्र धातु है	
		a. Cu and Zn b. Cu and Sn	
		c. Al and Pb d. Pb and Sn	
	iv	Producer gas is	
		$CO+N_2$ b. $CO+H_2O$ c. $CO+H_2$ d. N_2+H_2O	
		प्रोडयूसर गैस है	
		a. $CO+N_2$ b. $CO+H_2O$ c. $CO+H_2$ d. N_2+H_2O	
	v	Which type of reaction is corrosion	
		a. Reduction b. Oxidation c. both a and b d. none of these	
		संक्षारण किस प्रकार की अभिक्रिया होती है	
		a. **अपचयन** b. **आक्सीकरण** c. **दोनों** a **और** b d. इनमें से कोई नही ।	
2	a	Define Molarity.	2
		मोलरता को परिभाषित कीजिये l	
	b	If atomic no of an atom is 13 and its atomic weight is 27, then writethe name of atom and find the number of electrons, Protons and neutrons present in it.	4
		यदि किसी परमाणु का परमाणु क्रमांक 11 **है एवं इसका परमाणुभार** 23 **है तो उसका नाम लिखिए एवं उसमें उपस्थित इलेक्ट्रॉन, प्रोटॉन एवं न्यूट्रॉनकी संख्या ज्ञात कीजिए** l	

		Or	
		Compare between an electrovalent bond and a covalent bond.	
		विद्युत संयोजक बंध और सहसंयोजक बंध में तुलना कीजिए l	
	c	Explain the various postulates of Bohr's atomic model with diagram and also state its merits and demerits.	6
		बोर के परमाणु मॉडल के विभिन्न अभिगृहीत चित्र सहित समझाइए एवं इसके गुण एवं दोष भी बताइए l	
		Or	
		Explain the Pauli's lawandHund's rule with example.	
		पाउली के नियम और हुंड के नियम की व्याख्या उदाहरण सहित कीजिए l	
3	a.	Full form of EDTAis ……..	2
		EDTAका पूरा नाम..... है l	
	b.	Define hardness of water. Differentiate between Temporary hardness and permanent hardness	4
		जल की कठोरता को परिभाषित कीजियेl अस्थायी कठोरता एवं स्थायी कठोरता में अंतर कीजिये l	
		Or	
		Write short notes on Priming and foaming .	
		अपक्रमण एवं फेनन पर संक्षिप्त टिपण्णी लिखिए l	
	c.	Explain various steps of municipal water treatment in detail.	6
		नगरपालिका जल उपचार की विभिन्न चरणों को विस्तार से समझाइए l	
		Or	
		ExplainLime soda method of removal of hardness of water with necessary chemical reactions.	
		जल की कठोरता दूर करने की लाइम सोडा विधि को आवश्यक रासायनिक समीकरणों	

		सहित समझाइए l	
4	a	Write the name and chemical formula of two main ores of Iron.	2
		लोहे के दो प्रमुख अयस्क के नाम एवं रासायनिक सूत्र लिखिए l	
	b	Differentiate between Roasting and Calcination.	4
		भर्जन एवं निस्तापन में अंतर कीजिये ।	
		Or	
		What is cement? Write the composition of Portland cement.	
		सीमेंट क्या है ? पोर्टलैंड सीमेंट का संघटन लिखिए l	
	c	Write the method of preparation, properties and uses of the following polymers: 1. Bakelite 2. PVC	6
		निम्नलिखित बहुलको के निर्माण की विधि, गुण एवं उपयोग लिखिए l 1. बैकेलाइट 2 पीवीसी	
		Or	
		What are the general principles of metallurgy? Explain them briefly.	
		धातु कर्म के सामान्य सिद्धांत क्या है? संक्षिप्त में समझाइए l	
5	a	Match the pairs: Graphite Solid fuel Grease Solid lubricant Biogas Methane Coal Semi-solid lubricant	2
		जोड़ी बनाइये : ग्रेफाइट ठोस ईंधन ग्रीस ठोस स्नेहक बायोगैस मीथेन कोयला अर्ध ठोस स्नेहक	
	b	Write short notes on high calorific value and low calorific value.	4
		उच्च कैलोरी मान एवं निम्न कैलोरी मान पर संक्षिप्त टिप्पणी लिखिए l	

		Or	
		Write short notes on Cloud point and Pour point.	
		मेघ बिंदु एवं बहाव बिंदु पर संक्षिप्त टिप्पणी लिखिए l	
	c	Describe Octane number and cetane number.	6
		ऑक्टेन नंबर एवं सीटेन नंबर को विस्तार से समझाइए l	
		Or	
		What is lubricant?What are its main functions?Write the main characteristics of a good lubricant.	
		स्नेहक किसे कहते है ? इसके प्रमुख कार्य क्या है ? एक अच्छे स्नेहक के प्रमुख अभिलाक्षणिक गुण लिखिए l	
6	a	DefineRedox reaction.	2
		रेडोक्स अभिक्रिया को परिभाषित कीजिये l	
	b	Write Short note on electrolyticrefining.	4
		विद्युत् अपघटनी परिशोधन पर संक्षिप्त टिपण्णी लिखिए l	
		Or	
		Write Short note on electroplating with a neat diagram.	
		विद्युतलेपन पर संक्षिप्त टिपण्णी लिखिए l	
	C	Define corrosion. Explain the electrochemical theory of corrosion.	6
		संक्षारण को परिभाषित कीजिए। संक्षारण का विद्युत् रासायनिक सिद्धांत समझाइए l	
		Or	
		What do you understand by electrolysis? Explain Faraday's laws of electrolysis.	
		विद्युत अपघटन से आप क्या समझते हैं? फैराडे के विद्युत अपघटन के नियम समझाइए l	

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL
SEMESTER-I
QUESTION BANK OBJECTIVE TYPE
APPLIED CHEMISTRY

1. रदरफोर्ड का α -कण के प्रयोग से सर्वप्रथम प्रदर्शित किया कि परमाणु में होते हैं-

(अ) इलेक्ट्रॉन

(4) प्रोटीन

(स) न्यूट्रॉन

(द) नाभिक

Rutherford first demonstrated through the use of α -particles that atoms consist of-

(a) electrons

(b) protons

(c) neutrons

(d) nucleus

2. p-ऑर्बिटलो की आकृति निम्न होती है -

(अ) वृत्ताकार (spherical)

(ब) डम्बल (dumbell)

(स) दीर्घ वृत्ताकार (elliptical)

(द) पिरामिडीय (pyramidal)

The shape of p-orbitals is as follows-

(a) spherical

(b) dumbbell

(c) elliptical

(d) pyramidal

3. निम्नलिखित में कौन सा कथन सत्य है-

(अ) विभिन्न उपकोशों में स्थित इलेक्ट्रॉनों की ऊर्जा बढ़ने का क्रम s < p < d < f होता है।

(ब) इलेक्ट्रॉन गति के समय तरंग की भाँति व्यवहार करता है।

(स) एक ऑर्बिटल में अधिकतम दो इलेक्ट्रॉन आ सकते हैं।

(द) 3-d ऑर्बिटल की आकृति वृत्ताकार होती है।

Which of the following statements is true-

(a) The order of increasing energy of electrons in different sub-shells is s < p < d < f.

(b) The electron behaves like a wave during motion.

(c) A maximum of two electrons can fit in one orbital.

(d) The shape of 3-d orbital is circular.

4. सोडियम आयन (Na^+) का इलेक्ट्रॉनिक विन्यास है -

(अ) $1s^2, 2s^2, 2p^6, 3s^1$

(ब) $1s^2, 2s^2, 2p^6$

(स) $1s^2, 2s^2, 2p^5, 3s^1$

(द) $1s^2, 2s^2, 2s^6, 3s^2$

The electronic configuration of sodium ion (Na^+) is -

(a) $1s^2, 2s^2, 2p^6, 3s^1$

(b) $1s^2, 2s^2, 2p^6$

(c) $1s^2, 2s^2, 2p^5, 3s^1$

(d) $1s^2, 2s^2, 2s^6, 3s^2$

5. s, p, d, f के उपकोशों में उपस्थित रहने वाले इलेक्ट्रॉनों की अधिकतम संख्या क्रमशः

(अ) 14, 10, 6 व 2

(ब) 2,6,10 व 14

(स) 2,8, 18 व 32

(द) 32, 18, 8 व 2

The maximum number of electrons present in the sub-shells of s, p, d, f are respectively

