DIPLOMAWING

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA,BHOPAL

SCHEME OF STUDIES & EXAMINATIONS (IMPLEMENTED FROM SESSION:JULY-2023)

SECOND SEMESTER-GROUP'B'

:NAME OF THE PROGRAMME:

Cement Technology, Civil Engg., CTM, Electrical Engineering, IC Manufacturing, Mine Surveying, PRPC, Plastic Technology, Printing Technology, Production Engineering ,Textile Technology ,Dairy Engineering , Fire Safety &Technology

S.N.	PAPER CODE	SUBJECT CODE	SUBJECTNAME	THEORY COMPONENT								PRACTICALCOMPONENT					TOTALCREDITS	TOTALMARKS
				HRSPER WEEK	CREDITS	TERM WORK				THEORY PAPER		HRSPER WEEK	CREDITS	LAB WORK	PRACTICAL EXAM/VIVA			
						QUIZ/ASSIGNMENT	MID TERM TEST*		TOTAL	MARKS	DURATION				MARKS	DURATION		
							I	II										
1	7357	201	MATHEMATICS-II	4	4	10	10	10	30	70	03 Hrs.	0	0	0	0	0	4	100
2	7358	202	APPLIED PHYSICS-II	4	4	10	10	10	30	70	03 Hrs.	4	2	20	30	3 Hrs.	6	150
3	7352	203	APPLIED CHEMISTRY	4	4	10	10	10	30	70	03 Hrs.	4	2	20	30	3 Hrs.	6	150
4	7353	204	COMM.SKILLS IN ENGLISH	4	4	10	10	10	30	70	03 Hrs.	2	1	20	30	3 Hrs.	5	150
5			ENGINEERING GRAPHICS	0	0	0	0	0	0	0	0	4	2	40	60	3 Hrs.	2	100
6			ENGG.WORKSHOP PRACTICE	0	0	0	0	0	0	0	0	4	2	40	60	3 Hrs.	2	100
7			LIBERARY	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0
TOTAL				16	16				120	280		20	9	140	210		25	750

NOTE - (1)*Two Best, out of Three Mid Term Tests(Progressive Tests) Marks should be entered here.

GRAND TOTAL OF CREDITS
25

GRAND TOTAL OF MARKS
750

DIPLOMA WING
RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

SEMESTER II – GROUP 'A'

COURSE TITLE	:	MATHEMATICS - II
PAPER CODE	:	7357
SUBJECT CODE	:	201
TREORY CREDITS	:	04
PRACTICAL CREDITS	:	00

Course Content:

Unit	Topics and Sub-topics	Hours	Marks
Unit – I : Determinants and Matrices	Value of the determinants up to 3rd order, consistency of equations, Crammer's rule (equation of two variables only). Algebra of matrices, Types of Matrices, Transpose, Adjoint & Inverse of a matrix.	8	14
Unit–II: Integral Calculus	Integration as inverse operation of differentiation. Simple integration by substitution, integration by parts. Definite integration, Applications of integration for Simple problem on evaluation of area bounded by a curve and axes.	8	14
Unit – III : Co-ordinate Geometry	Equation of straight line in various standard forms(general, two point, slope, intercepts), Angle between two lines. Parallel and Perpendicular lines, General equation of a circle and its characteristics. Introduction of conics section and there standard form (Parabola, Ellipse, Hyperbola)	8	14
Unit–IV: Vector Algebra	Definition notation and rectangular resolution of a vector. Addition and subtraction of vectors. Scalar and vector products of 2 vectors. Application of vector product (Area of triangle and Parallelograms, Perpendicular unit vector Simple problems related to work.	8	14
Unit -V : Differential Equations	Order and Degree of differential equation, General and Particular solution of first order and first degree differential equation by variable separation method (simple problems).	8	14

Course Objectives:

This course is designed to give a comprehensive coverage at an introductory level to the subject of Matrices& Determinants, Integral Calculus, Coordinate geometry, Basic elements of vector algebra and First Order Differential Equations

Course Outcomes:

By the end of the course the students are expected to learn

The students are expected to acquire necessary background in Determinants and Matrices so as to appreciate the importance of the Determinants are the factors that scale different parameterizations so that they all produce same overall integrals, i.e. they are capable of encoding the inherent geometry of the original shape. The cumulative effect of the original quantity or equation is the Integration. The coordinate geometry provides a connection between algebra and geometry through graphs of lines and curves. Tell the difference between a resultant and a concurrent force to model simple physical problems in the form of a differential equation, analyze and interpret the solutions.

References:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers,NewDelhi,40th Edition, 2007.

2. G.B.Thomas, R.L.Finney,CalculusandAnalyticGeometry,AddisonWesley,9thEdition, 1995.

3. S.S. Sabharwal, Sunita Jain, Eagle Parkashan, Applied Mathematics, Vol.I&II, Jalandhar.

4. Comprehensive Mathematics, Vol.I&II by Laxmi Publications, Delhi.

5. Reena Garg & Chandrika Prasad, Advanced Engineering Mathematics, Khanna Publishing House, New Delhi

S.N.	PAPER CODE	SUBJECT CODE	SUBJECT NAME	THEORY COMPONENT								PRACTICAL COMPONENT					TOTAL CREDITS	TOTAL MARKS
				HRS PER WEEK	CREDITS	TERM WORK				THEORY PAPER		HRS PER WEEK	CREDITS	LAB WORK	PRACTICAL EXAM/VIVA			
						QUIZ/ASSIGNMENT	MID TERM TEST*		TOTAL	MARKS	DURATION				MARKS	DURATION		
							I	II										
1	7357	201	MATHEMATICS - II	4	4	10	10	10	30	70	03 Hrs.	0	0	0	0	0	4	100

Blue Print of Question Paper

Time: Three Hours Maximum Marks: 70

Unit	Part-A		Part-B	Part-C	Part-D
	10 Marks	10 Marks	15 Marks	20 Marks	15 Marks
Unit – I : Determinants and Matrices Unit–II: Integral Calculus Unit – III : Co-ordinate Geometry Unit–IV: Vector Algebra Unit -V : Differential Equations	**Pattern:** 5Objective type questions. (one question from each unit.)	**Pattern:** 1 Question of Match the column. 5 parts(one part from each unit.)	**Pattern:** Short Numerical problems.(8 questions set)At least two questions from unit1, 2, 3 And one question fromunit4,5. (5questions are to be attempted).	**Pattern:** Numerical problems. (8 questions set) At least one question from unit1, 2 And two questions from unit3, 4, 5. (5questions are to be attempted).	**Pattern:** Numerical problems.(5/6 questions set, 1 from each unit. (3questions are to be attempted.)
Total Marks =70	**10**	**10**	**15**	**20**	**15**

Question Bank for Mathematics-II

Unit-1 Determinants and Matrices

Part-A

Q.1) Choose the correct answers.