(a) 14, 10, 6 and 2

(b) 2,6,10 and 14

(c) 2,8, 18 and 32

(d) 32, 18,8 and 2

6. बोर के अनुसार एक कोश में अधिकतम इलेक्ट्रॉन की संख्या -

(अ) $3n^2$

(ब) n^2

(स) $2n^2$

(द) $4n^2$

According to Bohr, the maximum number of electrons in a shell is Number -

(a) $3n^2$

(b) n^2

(c) $2n^2$

(d) $4n^2$

7. हाइड्रोजन का कौन सा समस्थानिक रेडियोएक्टिव है -

(अ) $_1H^3$

(ब) $_1H^1$

(स) $_1H^2$

(द) इनमें से कोई नहीं

Which isotope of hydrogen is radioactive -

(a) $_1H^3$

(b) $_1H^1$

(c) $_1H^2$

(d) None of these

8. निम्न में से कौन सा तत्व रेडियोएक्टिव है –

(अ) आर्गन

(ब) निऑन

(स) पोटेशियम

(द) रेडियम

Which of the following elements is radioactive -

(a) Argon

(b) Neon

(c) Potassium

(d) Radium

9. α-कण होता है

(अ) हाइड्रोजन का नाभिक

(ब) हीलियम का नाभिक

(स) रेडियम का नाभिक

(द) ड्यूटीरियम का नाभिक

α -particle is

(a) Nucleus of hydrogen

(b) Nucleus of helium

(c) Nucleus of radium

(d) Nucleus of deuterium

10. α-कण की भेधन क्षमता होती है

(अ) गामा किरणों के तुल्य

(ब) बीटा कणों से कम

(स) बीटा कणों के तुल्य

(द) बीटा कणों से अधिक

Penetrating power of α-particle is

(a) Equal to gamma rays

(b) Less than beta particles

(c) beta particles Equal to

(d) More than beta particles

11. किसी तत्व का अर्ध-आयुकाल निर्भर करता है -

(अ) तत्व की मात्रा पर

(ब) तापक्रम पर

(स) दाब पर

(द) इनमें से कोई नहीं

The half-life of an element depends on -

(a) quantity of the element

(b) temperature

(c) pressure

(d) none of these

12. जल की कठोरता होती है -

(अ) $CaCO_3$

(ब) $Ca\ (HCO_3)_2$

(स) Na_2CO_3

(द) NaCl

Hardness of water is due to -

(a) $CaCO_3$

(b) $Ca(HCO_3)_2$

(c) Na_2CO_3

(d) NaCl

13. कठोर जल उपयुक्त नहीं है-

(अ) पीने एवं कपड़े धोने के लिए

(ब) बॉयलर्स में प्रयोग के लिए

(स) फसल की सिंचाई के लिए

(द) उपरोक्त सभी

Hard water is not suitable for -

(a) drinking and washing clothes

(b) use in boilers

(c) irrigation of crops

(d) all of the above

14. कठोर जल साबुन के साथ पर्याप्त झाग उत्पन्न नहीं करता, क्योंकि -

(अ) इनमें कैल्शियम और मैग्नीशियम के विलेय लवण होते हैं

(ब) इनमें लोहा होता है

(स) इनमें निलम्बित अशुद्धियों होती हैं

(द) इनमें सोडियम क्लोराइड होता है

Hard water does not produce sufficient lather with soap because -

(a) it contains soluble salts of calcium and magnesium

(b) it contains iron

(c) it contains suspended impurities

(d) it contains sodium chloride

15. कठोर जल को उबालने के लिए उपयोग में लाये जाने वाले विद्युत उपकरण के तापन अवयव पर जमने वाली सफेद परत में होता है -

(अ) शर्करा

(बी) सामान्य लवण

(स) कैल्शियम तथा मैग्नीशियम का लवण

(द) सोडियम कार्बोनेट

The white layer formed on the heating element of the electrical equipment used for boiling hard water is -

(a) sugar

(b) common salt

(c) salt of calcium and magnesium

(d) sodium carbonate

16. चूने के जल में होता है -

(अ) सोडियम हाइड्रॉक्साइड

(ब) कैल्शियम हाइड्रॉक्साइड

(स) सोडियम कार्बोनेट

(द) कैल्शियम क्लोराइड

Lime water contains –

(a) Sodium hydroxide

(b) Calcium hydroxide

(c) Sodium carbonate

(d) Calcium chloride

17. कठोर जल बॉयलर में भाप उत्पादन हेतु अनुपयुक्त होता है क्योंकि -

(अ) इसका क्वथनांक उच्च होता है

(ब) भाप उच्च दाब पर उत्पन्न होती है

(स) इससे बॉयलर की अंदर की सतह पर स्केल जम जाते हैं

(द) जल ऑक्सीजन तथा हाइड्रोजन में अपघटित हो जाता है

Hard water is unsuitable for steam production in boilers because -

(a) Its boiling point is high

(b) Steam is produced at high pressure

(c) It causes scale to form on the inner surface of the boiler

(d) Water decomposes into oxygen and hydrogen

18. EDTA विधि में प्रयुक्त विशेष सूचक है-

(अ) मेथिल ऑरेंज

(ब) फिनॉलफ्थेलीन

(स) इरियोक्रोम ब्लैक-टी

(डी) मिथाइल रेड

The special indicator used in EDTA method is -

(a) Methyl orange

(b) Phenolphthalein

(c) Eriochrome black-T

(d) Methyl red

19. किस विधि से जल के मृदुकरण से आसुत जल जैसा शुद्ध जल प्राप्त होता है -

(अ) लाइम-सोडा विधि

(ब) परम्यूटिट विधि

(स) उबालकर

(द) आयन विनिमय विधि

By which method, pure water like distilled water is obtained by softening water -

(a) Lime-soda method

(b) Permutit method

(c) By boiling

(d) Ion exchange method

20. निर्वातित जिओलाइट (एग्जास्टेड जोलाइट) का पुनरुत्पादन निम्नलिखित विलयन में उपचारित करके प्राप्त किया जा सकता है -

(अ) कैल्सियम क्लोराइड

(ब) सोडियम क्लोराइड

(स) मैग्नीशियम क्लोराइड

(द) जिंक क्लोराइड

Exhausted zeolite can be regenerated by treating it with the following solution -

(a) Calcium chloride

(b) Sodium chloride

(c) Magnesium chloride

(d) Zinc chloride

21. परम्यूटिट का औसतन जीवन काल होता है -

(अ) 20 वर्ष

(ब) 5 वर्ष

(स) 50 वर्ष

(द) 10 वर्ष

The average life of permutite is

(a) 20 years

(b) 5 years

(c) 50 years

(d) 10 years

22. क्रोमियम इस्पात का संक्षारण प्रतिरोध बढ़ाने के लिये इसमें मिलाई जाने वाली दूसरी धातु होती है -

अ) Zn

(ब) Cu

(सं) Sn

(द) Ni

The other metal added to chromium steel to increase its corrosion resistance is -

(a) Zn

(b) Cu

(c) Sn

(d) Ni

23. पीतल मिश्रधातु में है -

(अ) कॉपर तथा जस्ता

(ब) कॉपर तथा टिन

(स) ऐलुमिनियम तथा कॉपर

(द) ऐलुमिनियम तथा लेड

Brass alloy contains -

(a) Copper and Zinc

(b) Copper and Tin

(c) Aluminium and Copper

(d) Aluminium and Lead

24. डूरैलूमिन निम्न धातुओं की मिश्रधातु है -

(अ) Al, Cu, Mg, Mn

(ब) Al, Cu, Mg

(स) Al, Cu, Ag, Mn

(द) Cu, Mg, Zn

Duralumin is an alloy of the following metals -

(a) Al, Cu, Mg, Mn

(b) Al, Cu, Mg

(c) Al, Cu, Ag, Mn

(d) Cu, Mg, Zn

25. पोर्टलैण्ड के निर्माण में प्रयुक्त कच्चा पदार्थ है

(अ) चूने का पत्थर + मृदा + रेत

(ब) चूने का पत्थर + रेत + जिप्सम

(स) चूने का पत्थर + मृदा + जिप्सम

(द) ऐलुमिना + रेत + जिप्सम

The raw material used in the construction of Portland is

(a) Limestone + Soil + Sand

(b) Limestone + Sand + Gypsum

(c) Limestone + Soil + Gypsum

(d) Alumina + Sand + Gypsum

26. पोर्टलैण्ड सीमेन्ट का प्रमुख अवयव है -

(अ) ट्राइ कैल्सियम सिलिकेट

(ब) कैल्सियम ऑक्साइड

(स) मैग्नीशियम ऑक्साइड

(द) कैल्सियम सल्फेट

The main component of Portland cement is -

(a) Tri calcium silicate

(b) Calcium oxide

(c) Magnesium oxide

(d) Calcium sulphate

27. बहुलक अणु का आकार होता है -

(अ) 10^{-1} से 10^{-3} सेमी

(ब) 10^{-4} से 10^{-7} सेमी

(स) 10^{-1} से 10^{-7} सेमी

(द) 10^{-3} से 10^{-5} सेमी

The size of polymer molecule is -

(a) 10^{-1} to 10^{-3} cm

(b) 10^{-4} to 10^{-7} cm

(c) 10^{-1} to 10^{-7} cm

(d) 10^{-3} to 10^{-5} cm

28. बहुलीकरण जिसमें दो या अधिक रासायनिक रूप से भिन्न मोनोमर भाग लेते हैं। कहलाता है -

(अ) योगशील बहुलीकरण

(ब) सहबहुलीकरण

(स) बहुलीकरण

(द) इनमें से कोई नहीं

Polymerization in which two or more chemically different monomers take part, It is called -

(a) Additive polymerisation

(b) Copolymerisation

(c) Polymerisation

(d) None of these

29. निम्नलिखित में से कौन सा पदार्थ 65°C से अधिक ताप पर प्लास्टिक तथा कमरे के ताप पर रेजिन होता है -

(अ) बैकेलाइट

(ब) पॉलिस्टायरीन

(स) पॉलिविनाइल क्लोराइड

(द) पॉलिथीन

Which of the following substances is plastic at a temperature above 65°C and resin at room temperature

(a) Bakelite

(b) Polystyrene

(c) Polyvinyl chloride

(d) Polythene

30. थर्मोप्लास्टिक का निर्माण होता है -

(अ) क्लोरीनीकरण के द्वारा

(ब) नाइट्रीकरण के द्वारा

(स) संघनन बहुलीकरण के द्वारा

(द) श्रृंखला बहुलीकरण के द्वारा

Thermoplastics are made by -

(a) Chlorination

(b) Nitration

(c) Condensation polymerisation

(d) Chain polymerisation

31. फोम युक्त पॉलिस्टाइरीन प्लास्टिक होती है -

(अ) नाइलॉन

(ब) पी.वी.सी.