(i) Value of determinant $\begin{vmatrix} 2 & 5 \\ 0 & 1 \end{vmatrix}$ is

(a) 5 (b) 2 (c) 1 (d) 0

(ii) If $\begin{vmatrix} x-2 & 1 \\ 0 & 2 \end{vmatrix} = 0$, then value of x is

(a) $x = 1$ (b) $x = -1$ (c) $x = 2$ (d) $x = -2$

(iii) The matrix $\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$ is

(a) Scalar matrix (b) Unit matrix

(c) Diagonal matrix (d) Lower triangular matrix

(iv) The matrix $\begin{bmatrix} 8 & 7 & 3 \\ 0 & 5 & 2 \\ 0 & 0 & 6 \end{bmatrix}$ is

(a) Scaler matrix (b) Upper triangular matrix

(c) Diagonal matrix (d) Lower triangular matrix

(v) Transpose of the matrix $\begin{bmatrix} 4 & 3 \\ 9 & 7 \end{bmatrix}$ is

(a) $\begin{bmatrix} 4 & 9 \\ 3 & 7 \end{bmatrix}$ (b) $\begin{bmatrix} 3 & 4 \\ 7 & 9 \end{bmatrix}$ (c) $\begin{bmatrix} 7 & 3 \\ 9 & 4 \end{bmatrix}$ (d) $\begin{bmatrix} 4 & 3 \\ 7 & 9 \end{bmatrix}$

(vi) If $A = [\,1 \quad 2]$, $B = \begin{bmatrix} 2 \\ 3 \end{bmatrix}$ then AB is equal to

(a) $[\,2 \quad 6]$ (b) $\begin{bmatrix} 2 \\ 6 \end{bmatrix}$ (c) $[\,8\,]$ (d) $[\,7\,]$

Q.2) Match the column

(A) $\begin{bmatrix} 4 & 3 & -1 \\ 3 & 8 & 0 \end{bmatrix}$	(a) $Diagonal\ matrix$
(B) $\begin{bmatrix} 5 & 0 \\ 0 & 11 \end{bmatrix}$	(b) $Rectengular\ matrix$
(C) $\begin{vmatrix} 6 & 5 \\ 6 & 5 \end{vmatrix}$	(c) 1
(D) $\begin{bmatrix} 3 & 7 \\ 5 & 11 \end{bmatrix}^T$	(d) $\begin{bmatrix} 3 & 5 \\ 7 & 11 \end{bmatrix}$
(E) $\begin{vmatrix} cosx & -sinx \\ sinx & cosx \end{vmatrix}$	(e) 0

Part-B / C

Q.1) If $A = \begin{bmatrix} 2 & -1 \\ 3 & 0 \end{bmatrix}$, $B = \begin{bmatrix} 1 & 2 \\ 2 & -1 \end{bmatrix}$ then find the value of $A^2 - 2B$

Q.2) If $A = \begin{bmatrix} 3 & 2 & 1 \\ 0 & -1 & -2 \end{bmatrix}$, $B = \begin{bmatrix} 4 & 2 & -1 \\ 8 & 1 & 3 \end{bmatrix}$ then verify that

$(A + B)' = A' + B'$

Q.3) Find the value of determinant $\begin{vmatrix} 8 & 7 & 3 \\ 6 & 5 & 2 \\ 11 & 9 & 6 \end{vmatrix}$

Q.4) If $\begin{bmatrix} x & 2 \\ 1 & 3 \end{bmatrix} + 2\begin{bmatrix} 1 & y \\ 3 & 1 \end{bmatrix} = \begin{bmatrix} 0 & 1 \\ 7 & 5 \end{bmatrix}$ then find the value of x and y

Q.5) Solve by crammer rule $4x - 3y = 11,\ 3x + 7y = -1$

Q.6) If $A = \begin{bmatrix} 1 & 2 \\ -1 & 0 \end{bmatrix}$, $B = \begin{bmatrix} 2 & -1 \\ 4 & 3 \end{bmatrix}$ then find the value of $|2A + 3B|$

Q.7) If $A = \begin{bmatrix} 1 & 7 \\ 5 & 2 \end{bmatrix}$, $B = \begin{bmatrix} 1 & -1 \\ 0 & 2 \end{bmatrix}$ then find the value of $(A + B)^T$

Q.8) Solve by crammer rule $2x + y + 1 = 0, x - 2y + 3 = 0$

Q.9) If $x+y=\begin{bmatrix}1 & 2\\ 0 & -1\end{bmatrix}$ and $x-y=\begin{bmatrix}2 & 3\\ 4 & 1\end{bmatrix}$ then find the value of x and y

Q.10) Prove that following matrix is singular

$$\begin{bmatrix}1 & 1 & 2\\ 2 & 5 & 7\\ 2 & -1 & 1\end{bmatrix}$$

Part-D

Q.1) If $A=\begin{bmatrix}1 & 2 & 2\\ 2 & 1 & 2\\ 2 & 2 & 1\end{bmatrix}$ then find A^{-1}

Q.2) Find the inverse of A, where $A=\begin{bmatrix}1 & 3 & 2\\ 2 & -1 & 0\\ 3 & 2 & 1\end{bmatrix}$

Q.3) If $A=\begin{bmatrix}2 & -2\\ -2 & 2\end{bmatrix}$, then show that $A^3=16A$

Q.4) If $A=\begin{bmatrix}2 & 1 & 0\\ 3 & -1 & 4\\ 4 & 2 & 1\end{bmatrix}$ then show that $(A+A^T)$ is a symmetric matrix.

Q.5) If $A=\begin{bmatrix}2 & 1 & 0\\ 3 & -1 & 4\\ 4 & 2 & 1\end{bmatrix}$ then show that $(A-A^T)$ is a skew symmetric matrix.

Unit-II (Integral Calculus)

Part-A

Q.1) Choose the correct answers.

(i) $\int sec^2 x dx =$

(a) $secx$ (b) $tanx+c$

(c) $cosecx$ (d) $cotx+c$

(ii) $\int \frac{1}{x} dx =$

(a) $secx$ (b) $log_e x+c$

(c) $tanx+c$ (d) $tanx$

(iii) $\int_0^{\frac{\pi}{2}} sinx\, dx =$

(a) 0 (b) -1

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

(iv) $\int_0^1 x\, dx =$

(a) $\frac{1}{2}$ (b) 1

(c) 0 (d) 3

(v) $\int 1dx =$

(a) $x + c$ (b) $x^2 + c$

(c) $\frac{1}{x} + c$ (d) c

(vi) $\int_0^1 \frac{dx}{x+1}$

(a) $log_e 2 + c$ (b) $log_e 2$

(c) $log_e 1$ (d) $log_e 1 + c$

Q.2) Match the column

(A) $\int_a^b f(x)\, dx$ (a) $\log_e sinx$

(B) $\int \frac{1}{x} dx$ (b) $sinx$

(C) $\int cosx\, dx$ (c) $log_e x$

(D) $\int tanxdx$ (d) $\int_a^b f(t)$

(E) $\int cotx\, dx$ (e) $log_e secx$

Part-B/C

Q.1) Find $\int \left(ax + \frac{b}{x}\right) dx$

Q.2) Find $\int tan^2 x \, dx$

Q.3) Find $\int xe^x dx$

Q.4) Find $\int_0^2 x^3 \, dx$

Q.5) Find $\int xe^{x^2} dx$

Q.6) Find $\int \frac{1}{x \log_e x} dx$

Q.7) Find $\int \frac{1}{cos^2 x \, sin^2 x} \, dx$

Q.8) Find $\int \sqrt{(1 + sin2x)} dx$

Q.9) Find $\int x \, log_e \, dx$

Q.10) Find $\int \frac{1}{(1+cos2x)} \, dx$

Q11) Find $\int e^x \cos e^x \, dx$

Q.12) Find $\int \frac{sin(\log_e x)}{x} dx$

Q.13) Find $\int \frac{e^{\sqrt{x}}}{\sqrt{x}} dx$

Q.14)Find $\int log_e x dx$

Part-D

Q.1) Find the area bounded by curve,

$y^2 = 4ax$, X-axis, $x = 0 , x = a$

Q.2) Find the area bounded by curve,

$y = 2x + x^2 - x^3$, x − axis $x = -1 , x = 1$

Q.3) Find the area enclosed by curve.

$y^2 = x$, x − axis, $x = 0 , x = 1$

Q.4) Find the area bounded straight line $x + y = a$ and both axes in first quadrant.

Q.5) Find the area bounded straight line $\frac{x}{a} + \frac{y}{b} = 1$ and both axes in first quadrant

Q.6) Find $\int \frac{e^x(1+x)}{sin^2(xe^x)} dx$

Q.7) Find $\int \frac{e^x(1+x)}{cos^2(xe^x)} dx$

Unit-3 (Coordinate Geometry)

Part – A

Q.1) Choose the correct answers.

(i) The general equation of a straight line is:

(a) $ax + by + c = 0$ (b) $ax^2 + bx + c = 0$

(c) $xy = c$ (d) $y = m x^2$

(ii) Slope of the line $5x - 2y + 3 = 0$ is:

(a) 5 (b) -5

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

(iii) X-intercept of line $3x + 6 = 0$ is:

(a) -2 (b) 2

(c) -1 (d) 1

(iv) Condition for parallel lines

(a) $m_1 = m_2$ (b) $m_1 \times m_2 = -1$

(c) $m_1 + m_2 = 0$ (d) $m_1 \times m_2 = 1$

(v) Conic sections are obtained by cutting a:

(a) Sphere (b) Cube

(c) Cone (d) Cylinder

Q.2) Match the column

A. Equation of a line	a. $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$
B. Equation of a Ellipse	b. $y = mx + c$
C. Equation of a parabola	c. $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$
D. Equation of a hyperbola	d. $ax^2 + by^2 + 2gx + 2fy + c = 0$
E. Equation of a Circle	e. $y^2 = 4ax$

Part – B

Q.1) Find the equation of straight line which makes equal intercepts on the axes and passes through (1, 2).

Q.2) Find the equation of line which passes through origin and making angle of 45°.

Q.3) Find the equation of line passes the points $(2,3)$ and $(4,-7)$.

Q.4) If slope of line joining the points $(7,5)$ and $(k,1)$ is -4 then find k.

Q.5) Find the equation to the straight line cutting off intercepts 3 and 2 on axes of X and Y respectively.

Part – C

Q.1) Find the angle between the straight lines $x - \sqrt{3}y = 5$ and $x + \sqrt{3}y = 7$.

Q.2) Find the equation of line perpendicular to the line $2x - 3y + 5 = 0$ and passing through point (1, 1).

Q.3). Find the equation to a line passing through $(1,2)$ and parallel to the line

$2x + 3y = 4$.

Q.4) Find the equation of circle whose centre at $(2,-3)$ and having radius 5.

Q.5) Prove that the straight lines $y + 2x + 1 = 0$ and $2y - x + 3 = 0$ are perpendicular to each other.

Part – D

Q.1) Find the equation of line passing through $(1, 2)$ and parallel to the line passing through $(2,5)$ and $(4,1)$.

Q.2) Find the equation of line passing through $(-4, -3)$ and perpendicular to the line passing (1, 3) and (2, 7)

Q.3) Find the centre and radius of the circle

$3x^2 + 3y^2 - 5x - 6y + 4 = 0$

Q.4) Find the centre and radius of the circle

$9x^2 + y^2 = 4(x^2 - y^2 - 2x)$

Q.5) Find the centre and radius of the circle

$x^2 + y^2 - 14x - 18y - 14 = 0$

Unit-4 (Vector Algebra)

Part – A

Q.1) Choose the correct answers.

(i) Modulus of vector $4\hat{\imath} - 2\hat{\jmath} + 3\hat{k}$ is

(a) $\sqrt{11}$ (b) $\sqrt{29}$
(c) $\sqrt{21}$ (d) 3

(ii) Scalar product of vectors $2\hat{\imath} + 3\hat{\jmath} + 4\hat{k}$ and $\hat{\imath} + 2\hat{\jmath} + 3\hat{k}$ is

(a) 20 (b) 15
(c) 12 (d) 8

(ii) If vectors $\hat{\imath} + 4\hat{\jmath} + 3\hat{k}$ and $x\hat{\imath} + 2\hat{\jmath} - 4\hat{k}$ are mutually perpendicular then value of "x" is

(a) 0 (b) 2
(c) 3 (d) 4

(iv) If vectors $\vec{a}$ and $\vec{b}$ perpendicular then

(a) $\vec{a} \times \vec{b} = \vec{0}$ (b) $\vec{a}.\vec{b} = 1$

(c) $\vec{a}.\vec{b} = 0$ (d) $\left|\vec{a} \times \vec{b}\right| = 0$

(v) If vectors $\vec{a}$ and $\vec{b}$ are parallel then

(a) $\vec{a} \times \vec{b} = \vec{0}$ (b) $\vec{a}.\vec{b} = 1$

(c) $\vec{a}.\vec{b} = 0$ (d) $\left|\vec{a} \times \vec{b}\right| = 1$

Q.2) Match the column of following

(A) $\left\|6\hat{\imath} + 3\hat{\jmath} - 2\hat{k}\right\|$	(a) 1
(B) $\hat{\imath}.\hat{\imath}$	(b) 0
(C) $\hat{\jmath}.\hat{k}$	(c) 2
(D) $(2\hat{\imath} + 4\hat{\jmath}).(3\hat{\imath} - \hat{\jmath})$	(d) $\vec{0}$
(E) $\hat{\imath} \times \hat{\imath}$	(e) 7

Part – B/C

Q.1) If $\vec{a} = 2\hat{\imath} + \hat{\jmath} + \hat{k}$, $\vec{b} = -\hat{\imath} + \hat{\jmath} + \hat{k}$ then prove that $\vec{a}$ and $\vec{b}$ are perpendicular.

Q.2) If the position vectors of points P and Q are $2\hat{\imath} + 3\hat{\jmath} - \hat{k}$ and $4\hat{\imath} - 3\hat{\jmath} + 2\hat{k}$ then find $\overrightarrow{PQ}$.

Q.3) If the vectors $\hat{\imath} + 4\hat{\jmath} + 3\hat{k}$ and $\lambda\hat{\imath} + 2\hat{\jmath} - 4\hat{k}$ are perpendicular then find value of λ.

Q.4) Calculate the scalar product of $\vec{A} = 3\hat{\imath} + 4\hat{\jmath}$ and $\vec{B} = \hat{\imath} - 2\hat{\jmath}$.

Q.5)Find the unit vector in the direction of $3\hat{\imath} - 5\hat{\jmath} + 8\hat{k}$.

Q.6) If $= 2\hat{\imath} + \hat{\jmath}$, $\vec{b} = \hat{\imath} - \hat{\jmath} + \hat{k}$, then find $\left|\vec{a} \times \vec{b}\right|$.

Q.7) Show that the vectors $2\hat{\imath} - \hat{\jmath} + \hat{k}$, $\hat{\imath} - 3\hat{\jmath} - 5\hat{k}$ and $-\hat{\imath} - 2\hat{\jmath} - 6\hat{k}$ form a right angled triangle.

Q.8) If $|\vec{a} + \vec{b}| = |\vec{a} - \vec{b}|$, then prove that vectors $\vec{a}$ and $\vec{b}$ are perpendicular to each other.

Q.9) If $\vec{a} = \hat{\imath} + 2\hat{\jmath} - 3\hat{k}$, $\vec{b} = 3\hat{\imath} - \hat{\jmath} + 2\hat{k}$ then prove that $\vec{a} + \vec{b}$ and $\vec{a} - \vec{b}$ are perpendicular to each other.

Q.10) Find the unit vector parallel to the resultant of vectors $2\hat{\imath} + 4\hat{\jmath} - 5\hat{k}$ and $\hat{\imath} + 2\hat{\jmath} - 3\hat{k}$.

Part – D

Q.1) Find a vector perpendicular to each of the vectors $3\hat{\imath} + 7\hat{\jmath} + 2\hat{k}$ and

$2\hat{\imath} - 2\hat{\jmath} + 4\hat{k}$.

Q.2) Find the area of parallelogram whose adjacent sides are $3\hat{\imath} + \hat{\jmath} - 2\hat{k}$ and

$\hat{\imath} - 3\hat{\jmath} + 4\hat{k}$.

Q.3) Prove that $\vec{a} \times (\vec{b} + \vec{c}) + \vec{b} \times (\vec{c} + \vec{a}) + \vec{c} \times (\vec{a} + \vec{b}) = \vec{0}$

Q.4) If a force $\vec{F} = 2\hat{\imath} + \hat{\jmath} - \hat{k}$ is applied at a point $A(2, -1, 0)$ and due to this force it is displaced at point $B(2, 1, 0)$. Then calculate work done by force $\vec{F}$.