(स) थर्मोकोल

(द) टेरीलीन

Foamed polystyrene plastic is -

(a) Nylon

(b) PVC

(c) Thermocol

(d) Terylene

32. वह प्लास्टिक जिसे गर्म करने पर कोमल तथा ठंडा करने पर कठोर हो जाती है, कहलाती है

(अ) थर्मोइलास्टिक

(ब) थर्मोप्लास्टिक

(स) थर्मोसेटिंग

(द) थर्माइट

The plastic which becomes soft on heating and hard on cooling is called

(a) Thermoelastic

(b) Thermoplastic

(c) Thermosetting

(d) Thermite

33. बैकेलाइट का उपयोग किया जाता है -

(अ) केबिल बनाने में

(ब) विद्युत स्विच बनाने में

(स) कपड़ा बनाने में

(द) लेजम बनाने में

Bakelite is used -

(a) In making cables

(b) In making electrical switches

(c) In making clothes

(d) In making laces

34. ऑक्टेन संख्या है -

(अ) ऑक्टेन में कार्बन परमाणुओं की संख्या

(ब) ईंधन के गुणवत्ता निर्धारण का मापदण्ड

(स) क्रेकिंग विधि द्वारा बने ऑक्टेन अणु की संख्या

(द) ईंधन में कार्बन परमाणु की लम्बाई

Octane number is -

(a) Number of carbon atoms in octane

(b) Criteria for determining the quality of fuel

(c) Number of octane molecules formed by cracking process

(d) Length of carbon atom in fuel

35. ऑक्टेन मान शून्य होता है

(अ) पेट्रोल

(स) n-हेप्टेन

(ब) द्रवीकृत पेट्रोलियम गैस (LPG)

(द) आइसो-ऑक्टेन

Octane value is zero in

(a) Petrol

(c) n-heptane

(b) Liquefied petroleum gas (LPG)

(d) Iso-octane

36.पेट्रोल ईंधन की उपयुक्तता निर्धारित की जाती है

(अ) ऑक्टेन संख्या से

(ब) सीटेन संख्या से

(स) कार्बन की प्रतिशत मात्रा से

(द) हाइड्रोकार्बन श्रृंखला की लम्बाई से

Suitability of petrol fuel is determined by

(a) Octane number

(b) Cetane number

(c) Percentage of carbon

(d) Length of hydrocarbon chain

37 .आइसो-ऑक्टेन (2, 2, 4-ट्राइ मेथिल पेन्टेन) की ऑक्टेन रेटिंग है

(अ) 100

(ब) शून्य

(स) 50

(द) लगभग 100

Octane rating of iso-octane (2, 2, 4-tri methyl pentane) is

(a) 100

(b) Zero

(c) 50

(d) About 100

38. हेक्साडीकेन की सीटेन रेटिंग है -

(अ) 100

(ब) 0

(स) 50

(द) इनमें से कोई नहीं

Cetane rating of hexadecane is -

(a) 100

(b) 0

(c) 50

(d) None of these

39. जल गैस मिश्रण है

(अ) H_2 तथा CO_2

(ब) H_2 तथा NH_3

(स) CO तथा H_2

(द) CO_2 तथा NO_2

Water gas mixture is

(a) $H_2$and CO_2

(b) H_2 and NH_3

(c) CO and H_2

(d) CO_2 and NO_2

40. प्रोड्यूसर गैस मिश्रण है

(अ) CO तथा N_2

(ब) CO_2 तथा H_2

(स) CO तथा H_2

(द) CO_2तथा N_2

Producer gas mixture is

(a) CO and N_2

(b) CO_2 and H_2

(c) CO and H_2

(d) CO_2 and N_2

41. घर्षण कम करते हैं -

(अ) पेन्ट से

(ब) स्नेहक से

(स) वार्निश से

(द) उपरोक्त में से कोई नहीं

Friction is reduced by -

(a) Paint

(b) Lubricant

(c) Varnish

(d) Of the above nobody

42. स्नेहक के प्रयोग करने का उद्देश्य होता है-

(अ) घर्षण ऊष्मा बढ़ाना

(ब) प्रतिरोध बढ़ाना

(स) घर्षण प्रतिरोध कम करना

(द) रगड़ने वाली दो सतहों के मध्य प्रत्यक्ष सम्पर्क रोकन

The purpose of using lubricants is-

(a) increasing friction heat

(b) increasing resistance

(c) reducing frictional resistance

(d) Preventing direct contact between two rubbing surfaces

43. ठोस स्नेहक का प्रकार होता है -

(अ) ग्रेफाइट

(ब) कैल्सियम युक्त ग्रीज

(स) एक्सल ग्रीज

(द) खनिज तेल

The types of solid lubricants are –

(a) graphite

(b) grease containing calcium

(c) axle grease

(d) Mineral oil

44. द्रव स्नेहकों में सामान्यतः -

(अ) प्रज्वलन ताप बिन्दु अग्नि बिन्दु से अधिक होता है

(ब) अग्नि बिन्दु प्रज्वलन ताप बिन्दु से अधिक होता है

(स) अग्नि बिन्दु प्रज्वलन ताप बिन्दु से कम होता है

(द) प्रज्वलन बिन्दु तथा अग्नि बिन्दु समान होते हैं

Liquid lubricants generally include –

(a) The ignition temperature is higher than the fire point.

(b) The fire point is higher than the ignition temperature point.

(c) The fire point is lower than the ignition temperature point.

(d) Ignition point and fire point are same

45. CuSO4 विलयन में 1 फैराडे विद्युत की मात्रा प्रवाहित करने पर मुक्त Cu की मात्रा होगी .

(अ) एक ग्राम

(ब) एक ग्राम परमाणु

(स) दो ग्राम परमाणु

(द) एक ग्राम तुल्यांक

The amount of Cu liberated when 1 Faraday of electricity is passed through CuSO4 solution will be.

(a) One gram

(b) One gram atom

(c) Two gram atoms

(d) One gram equivalent

46. जब एक ऐम्पियर की धारा एक सेकण्ड तक किसी चालक में बहती है तो विद्युत की इस मात्रा को जाना जाता है

(अ) फैराडे में

(ब) कूलॉम में

(स) ई.एम.एफ. में

(द) ओम में

When a current of one ampere flows through a conductor for one second, this amount of electricity is known as

(a) Faraday

(b) Coulomb

(c) E.M.F. in

(d) in ohm

47. कॉपर धातु की प्लेट को फेरस सल्फेट के विलयन में डुबाया जाये तो

(अ) कॉपर अवक्षेपित हो जाता है

(ब) आयरन अवक्षेपित हो जाता है

(स) आयरन व कॉपर दोनों ही घुल जाते हैं

(द) कोई अभिक्रिया नहीं होती है

If a copper plate is dipped in a solution of ferrous sulphate then

(a) Copper is precipitated

(b) Iron is precipitated

(c) Both iron and copper dissolve

(d) No reaction takes place

48. जब ताँबे के तार के टुकड़े को $AgNO_3$ के विलयन में डुबाया जाये तो विलयन का रंग नीला हो जाता है, इसका कारण है

(अ) एक विलेय संकर का बनना

(ब) ताँबे का ऑक्सीकरण

(स) चाँदी का ऑक्सीकरण

(द) ताँबे का अपचयन

When a piece of copper wire is dipped in a solution of $AgNO_3$, the colour of the solution becomes blue, the reason for this is

(a) Formation of a soluble complex

(b) Oxidation of copper

(c) Oxidation of silver

(d) Reduction of copper

49. किसी वस्तु पर सिल्वर के लेपन में -

(अ) वस्तु को धनोद बनाते हैं

(ब) शुद्ध सिल्वर को ऋणोद बनाते हैं

(स) पोटैशियम अर्जेन्टोसायनाइड के विलयन को विद्युत अपघट्य के रूप में प्रयोग करते हैं

(द) वस्तु को ऋणोद बनाते हैं

In coating silver on an object -

(a) The object is made anode

(b) Pure silver is made cathode

(c) Potassium argentocyanide solution is used as electrolyte

(d) The object is made cathode

50. लोहे में जंग लगने पर लोहे का

(अ) अपचयन होता है

(ब) ऑक्सीकरण होता है

(स) जल अपघटन होता है

(द) निर्जलीकरण होता है

When iron rusts, it is

(a) reduced

(b) oxidized

(c) hydrolyzed

(d) dehydrated

51. अम्लीय माध्यम में विद्युत रासायनिक संक्षारण में

(अ) ऑक्सीजन निकलती है

(ब)ऑक्सीजन अवशोषित होती है

(स) हाहड्रोजन निकलती है

(द) हाहड्रोजन अवशोषित होती है

In electrochemical corrosion in acidic medium

(a) oxygen is released

(b) oxygen is absorbed

(c) hydrogen is released

(d) hydrogen is absorbed

52. लोहे के जलीय विलयन में संक्षारण होता है

(अ)कैथोड पर

(ब) ऐनोड पर होता है परंतु जंग कैथोड पर जमा होती है

(स) ऐनोड पर होता है तथा जंग भी ऐनोड पर जमा होती है

(द) उपरोक्त में से कोई नहीं है

Corrosion of iron in aqueous solution occurs

(a) at the cathode

(b) at the anode but rust is deposited at the cathode

(c) at the anode and rust is also deposited at the anode

(d) none of the above

53. गैल्वेनिक संक्षारण में अधिक आदर्श धातु व्यवहार करती है -

(अ) ऐनोड की तरह

(ब) कैथोड की तरह

(स) ऐनोड तथा कैथोड की तरह

(द) संक्षारित धातु की तरह

In galvanic corrosion, the more ideal metal behaves -

(a) like anode

(b) like cathode

(c) like anode and cathode

(d) like corroded metal

54. वायुमण्डलीय संक्षारण में निर्धारित कारक हैं

(अ) वायु में 02 की उपस्थिति

(ब) वायु में आर्द्रता की उपस्थिति

(स) SO_2 की उपस्थिति

(द) वर्षा की आवृत्ति

The determining factors in atmospheric corrosion are

(a) Presence of 02 in air

(b) Presence of humidity in air

(c) Presence of SO_2 (d) Frequency of rainfall

DIPLOMA WING
RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

SEMESTER I – GROUP 'A'

COURSE TITLE	:	COMMUNICATION SKILLS IN ENGLISH
PAPER CODE	:	7353
SUBJECT CODE	:	104
TREORY CREDITS	:	04
PRACTICAL CREDITS	:	01

Course Objectives:

Communication skills play an important role in career development. This course aims at introducing basic concepts of communication skills with an emphasis on developing personality of the students. Thus, the main objectives of this course are:

1. To develop confidence in speaking English with correct pronunciation.
2. To develop communication skills of the students i.e. Listening, Speaking, Reading and Writing skills.
3. To introduce the need for Personality Development- Focus will be on developing certain qualities which will aid students in handling personal and career challenges like self-awareness, inter personal skills, empathy, motivation, team spirit, leadership skills etc.

Course Content

Unit-I Communication: Theory and Practice (6 lectures) 14 Marks

1.1 Basics of Communication: Introduction, Meaning and Definition, Process of Communication.

1.2 Types of Communication: **Verbal** (Oral, Written) and **Non-verbal**–Signs, Symbols, Maps, Body Language (Kinesics) Para Language.