Q.5) Find area of triangle whose two sides are $\vec{a} = 2i + j - k$ and $\vec{b} = 3i + 2j + k$.

Unit-5 (Ordinary Differential Equation)

Part-A

Q.1) Choose the correct answers.

(i) General solution of differential equation $\frac{dy}{dx} = secxtanx$ is

(a) $y = secx + c$ (b) $y = tanx + c$

(c) $y = cosecx + c$ (d) $y = cotx + c$

(ii) General solution of differential equation $\frac{dy}{dx} = \sec^2 x$ is

(a) $y = secx + c$ (b) $y = tanx + c$

(c) $y = secx$ (d) $y = tanx$

(iii) General solution of differential equation $\frac{dy}{dx} = 2x$ is

(a) $y = x^2$ (b) $y = x^2 + c$ (c) $x = y^2$ (d) $x = y^2 + c$

(iv) General solution of differential equation $2xdx + 2ydy = 0$ is

(a) $x + y = c$ (b) $x^2 + y^2 = c$

(c) $x + y^2 = c$ (d) $x^2 + y = c$

(v) General solution of differential equation $dy = dx$ is

(a) $y = x + c$ (b) $y = x^2 + c$

(c) $y = \frac{1}{x} + c$ (d) $y = log_e x + c$

Q.2) Match the column

(A) $\frac{dy}{dx} = cosx + tanx$ (a) $Order = 2, Degree = 1$

(B) $\frac{d^2y}{dx^2} + 5\frac{dy}{dx} + 8y = e^{4x}$ (b) $Order = 1, Degree = 2$

(C) $\left(\frac{dy}{dx}\right)^2 + 2x\frac{dy}{dx} + y = 0$ (c) $Order = 2, Degree = 2$

(D) $\left[1 + \left(\frac{dy}{dx}\right)^2\right]^{\frac{3}{2}} = k\frac{d^2y}{dx^2}$ (d) $Order = 2, Degree = 3$

(E) $\left(\frac{d^2y}{dx^2}\right)^3 + \omega^2 y = 0$ (e) $Order = 1, Degree = 1$

Part-B / C

Q.1) Solve the differential equation $\frac{dy}{dx} = \frac{y}{1+x^2}$

Q.2) Solve the differential equation $\frac{dy}{dx} + 2xy = 0$

Q.3) Find the general solution of differential equation $e^y \frac{dy}{dx} + e^x = 0$

Q.4) Solve the differential equation $xy^2dx + yx^2dy = 0$

Q.5) Solve the differential equation $(1 + x^2)dy + x\sqrt{1 - y^2}dx = 0$

Q.6) Find the solution of differential equation $\frac{dy}{dx} = e^{x-y} + x^2e^{-y}$

Q.7) Find the solution of differential equation $\frac{dy}{dx} = e^{x-2y} + x^4e^{-2y}$

Q.8) Solve the differential equation $(1 + x^2)dy = (1 + y^2)dx$

Q.9) Solve the differential equation $\frac{dy}{dx} = 1 + x + y + xy$

Q.10) Solve the differential equation $9y\frac{dy}{dx} + 4x = 0$

Part-D

Q.1) Find the particular solution of differential equation $\frac{dy}{dx} = e^{x-y}$, where $y = 1\ at\ x = 0$

Q.2) Solve the differential equation

$tany.sec^2xdx + tanx.sec^2ydy = 0$, given that $x = \frac{\pi}{4}\ and\ y = \frac{\pi}{4}$

Q.3) Solve $3e^xtanydx + (1 + e^x)sec^2ydy = 0$, given that $y(0) = \frac{\pi}{4}$

Q.4) Find the particular solution of differential equation

$\frac{dy}{dx} = e^{x+y},\ where\ y = 1\ at\ x = 1$

Q.5) Find the solution of differential equation

$\frac{dy}{dx} = sec^2x, where\ y = 1\ at\ x = \frac{\pi}{4}$

Q.6) Find the particular solution of $x\frac{dy}{dx} + coty = 0$, if $y = \frac{\pi}{4}\ when\ x = \sqrt{2}$

Module Question Paper-1

Mathematics-II

Time: Three Hours Maximum Marks: 70

Note: All parts are mandatory (सभी भाग अनिवार्य हैं।)

Part-A

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

सही उत्तर का चयन कीजिए।

(i) Value of following determinant is (निम्न लिखित सारणिक का मान हैं)

$$\begin{vmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{vmatrix}$$

(a) 1 (b) 24

(c) 0 (d) -3

(ii) $\int cotxdx$ is equal to

$\int cotxdx$ का मान हैं

(a) sec^2x (b) $-cosec^2x$

(c) $tanx$ (d) $log_e sinx$

(iii) $y^2 = 4ax$ Represents ($y^2 = 4ax$ दर्शाता हैं)

(a) Circle वृत्त (b) Ellipse दीर्घवृत्त

(c) Parabola परवलय (d) Hyperbola अतिपरवलय

(iv) Modulus of vector $-3\hat{\imath} + 2\hat{\jmath} + 6\hat{k}$ is

सदिश $-3\hat{\imath} + 2\hat{\jmath} + 6\hat{k}$ का मापांक होगा

(a) -7 (b) 7

(c) ± 7 (d) 0

(v) General solution of differential equation $dy = dx$ is

अवकल समीकरण $dy = dx$ का व्यापक हल हैं

(a) $y = x + c$ (b) $y = x^2 + c$

(c) $y = \frac{1}{x} + c$ (d) $y = log_e x + c$

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

(A) $\begin{vmatrix} 1 & 3 & 5 \\ 0 & 2 & 4 \\ 0 & 0 & 3 \end{vmatrix}$ (a) 1

(B) $\int_0^{\frac{\pi}{2}} sinx\, dx$ (b) 6

(C) Slope of the line $5x - y + 3 = 0$ (c) 2

सरल रेखा $5x - y + 3 = 0$ का ढाल है

(D) $|6\hat{\imath} + 3\hat{\jmath} - 2\hat{k}|$ (d) 5

(E) Degree of equation $\left(\frac{dy}{dx}\right)^2 + y = 0$ (e) 7

अवकल समीकरण $\left(\frac{dy}{dx}\right)^2 + y = 0$ की घात हैं

Part-B

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

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

Q.1) If $\begin{bmatrix} x & 2 \\ 1 & 3 \end{bmatrix} + 2\begin{bmatrix} 1 & y \\ 3 & 1 \end{bmatrix} = \begin{bmatrix} 0 & 1 \\ 7 & 5 \end{bmatrix}$ then find the value of x and y.

यदि $\begin{bmatrix} x & 2 \\ 1 & 3 \end{bmatrix} + 2\begin{bmatrix} 1 & y \\ 3 & 1 \end{bmatrix} = \begin{bmatrix} 0 & 1 \\ 7 & 5 \end{bmatrix}$ तब x और y के मान ज्ञात कीजिए

Q.2) Find the value of determinant $\begin{vmatrix} 1^2 & 2^2 & 3^2 \\ 2^2 & 3^2 & 4^2 \\ 3^2 & 4^2 & 5^2 \end{vmatrix}$

सारणिक $\begin{vmatrix} 1^2 & 2^2 & 3^2 \\ 2^2 & 3^2 & 4^2 \\ 3^2 & 4^2 & 5^2 \end{vmatrix}$ का मान ज्ञात कीजिए

Q.3) Find the value of $\int_0^2 x^3\, dx$

समाकलन $\int_0^2 x^3\, dx$ का मान ज्ञात कीजिए

Q.4) Find the value of $\int tan^2\, x\, dx$

$\int tan^2\, x\, dx$ का मान ज्ञात कीजिए.

Q.5) Find the equation of line passes the points $(2,3)$ and $(4,-7)$.

बिंदुओ $(2,3)$ और $(4,-7)$ से होकर जाने वाली सरल रेखा का समीकरण ज्ञात करो.

Q.6) Find the equation of circle whose centre at $(1,-1)$ and having radius 4.

वृत्त का समीकरण ज्ञात कीजिए जिसका केंद्र $(1,-1)$ तथा त्रिज्या 4 हैं.

Q.7) If $\vec{a} = 2\hat{\imath} + \hat{\jmath} + \hat{k}$, $\vec{b} = -\hat{\imath} + \hat{\jmath} + \hat{k}$ then prove that $\vec{a}$ and $\vec{b}$ are perpendicular.

यदि $\vec{a} = 2\hat{\imath} + \hat{\jmath} + \hat{k}$, $\vec{b} = -\hat{\imath} + \hat{\jmath} + \hat{k}$ तब सिध्द कीजिए की $\vec{a}$ तथा $\vec{b}$ परस्पर लम्बवत सदिश हैं.

Q.8) Find the order and degree of differential equation $\left[1 + \left(\frac{dy}{dx}\right)^2\right]^{\frac{3}{2}} = k\frac{d^2y}{dx^2}$

अवकल समीकरण $\left[1 + \left(\frac{dy}{dx}\right)^2\right]^{\frac{3}{2}} = k\frac{d^2y}{dx^2}$ की कोटि और घात लिखिए

Part-C

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

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

Q.1) Solve by crammer rule $4x - 3y = 11,\ 3x + 7y = -1$

क्रेमर के नियम से $4x - 3y = 11,\ 3x + 7y = -1$ को हल कीजिए

Q.2) Find the value of $\int log_e x dx$

$\int log_e x dx$ का मान ज्ञात कीजिए

Q.3) Find the angle between the straight lines $x - \sqrt{3}y = 5$ and $x + \sqrt{3}y = 7$.

सरल रेखाओं $x - \sqrt{3}y = 5$ और $x + \sqrt{3}y = 7$ के बीच का कोण निकालिए

Q.4) Find the equation to a line passing through $(1,2)$ and parallel to the line $2x + 3y = 4$.

बिंदु $(1,2)$ से होकर जाने वाली तथा $2x + 3y = 4$ के समान्तर सरल रेखा का समीकरण ज्ञात कीजिए

Q.5) If $\vec{a} = 2\hat{\imath} + \hat{\jmath}$, $\vec{b} = \hat{\imath} - \hat{\jmath} + \hat{k}$, then find $|\vec{a} \times \vec{b}|$.

यदि $\vec{a} = 2\hat{\imath} + \hat{\jmath}$, $\vec{b} = \hat{\imath} - \hat{\jmath} + \hat{k}$, तब $|\vec{a} \times \vec{b}|$ ज्ञात कीजिए

Q.6) Find the unit vector parallel to the resultant of vectors $2\hat{\imath} + 4\hat{\jmath} - 5\hat{k}$ and $\hat{\imath} + 2\hat{\jmath} - 3\hat{k}$.

सदिशो $2\hat{\imath} + 4\hat{\jmath} - 5\hat{k}$ और $\hat{\imath} + 2\hat{\jmath} - 3\hat{k}$ के परिणामी सदिश का मात्रक सदिश ज्ञात कीजिए

Q.7) Solve the differential equation $xy^2dx + yx^2dy = 0$

अवकल समीकरण $xy^2dx + yx^2dy = 0$ को हल कीजिए

Q.8) Solve the differential equation $\frac{dy}{dx} = 1 + x + y + xy$

अवकल समीकरण $\frac{dy}{dx} = 1 + x + y + xy$ को हल कीजिए

Part-D

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

(Attempt any five out of eight questions) 5 में से कोई 3 प्रश्न हल कीजिए।

Q.1) If $A = \begin{bmatrix} 1 & 3 & 3 \\ 1 & 4 & 3 \\ 1 & 3 & 4 \end{bmatrix}$, then find A^{-1}

यदि $\mathrm{A} = \begin{bmatrix} 1 & 3 & 3 \\ 1 & 4 & 3 \\ 1 & 3 & 4 \end{bmatrix}$, तब A^{-1} ज्ञात कीजिए

Q.2) Find the area bounded by following curve,

$y^2 = 4ax$, X-axis, $x = 0\,, x = a$

निम्नलिखित वक्रों से घिरे हुए क्षेत्र का क्षेत्रफल ज्ञात कीजिए

$y^2 = 4ax$, X-axis, $x = 0\,, x = a$

Q.3) Find the centre and radius of following equation of circle.

निम्नलिखित वृत्त के समीकरण के लिए केंद्र और त्रिज्या ज्ञात कीजिए

$$x^2 + y^2 - 14x - 18y - 14 = 0$$

Q.4) A particle is displaced from $A(2, -1, 0)$ to the point $B(2, 1, 0)$ under the action of constant force $\vec{F} = 2\hat{\imath} + \hat{\jmath} - \hat{k}$. Find the total work done.

बल $\vec{F} = 2\hat{\imath} + \hat{\jmath} - \hat{k}$ द्वारा एक कण को बिंदु $A(2, -1, 0)$ से बिंदु $B(2, 1, 0)$ पर विस्थापित करने में किये गये कार्य को ज्ञात कीजिए

Q.5) Find the solution of differential equation

$\frac{dy}{dx} = sec^2 x, where\ y = 1\ at\ x = \frac{\pi}{4}$

अवकल समीकरण $\frac{dy}{dx} = sec^2 x$ को हल कीजिए यदि $x = \frac{\pi}{4}$ पर $y = 1$

Module Question Paper-2

Mathematics-II

Time: Three Hours Maximum Marks: 70

Note: All parts are mandatory (सभी भाग अनिवार्य हैं।)

Part-A

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

सही उत्तर का चयन कीजिए

(i) Following matrix is called (निम्न लिखित आव्यूह कहलाता हैं)

$$\begin{bmatrix} 2 & 0 & 0 \\ 0 & 5 & 0 \\ 0 & 0 & 7 \end{bmatrix}$$

(a) Scalar Matrix अदिश आव्यूह (b) Diagonal Matrix विकर्ण आव्यूह

(c) Unit Matrix इकाई आव्यूह (d) Row Matrix पंक्ति आव्यूह

(ii) $\int tanxdx$ is equal to

$\int tanxdx$ का मान हैं

(a) sec^2x (b) $-cosec^2x$

(c) $log_e secx$ (d) $log_e sinx$

(iii) $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ Represents ($\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ दर्शाता हैं)

(a) Circle वृत्त (b) Ellipse दीर्घवृत्त

(c) Parabola परवलय (d) Hyperbola अतिपरवलय

(iv)If vectors $\vec{a} = 2\hat{\imath} + 3\hat{\jmath} + \lambda\hat{k}$ and $\vec{b} = -3\hat{\imath} - 2\hat{\jmath} + 4\hat{k}$ are perpendicular, then value of λ is

यदि $\vec{a} = 2\hat{\imath} + 3\hat{\jmath} + \lambda\hat{k}$ और $\vec{b} = -3\hat{\imath} - 2\hat{\jmath} + 4\hat{k}$ परस्पर लम्बवत सदिश हैं, तब λ का मान हैं

(a) -3 (b) 3

(c) ± 12 (d) -12

(v) Order of differential equation $\sqrt{\frac{dy}{dx}} = \frac{d^2y}{dx^2}$ is

अवकल समीकरण $\sqrt{\frac{dy}{dx}} = \frac{d^2y}{dx^2}$ की कोटि हैं

(a) $\frac{1}{2}$ (b) 2

(c) 4 (d) $2\frac{1}{2}$

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

(A) $\begin{vmatrix} cosx & sinx \\ -sinx & cosx \end{vmatrix}$ (a) $\frac{1}{3}$

(B) $\int_0^1 x^2\,dx$ (b) 1

(C) Slope (m) of the line (c) $x^2 + y^2 = a^2$

सरल रेखा की प्रवणता (m) है.