1.3 Channels: Formal (Upward, Downward, Horizontal and Diagonal) and Informal (Grapevine).

1.4 Principles of Effective Written and Oral Communication (including 7 C's)

1.5 Barriers to Effective Communication (Semantic, Physical, Psychological, Organizational) and ways toovercome them.

Unit-II Soft Skills for Professional Excellence (5 lectures) 12 Marks

2.1 Introduction: Soft Skills and Hard Skills.

2.2Importance of Soft Skills as Life skills : Self-awareness and Self-analysis, Interpersonal effectiveness, Adaptability, Resilience, Emotional Intelligence, Empathy, Assertiveness, Conflict management, Problem Solving, Decision Making, Leadership, Motivation, Time Management and Team spirit.

Unit-III: Reading Comprehension (14 lectures) **16 Marks**

Comprehension, vocabulary enhancement and grammar exercises based on reading of the following texts:

Section-1-Prose

3.1.1 'An Astrologer's Day' from Malgudi Days by R. K. Narayan
3.1.2 'The Gift of the Magi' by O'Henry
3.1.3 'Uncle Podger Hangs a Picture' by Jerome K. Jerome

Section-2-Poetry

3.2.1 'Night of the Scorpion' by Nissim Ezekiel
3.2.2 'Stopping by Woods on a Snowy Evening' by Robert Frost
3.2.3 'Where the Mind is Without Fear' by Rabindranath Tagore

Unit-IV: Professional Writing and Business Communication (10 lectures) **14 Marks**

4.1 Précis writing and Comprehension exercises based on Unseen Passages.

4.2 E-mail etiquette, format of e-mail.
- 4.2.1 Draft a short email message requesting for one day leave from your workplace due tosickness.
- 4.2.2 Draft a short email message informing that you have resumed your duty after availing leave.
- 4.2.3 Draft a short email message informing about inferior/defective quality of goods supplied.

4.3 Drafting Letters
- 4.3.1 Parts of letters, mechanics, style and format.
- 4.3.2 Application for Job or Covering letter with Resume
- 4.3.3 Letters related to purchase: Enquiry, Order and Complaints (damaged or defectivegoods or for shortage in supply)

Unit-V: Vocabulary and Grammar (10 lectures**)** **10 Marks-Grammar + 4 Marks-Vocabulary**

5.1 Vocabulary of commonly used words, Synonyms, Antonyms and usage of same words asdifferent parts of speech.
5.2 One-word substitutions from the prescribed prose and poetry.

5.3 Determiners, Auxiliary verbs, Subject-verb agreement, Tense, Prepositions, Active and Passive Voice.

Course outcomes:

At the end of this course, the students will be able to:

1. Formulate grammatically correct sentences in English using appropriate vocabulary, to develop basicSpeaking and Writing skills.
2. Demonstrate Reading skills with correct pronunciation and comprehension.
3. Understand the importance of personality development with reference to soft skills to handle personal andprofessional challenges.
4. Apply principles of effective communication in oral and written professional communication.

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8. Margaret M. Maison, Examine your English, Orient Longman, New Delhi, 1964.
9. M. Ashraf Rizvi, Effective Technical Communication, Mc-Graw Hill, Delhi, 2002.
10. John Nielson, Effective Communication Skills, Xlibris, 2008.
11. Oxford Advanced Learners Dictionary
12. Roget's Thesaurus of English Words and Phrases
13. Levine, Levine & Levine, The Joy of Vocabulary
14. Collin's English Dictionary

Web Sources:

https://agendaweb.org/listening-

exercises.htmlwww.grammarly.com/

Suggested Further Reading (to enhance reading skills of students):

1. R.K Narayan : "Malgudi Days" (32 Short Stories), "Swami And His Friends"(novel)
2. O Henry : Short Stories : 'The Last Leaf', 'After Twenty Years'
3. Rabindranath Tagore : Poems from "Geetanjali" 'Freedom', 'Last Curtain'
4. Ruskin Bond : Short Stories : 'The Cherry Tree', 'The Thief', 'The Kite Maker'. "The Room on the Roof " (novel)

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COMMUNICATION SKILLS IN ENGLISH LAB

Course Objectives:

Communication skills play an important role in career development. This lab/practical course aims at actively involving students in various activities to improve their communication skills with an emphasis on developing personality of the students. Thus, the objectives of this course are:

1. To develop Listening Skills for enhancing communication.
2. To develop Speaking and Reading Skills with a focus on correct pronunciation and fluency.
3. To introduce the need for Personality Development- Focus will be on developing Soft Skills whichwill aid students in handling personal and career challenges. For that purpose group discussion, extempore and other activities to be conducted during practical classes and technology enabled learning should be integrated for effective learning.

Course Content:

Unit I Listening Skills (6 lectures)

1.1 Listening Process and Practice
1.2 Listening to recorded lectures, conversations, poems, interviews and speeches, Listeningcomprehension tests.

Unit II Reading Skills with correct Pronunciation (6 lectures)

2.1 Phonetics :Articulation of Sounds - Consonant, Vowels and Diphthongs.
2.2 Division of Words into Syllables, Practice of Word stress and Intonation.
2.3 Reading the prescribed text with correct pronunciation, intonation and comprehension.

Unit III Speaking Skills (6 lectures)

3.1 Introducing self, Introducing others (each student will also have to write the content of this activityduring exam which will be submitted for record purpose)
3.2 Conversation practice in routine situations (greeting, thanking, apologizing, requesting,congratulating, inviting, expressing likes and dislikes, etc.
3.3 Role Play-
  3.3.1 Making Enquiries at important public places.
  3.3.2 Question Tags and giving short answers for ease of conversing.

Unit IV Professional Skills (6 lectures)

4.1 Delivering formal short- speech, extempore (of 2 minutes duration)
4.2 Making **Oral presentation** of Mini Project* before external examiner in Practical exam(Written content of presentation (along with tools or aids), also to be submitted by eachStudent / group for the purpose of record)
4.3 Telephonic Conversations, Video Conferencing, Describing Telephone manners and Netiquette.(watching videos, role play and demonstrations)
4.4 Mock interviews for Jobs (videos and demonstrations)
4.5 Group Discussions (videos and demonstrations)

Unit V Building Vocabulary (6 lectures)

5.1 Phrasal verbs
5.2 Idioms and phrases, Administrative terms (English and Hindi)
5.3 Word exercises (homonyms), words with silent letters, commonly misspelled andmispronounced words.
5.4 Word games such as crosswords, scrabble, quiz, spell-it, etc. to enhance self-expression andvocabulary of participants.
5.5 Punctuation Exercises

Note:

*__Mini Project__: Topics of Mini-projects may be assigned individually; or the whole batch of students may bedivided into groups of 4-5 students each. Each student/group has to be assigned a topic for Mini-Project in the beginning of the semester. Each student/group will prepare a short presentation using various aids and tools e.g., charts, graphics, models, flow charts, examples and illustrations, power point, dialogues, role play etc. during the semester and submit it before the last teaching day after planning and rehearsing the oral presentation under supervision of the teacher. Each group will orally deliver this presentation of five to six minutes duration, using the prepared aids and tools during practical exam. Each student individually or as part of a group must participate in oral presentation for at least 1-2 minutes. The suggested topics for Mini- Project are-

1. (i)Describe Process of Communication (ii) Verbal and Non-verbal communication (iii) Oral and Written Communication (iv)Principles of Effective Communication (any four principles) (v) Explain Barriers to Communication (any one category of barriers) and ways to overcome them. Unit 1
2. Explain any three of these soft skills -Time Management, Grooming, Stress Management, Team Work, Self-analysis, Interpersonal effectiveness, Adaptability, Resilience, Emotional Intelligence, Empathy, Assertiveness, Conflict management, Problem Solving, Decision Making, Leadership, Motivation. Unit 2
3. Prepare a Phonetic Chart of Sounds of English. Unit 2
4. Read short stories of famous writers and present a summary along with sharing the new wordslearnt with their usage (any one short story may be chosen from 'suggested further reading'). Unit 3
5. Compose short poems and write stories on topics of your choice. (Any One Story or Poem)-Unit 3
6. Enumerate Qualities of a good letter, present different formats. Unit 4
7. Demonstrate the format of e-mail, and enlist email etiquette. Unit 4
8. (i)Describe Importance of Netiquette (ii) Describe Telephone Manners. Unit 5
9. Preparing for an Interview – Do's and Don'ts. Unit 5
10. Any other relevant topic considered appropriate by the teacher according to students' interest.

Learning Outcome:

At the end of this course the students will be able to:

1. Demonstrate Reading with correct Pronunciation and Comprehension.
2. Ask and Answer relevant questions orally after Listening to the spoken /delivered content intechnologically enabled learning environment.
3. Introduce themselves orally, introduce others, converse in routine and professional situationswith proper usage of language and vocabulary.
4. Prepare, organize and effectively deliver an oral presentation using digital or other tools.

Recommended Readings:

1. T. Balasubramanian, A text Book of English Phonetics for Indian Students, 3rd Ed.2022
2. Daniel Jones, English Pronouncing Dictionary, Cambridge, Cambridge University Press, 1956.
3. James Hartman & etal. English Pronouncing Dictionary, Cambridge, Cambridge University Press, 2006.
4. Kulbhushan Kumar, Effective Communication Skills, Khanna Publishing House, NewDelhi (RevisedEd.2018)
5. J. D. O'Connor, Better English Pronunciation, Cambridge, Cambridge University Press,1980.
6. Lindley Murray, English Grammar: Comprehending Principles and Rules,.London,Wilson and Sons,1908.
7. Margaret M. Maison, Examine your English, Orient Longman, New Delhi,1964.
8. J.Sethi & etal, A Practice Course in English Pronunciation, New Delhi, Prentice Hall,2004.

Web Sources For Speaking Skills

http://7esl.com

https://agendaweb.org/listening-exercises.html

http://grammarly.com

https://www.duolingo.com

https://learnenglish.britishcouncil.o

rghttp://www.ummoapp.com

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DIPLOMA WING
RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

SEMESTER I – GROUP 'A'

COURSE TITLE	:	ENGINEERING GRAPHICS
PAPER CODE	:	--
SUBJECT CODE	:	--
TREORY CREDITS	:	00
PRACTICAL CREDITS	:	02

Course Objectives:

- To understand the language of graphics which is used to express ideas, convey instructions while carrying out engineering jobs.
- To develop drafting and sketching skills, to know the applications of drawing equipments, and get familiarize with Indian Standards related to engineering drawings.
- To develop skills to visualize actual object or a part of it, on the basis of drawings.
- To develop skills to translate ideas into sketches and to draw and read various engineering curves, projections and dimensioning styles.
- To understand the basic commands and develop basic skills related to computer aided drafting, of how to draw, modify, and edit basic shapes (2D), using AUTOCAD.

Course Content

Unit – I Basic elements of Drawing

Drawing Instruments and supporting materials: method to use them with applications.

Convention of lines and their applications.

Representative Fractions – reduced, enlarged and full size scales; Engineering Scales such as plain and diagonal scale.

Dimensioning techniques as per SP-46:2003 – types and applications of chain, parallel and coordinate dimensioning.

Geometrical and Tangency constructions. (Redraw the figure)

Unit – II Orthographic projections

Introduction of projections-orthographic, perspective, isometric and oblique: concept and applications. (No question to be asked in examination).

Introduction to orthographic projection, First angle and Third angle method, their symbols.

Conversion of pictorial view into Orthographic Views – object containing plain surfaces, slanting surfaces, slots, ribs, cylindrical surfaces. (use First Angle Projection method only)

Unit – III Isometric Projections

Introduction to isometric projections.

Isometric scale and Natural scale.

Isometric view and isometric projection.

Illustrative problems related to objects containing lines, circles and arcs shape only.

Conversion of orthographic views into isometric view/projection.

Unit – IV Free Hand Sketches of engineering elements

Free hand sketches of machine elements: Thread profiles, nuts, bolts, studs, set screws, washer, Locking arrangements. (For branches other than mechanical Engineering, the teacher should select branch specific elements for free hand sketching)

Free hand sketches of orthographic view (on squared graph paper) and isometric view (on isometric grid paper)

Unit – V Computer aided drafting interface

Computer Aided Drafting: concept.

Hardware and various CAD software available.

System requirements and Understanding the interface.

Components of AutoCAD software window: Title bar, standard tool bar, menu bar, object properties tool bar, draw tool bar, modify tool bar, cursor cross hair. Command window, status bar, drawing area, UCS icon.

File features: New file, Saving the file, Opening an existing drawing file, Creating templates, Quit.

Setting up new drawing: Units, Limits, Grid, Snap.

Undoing and redoing action.

Unit – VI Computer aided drafting

Draw basic entities like Line, Circle, Arc, Polygon, Ellipse, Rectangle, Multiline, PolyLine.

Method of Specifying points: Absolute coordinates, Relative Cartesian and Polar coordinates.

Modify and edit commands like trim, extend, delete, copy, offset, array, block, layers.

Dimensioning: Linear, Horizontal Vertical, Aligned, Rotated, Baseline, Continuous, Diameter, Radius, Angular Dimensions.

Dim scale variable.

Editing dimensions.

Text: Single line Text, Multiline text.

Standard sizes of sheet. Selecting Various plotting parameters such as Paper size, paper units, Drawing orientation, plot scale, plot offset, plot area, print preview.

S. No.	Practical Exercises	Unit No.	Approx. Hrs
1	Draw horizontal, Vertical, 30 degree, 45 degree, 60 and 75 degrees lines, different types of lines, dimensioning styles using Tee and Set squares/ drafter. (do this exercise in sketch book)	I	02
2	Write alphabets and numerical (Vertical only) (do this exercise in sketch book)	I	02
3	Draw regular geometric constructions and redraw the given figure (do this exercise in sketch book) Part I	II	02
4	Draw regular geometric construction and redraw the given figure (do this exercise in sketch book) Part II	II	02
5	Draw a problem on orthographic projections using first angle method of projection having plain surfaces and slanting. Part I	III	02
6	Draw another problem on orthographic projections using first angle method of projection having slanting surfaces with slots. Part II	III	02

7	Draw two problems on orthographic projections using first angle method of projection having cylindrical surfaces, ribs. Part I	III	02
8	Draw two problems on Isometric view of simple objects having plain and slanting surface by using natural scale. Part I	IV	02
9	Draw some problems on Isometric projection of simple objects having cylindrical surface by using isometric scale. Part I	IV	02
10	Draw free hand sketches/ conventional representation of machine elements in sketch book such as thread profiles, nuts, bolts, studs, set screws, washers, Locking arrangements. Part I	V	02
11	Problem based Learning: Given the orthographic views of at least three objects with few missing lines, the student will try to imagine the corresponding objects, complete the views and draw these views in sketch book. Part I	III, II, V	02
12	Draw basic 2D entities like: Rectangle, Rhombus, Polygon using AutoCAD (Print out should be a part of progressive assessment). Part I	V	02
13	Draw basic 2D entities like: Circles, Arcs, circular using AutoCAD (Printout should be a part of progressive assessment). Part II	V	02
14	Draw basic 2D entities like: Circular and rectangular array using AutoCAD (Printout should be a part of progressive assessment). Part III	V	02
15	Draw blocks of 2D entities comprises of Rectangle, Rhombus, Polygon, Circles, Arcs, circular and rectangular array, blocks using AutoCAD (Print out should be a part of progressive assessment). Part IV	V	02
16	Draw basic branch specific components in 2D using AutoCAD (Print out should be a part of term work). Part I	VI	02
17	Draw complex branch specific components in 2D using AutoCAD (Print should be a part of progressive assessment). Part I	VI	02
	Total		**34**

SUGGESTED LEARNING RESOURCES

1. Bureau of Indian Standards. *Engineering Drawing Practice for Schools and Colleges IS: Sp-46.* BIS. Government of India, Third Reprint, October 1998; ISBN: 81-7061-091-2.
2. Bhatt, N. D. *Engineering Drawing*. Charotar Publishing House, Anand, Gujrat 2010; ISBN: 978-93-80358-17-8.
3. Jain & Gautam, Engineering Graphics & Design, Khanna Publishing House, New Delhi (ISBN: 978-93-86173-478)
4. Jolhe, D. A. *Engineering Drawing*. Tata McGraw Hill Edu. New Delhi, 2010; ISBN: 978-0-07-064837-1
5. Dhawan, R. K. *Engineering Drawing*. S. Chand and Company, New Delhi; ISBN: 81-219-1431-0.
6. Shah, P. J. *Engineering Drawing*. S. Chand and Company, New Delhi, 2008, ISBN:81-219-2964-4.
7. Kulkarni, D. M.; Rastogi, A. P.; Sarkar, A. K. *Engineering Graphics with AutoCAD*. PHI Learning Private Limited-New Delhi (2010); ISBN: 978-8120337831.
8. Jeyapoovan, T. *Essentials of Engineering Drawing and Graphics using AutoCAD*. Vikas Publishing HousePvt. Ltd, Noida, 2011; ISBN: 978-8125953005.
9. Autodesk. *AutoCAD User Guide*. Autodesk Press, USA, 2015.
10. Sham, Tickoo. *AutoCAD 2016 for Engineers and Designers*. Dreamtech Press; Galgotia Publication, New Delhi, 2015; ISBN 978-9351199113.

Software/Learning Websites

1. https://www.youtube.com/watch?v=TJ4jGyD-WCw
2. https://www.youtube.com/watch?v=dmt6_n7Sgcg
3. https://www.youtube.com/watch?v=_MQScnLXL0M
4. https://www.youtube.com/watch?v=3WXPanCq9LI
5. https://www.youtube.com/watch?v=fvjk7PlxAuo
6. http://www.me.umn.edu/coursesme2011/handouts/engg%20graphics.pdf
7. https://www.machinedesignonline.com

Course Outcomes

Following outcomes will be achieved:

1) Select and construct appropriate drawing scales, use drawing equipment's, and understand Indian Standards of engineering drawing

2) Draw views of given object and components 3) Sketch orthographic projections into isometric projections and vice versa.

3) Apply computer aided drafting tools to create 2D engineering drawings

DIPLOMA WING
RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

SEMESTER I – GROUP 'A'

COURSE TITLE	:	ENGINEERING WORSHOP PRACTICE
PAPER CODE	:	--
SUBJECT CODE	:	--
TREORY CREDITS	:	00
PRACTICAL CREDITS	:	02

Course Objectives:

- To understand basic engineering processes for manufacturing and assembly.
- To understand, identify, select and use various marking, measuring, and holding, striking and cutting tools and equipment's
- To understand and interpret job drawings, produce jobs, and inspect the job for specified dimensions
- To understand the various types of wiring systems and acquire skills in house wiring
- To understand, operate, control different machines and equipment's adopting safety practices

Course Content:

S.No.	Details Of Practical Content
I	**Carpentry:** i) Demonstration of different wood working tools / machines. ii) Demonstration of different wood working processes, like plaining, marking, chiseling, grooving, turning of wood etc. iii) One simple job involving any one joint like mortise and tenon dovetail, bridle, half lap etc.
II	**Fitting:** i) Demonstration of different fitting tools and drilling machines and power tools ii) Demonstration of different operations like chipping, filing, drilling, tapping, sawing, cutting etc. iii) One simple fitting job involving practice of chipping, filing, drilling, tapping, cutting etc
III	**Welding:** i) Demonstration of different welding tools / machines. ii) Demonstration on Arc Welding, Gas Welding, MIG, MAG welding, gas cutting and rebuilding of broken parts with welding. iii) One simple job involving butt and lap joint
IV	**Sheet Metal Working:** i) Demonstration of different sheet metal tools / machines. ii) Demonstration of different sheet metal operations like sheet cutting, bending, edging, end curling, lancing, soldering, brazing, and riveting. iii) One simple job involving sheet metal operations and soldering and riveting.
V	**Electrical House Wiring:** Practice on simple lamp circuits (i) one lamp controlled by one switch by surface conduit wiring, (ii) Lamp circuits- connection of lamp and socket by separate switches, (iii) Connection of Fluorescent lamp/tube light, (iv) simple lamp circuits-install bedroom lighting. And (v) Simple lamp circuits- install stair case wiring.
VI	**Demonstration:** i) Demonstration of measurement of Current, Voltage, Power and Energy. ii) Demonstration of advance power tools, pneumatic tools, electrical wiring tools and accessories. iii) Tools for Cutting and drilling

References:

2. S.K. Hajara Chaudhary, Workshop Technology, Media Promoters and Publishers, New Delhi, 2015
3. B.S. Raghuwanshi, Workshop Technology, Dhanpat Rai and sons, New Delhi 2014
4. K. Venkat Reddy, Workshop Practice Manual, BS Publications, Hyderabad 2014
5. Kents Mechanical Engineering Hand book, John Wiley and Sons, New York

Course outcomes

At the end of the course, the student will be able to:

CO1	Acquire skills in basic engineering practice to identify, select and use various marking, measuring, and holding, striking and cutting tools & equipment's and machines
CO2	Understand job drawing and complete jobs as per specifications in allotted time
CO3	Inspect the job for the desired dimensions and shape
CO4	Operate, control different machines and equipment's adopting safety practices

DIPLOMA WING
RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

SEMESTER I – GROUP 'A'

COURSE TITLE	:	SPORTS AND YOGA
PAPER CODE	:	--
SUBJECT CODE	:	--
TREORY CREDITS	:	00
PRACTICAL CREDITS	:	01

Course Objectives:

- To make the students understand the importance of sound health and fitness principles as they relate to better health.
- To expose the students to a variety of physical and yogic activities aimed at stimulating their continued inquiry about Yoga, physical education, health and fitness.
- To create a safe, progressive, methodical and efficient activity based plan to enhance improvement and minimize risk of injury.
- To develop among students an appreciation of physical activity as a lifetime pursuit and a means to better health.