(D) $(6\hat{\imath} + 3\hat{\jmath}).\left(3\hat{\jmath} - 2\hat{k}\right)$ (d) $tan\theta$

(E) $xdx + ydy = 0$ (e) 9

Part-B

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

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

Q.1) If $A = \begin{bmatrix} 2 & 3 \\ 4 & 0 \end{bmatrix}, B = \begin{bmatrix} -1 & 5 \\ 1 & 6 \end{bmatrix}$ then verify that $(A+B)^T = A^T + B^T$

यदि $A = \begin{bmatrix} 2 & 3 \\ 4 & 0 \end{bmatrix}, B = \begin{bmatrix} -1 & 5 \\ 1 & 6 \end{bmatrix}$ तब सिध्द कीजिए $(A+B)^T = A^T + B^T$

Q.2) Prove that following matrix is singular

$$\begin{bmatrix} 1 & 1 & 2 \\ 2 & 5 & 7 \\ 2 & -1 & 1 \end{bmatrix}$$

सिध्द कीजिए की आव्यूह $\begin{bmatrix} 1 & 1 & 2 \\ 2 & 5 & 7 \\ 2 & -1 & 1 \end{bmatrix}$ अव्युत्क्रमणीय हैं.

Q.3) Find the value of $\int_0^1 \frac{dx}{x+1}$

समाकलन $\int_0^1 \frac{dx}{x+1}$ का मान ज्ञात कीजिए

Q.4) Find the value of $\int \sqrt{(1+sin2x)}dx$

$\int \sqrt{(1+sin2x)}dx$ का मान ज्ञात कीजिए.

Q.5) Find the equation of straight line which makes equal intercepts on the axes and passes through (3, 2).

उस सरल रेखा का समीकरण ज्ञात कीजिए जो दोनों कक्षों से बराबर अन्तः खंड काटती है और बिंदु (3, 2) होकर जाती हैं.

Q.6) Find the equation of circle whose centre at $(-2,3)$ and having radius 5.

वृत्त का समीकरण ज्ञात कीजिए जिसका केंद्र $(-2,3)$ तथा त्रिज्या 5 हैं.

Q.7) If the position vectors of points P and Q are $3\hat{\imath} + 2\hat{\jmath} - \hat{k}$ and $4\hat{\imath} - \hat{\jmath} + 2\hat{k}$ then find $\overrightarrow{PQ}$ and $|\overrightarrow{PQ}|$.

यदि बिंदुओ P तथा Q के स्थिति सदिश क्रमशः $3\hat{\imath} + 2\hat{\jmath} - \hat{k}$ और $4\hat{\imath} - \hat{\jmath} + 2\hat{k}$ हैं तब $\overrightarrow{PQ}$ और $|\overrightarrow{PQ}|$ ज्ञात कीजिए.

Q.8) Find the order and degree of differential equation $\left(\frac{d^2y}{dx^2}\right)^3 + \omega^2\left(\frac{dy}{dx}\right)^4 = 0$

अवकल समीकरण $\left(\frac{d^2y}{dx^2}\right)^3 + \omega^2\left(\frac{dy}{dx}\right)^4 = 0$ की कोटि और घात लिखिए

Part-C

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

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

Q.1) Solve by crammer rule $2x + y + 1 = 0\ and\ x - 2y + 3 = 0$

क्रेमर के नियम से $2x + y + 1 = 0$ और $x - 2y + 3 = 0$ को हल कीजिए

Q.2) Find the value of $\int \frac{e^{\sqrt{x}}}{\sqrt{x}} dx$

$\int \frac{e^{\sqrt{x}}}{\sqrt{x}} dx$ का मान ज्ञात कीजिए

Q.3) Prove that the straight lines $y + 2x + 1 = 0$ and $2y - x + 3 = 0$ are perpendicular to each other.

सिध्द कीजिए की सरल रेखाए $y + 2x + 1 = 0$ और $2y - x + 3 = 0$ परस्पर लम्बवत हैं

Q.4) Find the equation of line passing through $(1, 2)$ and parallel to the line passing through (2,5) and (4,1).

उस सरल रेखा का समीकरण ज्ञात कीजिए जो बिंदु (1,2) से जाती हैं तथा बिंदुओ (2,5) और (4,1) को मिलाने वाली रेखा के समान्तर हैं

Q.5) Find the area of parallelogram whose adjacent sides are $3\hat{\imath} + \hat{\jmath} - 2\hat{k}$ and $\hat{\imath} - 3\hat{\jmath} + 4\hat{k}$.

समान्तर चतुर्भुज का क्षेत्रफल ज्ञात कीजिए जिसकी आसन्न भुजाएं $3\hat{\imath} + \hat{\jmath} - 2\hat{k}$ और $\hat{\imath} - 3\hat{\jmath} + 4\hat{k}$ हैं

Q.6) Show that the vectors $2\hat{\imath} - \hat{\jmath} + \hat{k}$, $\hat{\imath} - 3\hat{\jmath} - 5\hat{k}$ and $-\hat{\imath} - 2\hat{\jmath} - 6\hat{k}$ form a right angled triangle.

सिध्द कीजिए की सदिश $2\hat{\imath} - \hat{\jmath} + \hat{k}$, $\hat{\imath} - 3\hat{\jmath} - 5\hat{k}$ और $-\hat{\imath} - 2\hat{\jmath} - 6\hat{k}$ एक समकोण त्रिभुज का निर्माण करते हैं

Q.7) Solve the differential equation $9y\frac{dy}{dx} + 4x = 0$

अवकल समीकरण $9y\frac{dy}{dx} + 4x = 0$ को हल कीजिए

Q.8) Solve the differential equation $\frac{dy}{dx} = e^{x-2y} + x^4 e^{-2y}$

अवकल समीकरण $\frac{dy}{dx} = e^{x-2y} + x^4 e^{-2y}$ को हल कीजिए

Part-D

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

(Attempt any five out of eight questions) 5 में से कोई 3 प्रश्न हल कीजिए।

Q.1) If $A = \begin{bmatrix} 2 & -2 \\ -2 & 2 \end{bmatrix}$, then show that $A^3 = 16A$

यदि $A = \begin{bmatrix} 2 & -2 \\ -2 & 2 \end{bmatrix}$, तब सिध्द कीजिए $A^3 = 16A$

Q.2) Find the area bounded by straight line $\frac{x}{a} + \frac{y}{b} = 1$ and both axes in first quadrant.

सरल रेखा $\frac{x}{a} + \frac{y}{b} = 1$ और दोनों अक्षो के द्वारा प्रथम चतुर्थांश में घिरे हुए क्षेत्र का क्षेत्रफल ज्ञात कीजिए.

Q.3) Find the centre and radius of following equation of circle.

निम्नलिखित वृत्त के समीकरण के लिए केंद्र और त्रिज्या ज्ञात कीजिए

$$9x^2 + y^2 = 4(x^2 - y^2 - 2x)$$

Q.4) Find a unit vector which is perpendicular to each of the vectors $2\hat{\imath} - \hat{\jmath} + \hat{k}$ and $3\hat{\imath} + 4\hat{\jmath} - \hat{k}$.

वह मात्रक सदिश ज्ञात कीजिए जो सदिशो $2\hat{\imath} - \hat{\jmath} + \hat{k}$ और $3\hat{\imath} + 4\hat{\jmath} - \hat{k}$ प्रत्येक पर लम्बवत हैं.

Q.5) Find the solution of differential equation

$tany.sec^2xdx + tanx.sec^2ydy = 0$, given that $x = \frac{\pi}{4}\ and\ y = \frac{\pi}{4}$

अवकल समीकरण $tany.sec^2xdx + tanx.sec^2ydy = 0$ को हल कीजिए जबकि दिया है $x = \frac{\pi}{4}$ और $y = \frac{\pi}{4}$

DIPLOMA WING
RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

SEMESTER II – GROUP 'B'

COURSE TITLE	:	APPLIED PHYSICS - II
PAPER CODE	:	7358
SUBJECT CODE	:	202
TREORY CREDITS	:	04
PRACTICAL CREDITS	:	02

Course Objectives

Applied Physics aims to give an understanding of this world both by observation and by prediction of the way in which 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 under- stand 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: Wave motion and its applications

Simple Harmonic Motion (SHM): definition, expression for displacement, velocity, acceleration, time-period, frequency, phase etc.