Course Content:

- **Introduction to Physical Education**
  - Meaning & definition of Physical Education
  - Aims & Objectives of Physical Education
  - Changing trends in Physical Education
- **Olympic Movement**
  - Ancient & Modern Olympics (Summer & Winter)
  - Olympic Symbols, Ideals, Objectives & Values
  - Awards and Honours in the field of Sports in India (Dronacharya Award, Arjuna Award, Dhayanchand Award, Rajiv Gandhi Khel Ratna Award etc.)
- **Physical Fitness, Wellness & Lifestyle**
  - Meaning & Importance of Physical Fitness & Wellness
  - Components of Physical fitness
  - Components of Health related fitness
  - Components of wellness
  - Preventing Health Threats through Lifestyle Change
  - Concept of Positive Lifestyle

- **Fundamentals of Anatomy & Physiology in Physical Education, Sports and Yoga**
    - Define Anatomy, Physiology & Its Importance
    - Effect of exercise on the functioning of Various Body Systems. (Circulatory System, Respiratory System, Neuro-Muscular System etc.)

- **Kinesiology, Biomechanics & Sports**
    - Meaning & Importance of Kinesiology & Biomechanics in Physical Edu. & Sports
    - Newton's Law of Motion & its application in sports.
    - Friction and its effects in Sports.
- **Postures**
    - Meaning and Concept of Postures.
    - Causes of Bad Posture.
    - Advantages & disadvantages of weight training.
    - Concept & advantages of Correct Posture.
    - Common Postural Deformities – Knock Knee; Flat Foot; Round Shoulders; Lordosis, Kyphosis, Bow Legs and Scoliosis.
    - Corrective Measures for Postural Deformities

- **Yoga**
    - Meaning & Importance of Yoga
    - Elements of Yoga
    - Introduction - Asanas, Pranayama, Meditation & Yogic Kriyas
    - Yoga for concentration & related Asanas (Sukhasana; Tadasana; Padmasana & Shashankasana)
    - Relaxation Techniques for improving concentration - Yog-nidra
- **Yoga & Lifestyle**
    - Asanas as preventive measures.
    - Hypertension: Tadasana, Vajrasana, Pavan Muktasana, Ardha Chakrasana, Bhujangasana, Sharasana.
    - Obesity: Procedure, Benefits & contraindications for Vajrasana, Hastasana, Trikonasana, Ardh Matsyendrasana.
    - Back Pain: Tadasana, Ardh Matsyendrasana, Vakrasana, Shalabhasana, Bhujangasana.
    - Diabetes: Procedure, Benefits & contraindications for Bhujangasana, Paschimottasana, Pavan Muktasana, Ardh Matsyendrasana.
    - Asthema: Procedure, Benefits & contraindications for Sukhasana, Chakrasana, Gomukhasana, Parvatasana, Bhujangasana, Paschimottasana, Matsyasana.

- **Training and Planning in Sports**
  - Meaning of Training
  - Warming up and limbering down
  - Skill, Technique & Style
  - Meaning and Objectives of Planning.
  - Tournament – Knock-Out, League/Round Robin & Combination.
- **Psychology & Sports**
  - Definition & Importance of Psychology in Physical Edu. & Sports
  - Define & Differentiate Between Growth & Development
  - Adolescent Problems & Their Management
  - Emotion: Concept, Type & Controlling of emotions
  - Meaning, Concept & Types of Aggressions in Sports.
  - Psychological benefits of exercise.
  - Anxiety & Fear and its effects on Sports Performance.
  - Motivation, its type & techniques.
  - Understanding Stress & Coping Strategies.
  - Doping
    - Meaning and Concept of Doping
    - Prohibited Substances & Methods
    - Side Effects of Prohibited Substances
  - **Sports Medicine**
    - First Aid – Definition, Aims & Objectives.
    - Sports injuries: Classification, Causes & Prevention.
    - Management of Injuries: Soft Tissue Injuries and Bone & Joint Injuries
  - **Sports / Games**

    Following sub topics related to any one Game/Sport of choice of student out of: Athletics, Badminton, Basketball, Chess, Cricket, Kabaddi, Lawn Tennis, Swimming, Table Tennis, Volleyball, Yoga etc.
    - History of the Game/Sport.
    - Latest General Rules of the Game/Sport.
    - Specifications of Play Fields and Related Sports Equipment.
    - Important Tournaments and Venues.
    - Sports Personalities.
    - Proper Sports Gear and its Importance.

References:

1. Modern Trends and Physical Education by Prof. Ajmer Singh.
2. Light On Yoga By B.K.S. Iyengar.
3. Health and Physical Education – NCERT (11th and 12th Classes)

Course Outcomes:

On successful completion of the course the students will be able to:

(i) Practice Physical activities and Hatha Yoga focusing on yoga for strength, flexibility, and relaxation.

(ii) Learn techniques for increasing concentration and decreasing anxiety which leads to stronger academic performance.

(iii) Learn breathing exercises and healthy fitness activities

(iv) Understand basic skills associated with yoga and physical activities including strength and flexibility, balance and coordination.

(v) Perform yoga movements in various combination and forms.

(vi) Assess current personal fitness levels.

(vii) Identify opportunities for participation in yoga and sports activities.

(viii) Develop understanding of health-related fitness components: cardiorespiratory endurance, flexibility and body composition etc.

(ix) Improve personal fitness through participation in sports and yogic activities.

(x) Develop understanding of psychological problems associated with the age and lifestyle.

(xi) Demonstrate an understanding of sound nutritional practices as related to health and physical performance.

(xii) Assess yoga activities in terms of fitness value.

(xiii) Identify and apply injury prevention principles related to yoga and physical fitness activities.

(xiv) Understand and correctly apply biomechanical and physiological principles elated to exercise and training

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INDUCTION PROGRAM

Please refer Appendix IV for guidelines.

The Essence and Details of Induction program can also be understood from the 'Detailed Guide on Student Induction program', as available on AICTE Portal, although that is for UG students of Engineering & Technology
(Link:https://www.aicteindia.org/sites/default/files/Detailed%20Guide%20on%20Student%20Induction%20program.pdf).

Induction program (mandatory)	Two-week duration
Induction program for students to be offered right at the start of the first year.	• Physical activity • Creative Arts • Universal Human Values • Literary • Proficiency Modules • Lectures by Eminent People • Visits to local Areas • Familiarization to Dept./Branch & Innovations



Appendix - IV
Student Induction Program

STUDENT INDUCTION PROGRAM

The students will have to undergo a mandatory induction program as part of their Diploma Programme Curriculum right at the start of the first year. The duration of the induction program will be of two weeks wherein students will undergo a wide variety of activities without actually starting with their usual classes. Normal classes will start only after the induction program is over.

This will help build confidence among the new students, instil a sense of connect and appreciation towards their institution, provide them with the comfortable environment to adjust and pick up friendship with other students, facilitate them to get to know important functionaries and faculty members of the institution, equip them with human and social values.

The Induction Program will help the new students in building social character, leadership qualities, self-confidence, creativity and appreciation for mankind and nature at large. In nutshell, the induction program is envisaged to give the new students the broader foundational experience for the lifelong success.

The new students, in the process, will get to learn about various processes and procedures in place in the institution, facilities and best practices, student activities, and the culture & values prevailing in the institution. The Program is also expected to be used for rectifying some critical lacunas, for example, Communication Skills in English for those students who have deficiency in it. Such students can be identified by conducting diagnostic tests and special Proficiency Modules can be conducted for them.

The mentor-mentee groups of the students are formed with each group comprising small number of students and being associated with a faculty mentor. Then the different activities start with a healthy daily routine.

The suggestive list of activities is as mentioned below:

- Physical Activity
- Creative Arts and Culture
- Mentoring & Universal Human Values
- Familiarization with the institution, Dept./Branch
- Literary Activity
- Proficiency Modules
- Lectures & Workshops by Eminent People
- Visits in Local Area
- Extra-Curricular Activities in the institution
- Feedback and Report on the Program

Induction Program Schedule (Suggestive only)

Note: It is presumed that the first year students are so divided into two major groups that the number of students in each group is almost equal with some branches forming part of Group-I while the rest of the branches being part of Group-II.