Wave motion, transverse and longitudinal waves with examples, definitions of wave velocity, frequency and wave length and their relationship, Sound and light waves and their properties,

Acoustics of buildings – reverberation, reverberation time, echo, noise, methods to control reverberation time and their applications.
Ultrasonic waves – Introduction and properties, engineering and medical applications of ultrasonic.

UNIT-2: Optics

Basic optical laws; reflection and refraction, refractive index, Critical angle, Total internal reflection, conditions for total internal reflection, applications of total internal reflection, lens and thin lenses, Image formation by lens, lens formula (without derivation), power of lens, magnification.

Optical Instruments; simple and compound microscope and its magnifying power, astronomical telescope in normal adjustment, uses of microscope and telescope.

Fiber Optics: Introduction to optical fibers, light propagation, acceptance angle and numerical aperture, applications in telecommunication and medical field.

UNIT-3: Electrostatics

Coulombs law, unit of charge, Electric field, Electric lines of force and their properties, Electric flux, Electric potential and potential difference, Gauss law, Application of Gauss law to find electric field intensity of straight charged conductor and charged conducting solid and hollow sphere.

Capacitor and its working, Types of capacitors, Capacitance and its units. Capacitance of a parallel plate capacitor, Series and parallel combination of capacitors, dielectric and its effect on capacitance.

UNIT-4: Current Electricity & Electromagnetism

Electric Current and its units, Direct and alternating current, Resistance and its units, Series and parallel combination of resistances, Factors affecting resistance of a wire, carbon resistances and colour coding, Ohm's law, Concept of terminal potential difference and Electro motive force (EMF) Kirchhoff's laws.

Heating effect of current, joule's law, Electric power, Electric energy and its units, Advantages of Electric Energy over other forms of energy.

Magnetic field, magnetic flux and units, Concept of electromagnetic induction, Faraday's Laws, Lorentz force, Force on current carrying conductor, Force on rectangular coil placed in magnetic field, Moving coil galvanometer: principle, construction and working, Conversion of a galvanometer into ammeter and voltmeter.

UNIT-5: Semiconductor and Modern Physics

Types of materials (insulator, semi-conductor, conductor), intrinsic and extrinsic semiconductors, p-n junction, junction diode and V-I characteristics, Diode as rectifier – half wave and full wave rectifier (centre taped)

Laser: spontaneous and stimulated emission; population inversion, pumping methods, optical feedback, Ruby laser and He-Ne laser, Laser characteristics, Engineering and medical applications of lasers.

Nanoscience and Nanotechnology: Introduction, nanoparticles and nano materials, properties at nanoscale, Nanotechnology, nanotechnology-based devices, and applications.

Learning Outcome:-

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

a) Describe waves and wave motion, periodic and simple harmonic motions and solve simple problems. Establish wave parameters: frequency, amplitude, wavelength, and velocity and able to explain relation among them.
b) Explain ultrasonic waves and engineering, medical and industrial applications of Ultrasonic. Apply acoustics principles to various types of buildings for best sound effect.
c) State basic optical laws, establish the location of the images formed by thin converging lens, design and assemble microscope using lenses combination.
d) Describe refractive index of a liquid or a solid and will be able to explain conditions for total internal reflection.

e) Appreciate the potential of optical fiber in fields of medicine and communication.

f) Define capacitance and its unit, explain the function of capacitors in simple circuits, and solve simple problems.

g) Differentiate between insulators, conductors and semiconductors, and define the terms: potential, potential difference, electromotive force.

h) Express electric current as flow of charge, concept of resistance, measure of the parameters: electric current, potential difference, resistance.

i) List the effects of an electric current and its common applications, State Ohm's law, calculate the equivalent resistance of a variety of resistor combinations, distinguish between AC and DC currents, determine the energy consumed by an appliance,

j) State the laws of electromagnetic induction, describe the effect on a current-carrying conductor when placed in a magnetic field.

k) Explain the operation of appliances like moving coil galvanometer.

l) Apply the knowledge of diodes in rectifiers, power adapters and various electronic circuits. Use the knowledge of semiconductors in various technical gadgets like mobile phones, computers, LED, photocells, solar lights etc.

m) Illustrate the conditions for light amplification in various LASER and laser based instruments and optical devices.

n) Express importance of nanoscience and nanotechnology and impact of nanotechnology to the society.

References:

1. Text Book of Physics for Class XI&XII(Part-I, Part-II);N.C.E.R.T., Delhi
2. AppliedPhysics,Vol.IandVol.II,TTTIPublications,TataMcGrawHill,Delhi
3. Concepts in Physics by H.C.Verma, Vol.I &II, Bharti Bhawan Ltd.New Delhi
4. Engineering Physics by PVNaik, Pearson Education Pvt.Ltd, New Delhi.
5. vuqiz;qDr HkkSfrdh&II, vfer tSu ,oa bUnj dqekj flag] lat; ifCyds'ku] t;iqj A
6. e-books/e-tools/learningphysicssoftware/websitesetc.

APPLIED PHYSICS – II LAB

Course Objectives:

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 Practicals/Activities: (To perform minimum 8 Practicals)

1. To determine and verify the time period of a cantilever.

2. To determine velocity of ultrasonic in different liquids using ultrasonic interferometer.

3. To verify laws of reflection from a plane mirror/ interface.

4. To verify laws of refraction (Snell's law) using a glass slab.

5. To determine focal length and magnifying power of a convex lens.

6. To verify Ohm's law by plotting graph between current and potential difference.

7. To verify laws of resistances in series and parallel combination.

8. To verify Kirchhoff's law using electric circuits.

9. To find resistance of a galvanometer by half deflection method.

10. To convert a galvanometer into an ammeter.

11. To convert a galvanometer into a voltmeter.

12. To draw V-I characteristics of a semiconductor diode (Ge, Si) and determine its knee volt- age.

Suggested Student Activities & 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 or descriptive in nature should be given to the students for self-learning and assess the development of competency through classroom presentations/projects.
- Micro-projects on relevant may be given to group of students for hand-on experiences.

Learning Outcome:

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

a) Apply concept of vibrations and determine the time period of vibrating objects.

b) Use of equipment for determining velocity of ultrasonic in different liquids.

c) Verify optical laws; reflection, refraction from plane interfaces and surfaces.

d) Apply knowledge of optics to determine focal length and magnifying power of optical lenses.

e) Understand uses of electrical components and meters and verify Ohm's law for flow of current.

f) Quantify resistances and verify laws of series and parallel combination of resistances.

g) Apply concept of electrical vibrations in determine frequency of AC main.

h) Analyse electrical circuits and verify Kirchhoff's law governing electrical circuits.

i) Measure resistance of a galvanometer and how it is converted into an ammeter and voltmeter.

j) Investigate characteristics of semiconductor diodes.

Recommended Books:

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., New Delhi

3. Practical Physics by C. L. Arora, S. Chand & Company Ltd.

e-books/e-tools/ learning physics software/you Tube videos/ websites etc.

****

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

SEMESTER – II

COURSE TITLE: APPLIED PHYSICS –II

SUBJECT CODE: 202

PAPER CODE: 7358

THEORY CREDIT: 04.

BLUE PRINT OF QUESTION PAPER

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

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	WAVE MOTION AND ITS APPLICATION	1	1	1	1	**14**
2	OPTICS	1	1	1	1	**14**
3	ELECTROSTATICS	1	1	1	1	**14**
4	CURRENT ELECTRICITY & ELECTROMAGNATISM	1	1	1	1	**14**
5	SEMICONDUCTOR & MODERN PHYSICS	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 – II

MODEL QUESTION PAPER : APPLIED PHYSICS –II

SUBJECT CODE: 202 **PAPER CODE: 7358**

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: **2x5 marks**

(i) Which of the following produces ultrasonic waves?