Time	**Activity**	**Students' Group**	**Venue**
Whole day	Students arrive - Hostel allotment	I & II	
DAY 1			
9.30 am – 10.45 am	Mentor-mentee groups - Introduction within group.	I	Suitable Venue as per number of mentor-mentee groups
	Screening of Institute Documentary Movie; video clips of various functions and events	II	Conference/Seminar Hall
11.00 am – 12.15 pm	Mentor-mentee groups - Introduction within group.	II	Suitable Venue as per number of mentor-mentee groups
	Screening of Institute Documentary Movie; video clips of various functions and events	I	Conference/Seminar Hall
12.30 pm – 2.30 pm	Lunch	I & II	Respective Hostels
3.30 pm – 5.30 pm	Institute Excursion	I & II	Around the Campus
5.30 pm – 9.30 pm	Rest and Dinner	I & II	Respective Hostels
DAY 2			
6:00 am	Wake up call	I & II	Respective Hostels
6:30 am -7:20 am	Physical activity (mild exercise/yoga)	I & II	Sports Ground
7.30 am -9.20 am	Bath, Breakfast etc.	I & II	Respective Hostels
9.30 am – 12.30 pm	Presentation cum Interactive Session with: Important Institution Functionaries like Principal, HoDs etc.	I	Conference/Seminar Hall
	Visit to Respective Departments	II	Respective Departments
12.30 pm – 2.30 pm	Lunch	I & II	Respective Hostels
2.30 pm – 5.30 pm	Presentation cum Interactive Session with: Important Institution Functionaries like Principal, HoDs etc.	II	Conference/Seminar Hall
	Visit to Respective Departments	I	Respective Departments
DAY 3			
6:00 am	Wake up call	I & II	Respective Hostels
6:30 am -7:20 am	Physical activity (mild exercise/yoga)	I & II	Sports Ground
7.30 am -9.20 am	Bath, Breakfast etc.	I & II	Respective Hostels
9.30 am – 10.30 am	Diagnostic test (for English)	I & II	Suitable venue as per strength of students

10.30 am – 11.00 am	Break	I & II	
11.00 am – 12.30 pm	Universal Human Values	I (Section wise-)	Suitable venue as per number of sections
	Creative Arts / Technical Workshops / Proficiency Modules	II (Section wise)	Suitable venue as per number of sections
12.30 pm – 2.30 pm	Lunch	I & II	Respective Hostels
2.30 pm – 4.00 pm	Universal Human Values	II (Section wise-)	Suitable venue as per number of sections
	Creative Arts / Technical Workshops / Proficiency Modules	I (Section wise)	Suitable venue as per number of sections
4.00 pm – 4.30 pm	Break	I & II	
4.30 pm – 6.30 pm	Lecture Sessions or Films on Universal Human Values / Cultural / Talent hunt Activities / Performances by Classical or folk artists	II	Conference/Seminar Hall
	Sports & Games	I	Sports Ground
2.30 pm – 6.30 pm	Local visits	02/03 sections (by rotation)	Historical places in and around the area
6.30 pm – 9.30 pm	Rest and Dinner	I & II	Respective Hostels
DAY 4			
6:00 am	Wake up call	I & II	Respective Hostels
6:30 am - 7:20 am	Physical activity (mild exercise/yoga)	I & II	Sports Ground
7.30 am - 9.20 am	Bath, Breakfast etc.	I & II	Respective Hostels
9.30 am – 10.30 am	Universal Human Values	I (Section wise)	Suitable venue as per number of sections
	Presentation cum Interactive Session with Eminent Alumni/Eminent Speaker	II	Conference/Seminar Hall
10.30 am – 11.00 am	Break	I & II	
11.00 am – 12.00 pm	Creative Arts / Technical Workshops / Proficiency Modules	I (Section wise)	Suitable venue as per number of sections
	Presentation cum Interactive Session with Eminent Alumni/Eminent Speaker	II	Conference/Seminar Hall
12.30 pm – 2.30 pm	Lunch Break	I & II	Respective Hostels
2.30 pm – 3.30 pm	Universal Human Values	II (Section wise)	Suitable venue as per number of sections
	Presentation cum Interactive Session with Eminent Alumni/Eminent Speaker	I	Conference/Seminar Hall

3.30 pm – 4.30 pm	Creative Arts / Technical Workshops / Proficiency Modules	II (Section wise)	Suitable venue as per number of sections
	Presentation cum Interactive Session with Eminent Alumni/Eminent Speaker	I	Conference/Seminar Hall
4.30 pm – 5.00 pm	Break	I & II	
5.00 pm – 7.00 pm	Lecture Sessions or Films on Universal Human Values / Cultural / Talent hunt Activities / Performances by Classical or folk artists	II	Conference/Seminar Hall
	Sports & Games	I	Sports Ground
2.30 pm – 7.00 pm	Local visits	02/03 sections (by rotation)	Historical places in and around the area
7.00 pm – 9.30 pm	Rest and Dinner	I & II	Respective Hostels
DAY 5			
6:00 am	Wake up call	I & II	Respective Hostels
6:30 am -7:20 am	Physical activity (mild exercise/yoga)	I & II	Sports Ground
7.30 am -9.20 am	Bath, Breakfast etc.	I & II	Respective Hostels
9.30 am – 10.30 am	Universal Human Values	II (Section wise)	Suitable venue as per number of sections
	Presentation cum Interactive Session with Eminent Alumni/Eminent Speaker	I	Conference/Seminar Hall
10.30 am – 11.00 am	Break	I & II	
11.00 am – 12.00 pm	Creative Arts / Technical Workshops / Proficiency Modules	II (Section wise)	Suitable venue as per number of sections
	Presentation cum Interactive Session with Eminent Alumni/Eminent Speaker	I	Conference/Seminar Hall
12.30 pm – 2.30 pm	Lunch Break	I & II	Respective Hostels
2.30 pm – 3.30 pm	Universal Human Values	I (Section wise)	Suitable venue as per number of sections
	Presentation cum Interactive Session with Eminent Alumni/Eminent Speaker	II	Conference/Seminar Hall
3.30 pm – 4.30 pm	Creative Arts / Technical Workshops / Proficiency Modules	I (Section wise)	Suitable venue as per number of sections
	Presentation cum Interactive Session with Eminent Alumni/Eminent Speaker	II	Conference/Seminar Hall
4.30 pm – 5.00 pm	Break	I & II	

5.00 pm – 7.00 pm	Lecture Sessions or Films on Universal Human Values / Cultural / Talent hunt Activities / Performances by Classical or folk artists (coordinated by Students' Clubs and Technical Societies)	I	Conference/Seminar Hall
	Sports & Games	II	Sports Ground
2.30 pm – 7.00 pm	Local visits	02/03 sections (by rotation)	Historical places in and around the area
7.00 pm – 9.30 pm	Rest and Dinner	I & II	Respective Hostels
DAY 6			
6:00 am	Wake up call	I & II	Respective Hostels
6:30 am -7:20 am	Physical activity (mild exercise/yoga)	I & II	Sports Ground
7.30 am -9.20 am	Bath, Breakfast etc.	I & II	Respective Hostels
9.30 am – 10.30 am	Universal Human Values	I (Section wise)	Suitable venue as per number of sections
	Presentation cum Interactive Session with Eminent Alumni/Eminent Speaker	II	Conference/Seminar Hall
10.30 am – 11.00 am	Break	I & II	
11.00 am – 12.00 pm	Creative Arts / Technical Workshops / Proficiency Modules	I (Section wise)	Suitable venue as per number of sections
	Presentation cum Interactive Session with Eminent Alumni/Eminent Speaker	II	Conference/Seminar Hall
12.30 pm – 2.30 pm	Lunch Break	I & II	Respective Hostels
2.30 pm – 3.30 pm	Universal Human Values	II (Section wise)	Suitable venue as per number of sections
	Presentation cum Interactive Session with Eminent Alumni/Eminent Speaker	I	Conference/Seminar Hall
3.30 pm – 4.30 pm	Creative Arts / Technical Workshops / Proficiency Modules	II (Section wise)	Suitable venue as per number of sections
	Presentation cum Interactive Session with Eminent Alumni/Eminent Speaker	I	Conference/Seminar Hall
4.30 pm – 5.00 pm	Break	I & II	
5.00 pm – 7.00 pm	Lecture Sessions or Films on Universal Human Values / Cultural / Talent hunt Activities / Performances by Classical or folk artists (coordinated by Students' Clubs and Technical Societies)	II	Conference/Seminar Hall
	Sports & Games	I	Sports Ground

2.30 pm – 7.00 pm	Local visits	02/03 sections (by rotation)	Historical places in and around the area
7.00 pm – 9.30 pm	Rest and Dinner	I & II	Respective Hostels
DAY 7			
6:00 am	Wake up call	I & II	Respective Hostels
6:30 am -7:20 am	Physical activity (mild exercise/yoga)	I & II	Sports Ground
7.30 am -9.20 am	Bath, Breakfast etc.	I & II	Respective Hostels
9.30 am – 10.30 am	Universal Human Values	II (Section wise)	Suitable venue as per number of sections
	Presentation cum Interactive Session with Eminent Alumni/Eminent Speaker	I	Conference/Seminar Hall
10.30 am – 11.00 am	Break	I & II	
11.00 am – 12.00 pm	Creative Arts / Technical Workshops / Proficiency Modules	II (Section wise)	Suitable venue as per number of sections
	Presentation cum Interactive Session with Eminent Alumni/Eminent Speaker	I	Conference/Seminar Hall
12.30 pm – 2.30 pm	Lunch Break	I & II	Respective Hostels
2.30 pm – 3.30 pm	Universal Human Values	I (Section wise)	Suitable venue as per number of sections
	Presentation cum Interactive Session with Eminent Alumni/Eminent Speaker	II	Conference/Seminar Hall
3.30 pm – 4.30 pm	Creative Arts / Technical Workshops / Proficiency Modules	I (Section wise)	Suitable venue as per number of sections
	Presentation cum Interactive Session with Eminent Alumni/Eminent Speaker	II	Conference/Seminar Hall
4.30 pm – 5.00 pm	Break	I & II	
5.00 pm – 7.00 pm	Lecture Sessions or Films on Universal Human Values / Cultural / Talent hunt Activities / Performances by Classical or folk artists (coordinated by Students' Clubs and Technical Societies)	I	Conference/Seminar Hall
	Sports & Games	II	Sports Ground
2.30 pm – 7.00 pm	Local visits	02/03 sections (by rotation)	Historical places in and around the area
7.00 pm – 9.30 pm	Rest and Dinner	I & II	Respective Hostels
DAY 8			
6:00 am	Wake up call	I & II	Respective Hostels

6:30 am -7:20 am	Physical activity (mild exercise/yoga)	I & II	Sports Ground
7.30 am -9.20 am	Bath, Breakfast etc.	I & II	Respective Hostels
9.30 am – 10.30 am	Universal Human Values	I (Section wise)	Suitable venue as per number of sections
	Presentation cum Interactive Session with Eminent Alumni/Eminent Speaker	II	Conference/Seminar Hall
10.30 am – 11.00 am	Break	I & II	
11.00 am – 12.00 pm	Creative Arts / Technical Workshops / Proficiency Modules	I (Section wise)	Suitable venue as per number of sections
	Presentation cum Interactive Session with Eminent Alumni/Eminent Speaker	II	Conference/Seminar Hall
12.30 pm – 2.30 pm	Lunch Break	I & II	Respective Hostels
2.30 pm – 3.30 pm	Universal Human Values	II (Section wise)	Suitable venue as per number of sections
	Presentation cum Interactive Session with Eminent Alumni/Eminent Speaker	I	Conference/Seminar Hall
3.30 pm – 4.30 pm	Creative Arts / Technical Workshops / Proficiency Modules	II (Section wise)	Suitable venue as per number of sections
	Presentation cum Interactive Session with Eminent Alumni/Eminent Speaker	I	Conference/Seminar Hall
4.30 pm – 5.00 pm	Break	I & II	
5.00 pm – 7.00 pm	Lecture Sessions or Films on Universal Human Values / Cultural / Talent hunt Activities / Performances by Classical or folk artists (coordinated by Students' Clubs and Technical Societies)	II	Conference/Seminar Hall
	Sports & Games	I	Sports Ground
2.30 pm – 7.00 pm	Local visits	02/03 sections (by rotation)	Historical places in and around the area
7.00 pm – 9.30 pm	Rest and Dinner	I & II	Respective Hostels
DAY 9			
6:00 am	Wake up call	I & II	Respective Hostels
6:30 am -7:20 am	Physical activity (mild exercise/yoga)	I & II	Sports Ground
7.30 am -9.20 am	Bath, Breakfast etc.	I & II	Respective Hostels

9.30 am – 10.30 am	Universal Human Values	II (Section wise)	Suitable venue as per number of sections
	Presentation cum Interactive Session with Eminent Alumni/Eminent Speaker	I	Conference/Seminar Hall
10.30 am – 11.00 am	Break	I & II	
11.00 am – 12.00 pm	Creative Arts / Technical Workshops / Proficiency Modules	II (Section wise)	Suitable venue as per number of sections
	Presentation cum Interactive Session with Eminent Alumni/Eminent Speaker	I	Conference/Seminar Hall
12.30 pm – 2.30 pm	Lunch Break	I & II	Respective Hostels
2.30 pm – 3.30 pm	Universal Human Values	I (Section wise)	Suitable venue as per number of sections
	Presentation cum Interactive Session with Eminent Alumni/Eminent Speaker	II	Conference/Seminar Hall
3.30 pm – 4.30 pm	Creative Arts / Technical Workshops / Proficiency Modules	I (Section wise)	Suitable venue as per number of sections
	Presentation cum Interactive Session with Eminent Alumni/Eminent Speaker	II	Conference/Seminar Hall
4.30 pm – 5.00 pm	Break	I & II	
5.00 pm – 7.00 pm	Lecture Sessions or Films on Universal Human Values / Cultural / Talent hunt Activities / Performances by Classical or folk artists (coordinated by Students' Clubs and Technical Societies)	I	Conference/Seminar Hall
	Sports & Games	II	Sports Ground
2.30 pm – 7.00 pm	Local visits	02/03 sections (by rotation)	Historical places in and around the area
7.00 pm – 9.30 pm	Rest and Dinner	I & II	Respective Hostels
DAY 10			
6:00 am	Wake up call	I & II	Respective Hostels
6:30 am -7:20 am	Physical activity (mild exercise/yoga)	I & II	Sports Ground
7.30 am -9.20 am	Bath, Breakfast etc.	I & II	Respective Hostels
9.30 am – 10.30 am	Universal Human Values	I (Section wise)	Suitable venue as per number of sections
	Presentation cum Interactive Session with Eminent Alumni/Eminent Speaker	II	Conference/Seminar Hall
10.30 am – 11.00 am	Break	I & II	

11.00 am – 12.00 pm	Creative Arts / Technical Workshops / Proficiency Modules	I (Section wise)	Suitable venue as per number of sections
	Presentation cum Interactive Session with Eminent Alumni/Eminent Speaker	II	Conference/Seminar Hall
12.30 pm – 2.30 pm	Lunch Break	I & II	Respective Hostels
2.30 pm – 3.30 pm	Universal Human Values	II (Section wise)	Suitable venue as per number of sections
	Presentation cum Interactive Session with Eminent Alumni/Eminent Speaker	I	Conference/Seminar Hall
3.30 pm – 4.30 pm	Creative Arts / Technical Workshops / Proficiency Modules	II (Section wise)	Suitable venue as per number of sections
	Presentation cum Interactive Session with Eminent Alumni/Eminent Speaker	I	Conference/Seminar Hall
4.30 pm – 5.00 pm	Break	I & II	
5.00 pm – 7.00 pm	Lecture Sessions or Films on Universal Human Values / Cultural / Talent hunt Activities / Performances by Classical or folk artists (coordinated by Students' Clubs and Technical Societies)	II	Conference/Seminar Hall
	Sports & Games	I	Sports Ground
2.30 pm – 7.00 pm	Local visits	02/03 sections (by rotation)	Historical places in and around the area
7.00 pm – 9.30 pm	Rest and Dinner	I & II	Respective Hostels
DAY 11			
6:00 am	Wake up call	I & II	Respective Hostels
6:30 am -7:20 am	Physical activity (mild exercise/yoga)	I & II	Sports Ground
7.30 am -9.20 am	Bath, Breakfast etc.	I & II	Respective Hostels
9.30 am – 10.30 am	Universal Human Values	II (Section wise)	Suitable venue as per number of sections
	Presentation cum Interactive Session with Eminent Alumni/Eminent Speaker	I	Conference/Seminar Hall
10.30 am – 11.00 am	Break	I & II	
11.00 am – 12.00 pm	Creative Arts / Technical Workshops / Proficiency Modules	II (Section wise)	Suitable venue as per number of sections
	Presentation cum Interactive Session with Eminent Alumni/Eminent Speaker	I	Conference/Seminar Hall
12.30 pm – 2.30 pm	Lunch Break	I & II	Respective Hostels

2.30 pm – 3.30 pm	Universal Human Values	I (Section wise)	Suitable venue as per number of sections
	Presentation cum Interactive Session with Eminent Alumni/Eminent Speaker	II	Conference/Seminar Hall
3.30 pm – 4.30 pm	Creative Arts / Technical Workshops / Proficiency Modules	I (Section wise)	Suitable venue as per number of sections
	Presentation cum Interactive Session with Eminent Alumni/Eminent Speaker	II	Conference/Seminar Hall
4.30 pm – 5.00 pm	Break	I & II	
5.00 pm – 7.00 pm	Lecture Sessions or Films on Universal Human Values / Cultural / Talent hunt Activities / Performances by Classical or folk artists (coordinated by Students' Clubs and Technical Societies)	I	Conference/Seminar Hall
	Sports & Games	II	Sports Ground
2.30 pm – 7.00 pm	Local visits	02/03 sections (by rotation)	Historical places in and around the area
7.00 pm – 9.30 pm	Rest and Dinner	I & II	Respective Hostels
DAY 12			
6:00 am	Wake up call	I & II	Respective Hostels
6:30 am -7:20 am	Physical activity (mild exercise/yoga)	I & II	Sports Ground
7.30 am -9.20 am	Bath, Breakfast etc.	I & II	Respective Hostels
9.30 am – 10.30 am	Universal Human Values	I (Section wise)	Suitable venue as per number of sections
	Presentation cum Interactive Session with Eminent Alumni/Eminent Speaker	II	Conference/Seminar Hall
10.30 am – 11.00 am	Break	I & II	
11.00 am – 12.00 pm	Creative Arts / Technical Workshops / Proficiency Modules	I (Section wise)	Suitable venue as per number of sections
	Presentation cum Interactive Session with Eminent Alumni/Eminent Speaker	II	Conference/Seminar Hall
12.30 pm – 2.30 pm	Lunch Break	I & II	Respective Hostels
2.30 pm – 3.30 pm	Universal Human Values	II (Section wise)	Suitable venue as per number of sections
	Presentation cum Interactive Session with Eminent Alumni/Eminent Speaker	I	Conference/Seminar Hall
3.30 pm – 4.30 pm	Creative Arts / Technical Workshops / Proficiency Modules	II (Section wise)	Suitable venue as per number of sections
	Presentation cum Interactive Session with Eminent Alumni/Eminent Speaker	I	Conference/Seminar Hall

4.30 pm – 5.00 pm	Break	I & II	
6.00 pm – 8.00 pm	Talent Show and Valedictory Function Principal's Address	I & II	Suitable venue (indoor/ outdoor)
8.00 pm – 9.30 pm	Rest and Dinner	I & II	Respective Hostels

Note:

1. Total duration of the Induction Program is two weeks i.e. 12 working days with Saturdays being working and Sundays off.
2. Sundays can be utilized for screening some Patriotic / Socially Significant Movies in the Jubilee Hall.
3. Faculty mentors would be required to obtain the feedback cum suggestions of the students of their respective groups about the Induction programme on the last day.
4. Coordinators can be assigned for various activities during the induction programme. The suggestive template is as under:
5.

S. No.	**Name of the activity**	**Coordinators**
1.	Visits to different departments and around the campus	HoDs
2.	Physical/Sports activities in the Sports Ground (Morning as well as Evening)	In charge of Physical Education / Sports
3.	• Creative Arts / Technical Workshops. • Lecture Sessions or Films on Universal Human Values / Cultural / Talent hunt Activities / Performances by Classical or folk artists. • Talent Show and Valedictory Function.	In charge of Technical / Cultural activities
4.	Presentation cum Interactive Session with Eminent Alumni/Eminent Speaker	Training & Placement In charge
5.	Universal Human Values	Suitable Faculty members
6.	Proficiency Module (English)	Faculty of English language
7.	Local Visits	Hostel Wardens / Discipline in charge
8.	• Wake up call/Hostel related activities • Arrangements at Valedictory Function	Chief Wardens (Boys/Girls)

Schedule of local visits

Dates	Sections
…	…
…	…
…	…

Note:

1. The faculty mentors of the respective mentor-mentee groups/sections will accompany the students on local visits.
2. The Institute buses, if there, may be made available for the purpose each day or some other arrangements may be made.
3. Attendance of the students be taken at the time of departure and return.

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