(a) Bat (b) Buzzer (c) Horse (d) None of these.

इनमे से कौन पराश्रव्य तरंगे उत्पन्न करता है :

(a) चमगादड़ (b) घंटी (c) घोड़ा (d) इनमे से कोई नहीं

(ii) Electric current represents:

(a) charge per unit volume (b) charge per unit time

(c) charge per unit area (d) None of these.

विद्युत धारा है :

(a) आवेश प्रति इकाई आयतन (b) आवेश प्रति इकाई समय

(c) आवेश प्रति इकाई क्षेत्रफल (d) इनमे से कोई नहीं

(iii) Focal length of a lens is 50 cm. its power is .....

(a) 1.2D (b) 2.1 D (c) 1 D (d) 2 D.

एक लेंस की फोकस दूरी 50 cm है । इसकी क्षमता ज्ञात है .....

(a) 1.2D (b) 2.1 D (c) 1 D (d) 2 D.

(iv) Current carriers in metallic conductors are?

(a) Free electrons (b) Protons (c) holes (d) neutrons.

धात्विक चालकों में धारा वाहक होते है :

(a) मुक्त इलेक्ट्रान (b) प्रोटॉन (c) होल (d) न्यूट्रॉन

(v) Dielectrics are basically -

(a) Insulators (b) Superconductors (c) Semiconductors (d) Conductors

परावैद्युत मूलतः है -

(a) कुचालक (b) अतिचालक (c) अर्द्धचालक (d) चालक

Q.2 a) Fill in the blank: **1X2 marks**

(i) The distance from one crest to the next is the _____.

एक श्रृंग से दूसरे श्रृंग के मध्य की दूरी .....

(ii) The speed of sound depends on ..... And temperature.

ध्वनि की गति ..... और तापमान पर निर्भर करती है

b) Explain echo and reverberation with example.

प्रतिध्वनि और अनुरणन की समझाइए।

OR (अथवा)

Derive a relation between acceleration and displacement for the particle in SHM. **4 marks**

सरल आवर्त गति करते कण के त्वरण और विस्थापन मे संबंध स्थापित कीजिए ।

c) Define ultrasonic waves. Write in detail the application of ultrasonic waves.

पराश्रव्य तरंगों को परिभाषित कीजिए। इनके चार गुण और चार उपयोग लिखिए।

OR (अथवा)

Differentiate longitudinal and transverse waves **6 marks**

अनुदैर्घ्य और अनुप्रस्थ तरंगों में अंतर लिखिए।

Q.3 a) write the law of reflection and refraction . **2 marks**

परावर्तन और अपवर्तन के नियमों को लिखिए।

b) Explain the principle of optical fiber. Write the applications of optical fiber in telecommunication and medical field. **4 marks**

प्रकाशिक तंतु के सिद्धांत को समझाईए। प्रकाशिक तंतु के उपयोग दूरसंचार और मेडिकल क्षेत्र मे लिखिए ।

OR (अथवा)

Explain total internal reflection and write necessary conditions for it.

पूर्ण आंतरिक परावर्तन को समझाईए और इसकी आवश्यक शर्तें लिखें।

c) Describe the astronomical telescope under following heads: **6 marks**

(i) neat and labeled ray diagram (ii) derivation of the formula of magnifying power.

खगोलीय दूरदर्शी का वर्णन निम्न शीर्षकों के अंतर्गत कीजिए:

(i) स्वच्छ एवं नामांकित किरण आरेख (ii) आवर्धन क्षमता के सूत्र की व्युत्पत्ति।

OR (अथवा)

Derive an expression for magnifying power of compound microscope when final image is form at

(i) least distance of distinct vision. (ii) infinity.

संयुक्त सूक्ष्मदर्शी की आवर्धन क्षमता के लिए सूत्र की स्थापना करें जबकि अंतिम प्रतिबिंब :

(i) सुस्पस्ट दृष्टि की न्यूमतम दूरी पर बने (ii) अनंत पर बने।

Q.4 a) write the vector formula for coulomb's law and electric field intensity. **2 marks**

कूलॉम का नियम और विद्युत क्षेत्र की तीव्रता के सूत्र सदिश रूप मे लिखिए ।

b) Derive an expression for the equivalent capacitance in series combination. **4 marks**

श्रेणीक्रम संयोजन में समतुल्य धारिता के लिए व्यंजक व्युत्पन्न करें।

OR (अथवा)

Define the dielectric materials. Explain its effect on capacitance.

परावैद्युत पदार्थों को परिभाषित कीजिए। इनके धारिता पर प्रभाव को समझाईए ।

c) Find the electric field intensity of straight charged conductor of infinite length with the help of Gauss' law. **6 marks**

गॉस के नियम की सहायता से अनंत लंबाई के सीधे चालक की विद्युत क्षेत्र की तीव्रता ज्ञात कीजिए।

OR (अथवा)

Explain the electric flux and write its unit. Also write the any four properties of electric line of force.

विद्युत फ्लक्स को समझाते हुए इसका मात्रक लिखिए। विद्युत बल रेखाओं के चार गुण लिखिए।

Q.5 a) **match the column:** **2 marks**

(i) Joule's law	(a) $R=R_1R_2/(R_1+R_2)$
(ii) Ohm's law	(b) $H = I^2RT$
(iii) Series combination of resistances.	(c) $R = R_1+R_2$
(iv) parallel combination of resistances	(d) $V = IR$

सही मिलान करें :

(i) जूल का नियम	(a) $R=R_1R_2/(R_1+R_2)$
(ii) ओम का नियम	(b) $H = I^2RT$
(iii) प्रतिरोधों का श्रेणी क्रम संयोजन	(c) $R = R_1+R_2$
(iv) प्रतिरोधों का समांतर क्रम संयोजन	(d) $V = IR$

b) Explain the Kirchhoff's law. **4 marks**

किरचॉफ के नियमों को समझाईए ।

OR (अथवा)

Explain the Faraday's law of electromagnetic induction.

फैराडे के विद्युत चुंबकीय प्रेरण के नियमों को समझाइए।

c) Define Lorentz force. Derive an expression for the force on a current carrying conductor in a magnetic field. **6 marks**

लॉरेंज बल को परिभाषित कीजिए। धारावाही चालक पर चुंबकीय क्षेत्र मे लगाने वाले बल के लिए व्यंजक स्थापित करें।

OR (अथवा)

Explain the construction and principal of moving coil galvanometer.

चल कुंडल धारामापी की सिद्धांत और कार्यविधि को समझाईए ।

Q.6 a) match the column: **2 marks**

(i) Energy band gap of Si	(a) 0
(ii) laser is	(b) very small in size
(iii) nano-materials are	(c) 1.1 eV
(iv) Energy band gap of Cu	(d) highly directional

सही मिलान करें :

(i) Si का ऊर्जा अंतराल	(a) 0
(ii) लेसर है	(b) आकार मे बहुत छोटा
(iii) नैनो-पदार्थ है	(c) 1.1 eV
(iv) Cu का ऊर्जा अंतराल	(d) उच्च दिशिक

b) Write a short note on uses of nano-particles. **4 marks**

नैनो-कणों के उपयोग पर एक संक्षिप्त टिप्पणी लिखें

OR (अथवा)

Differentiate between P type and N type semiconductor.

P प्रकार और N प्रकार के अर्द्धचालक मे अंतर लिखिए।

c) Explain **He – Ne** laser on following terms: **6 marks**

(i) construction and principle (ii) Energy level diagram

He – Ne लेसर को निम्न बिंदुओं के आधार पर समझाईए:

(i) संरचना और सिद्धांत (ii) ऊर्जा स्तर आरेख

OR (अथवा)

Explain the use of P-N junction diode as a full wave rectifier.

P-N संधि डायोड का उपयोग पूर्ण तरंग दिष्टकारी के रूप मे समझाइए।

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.

******

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 II – GROUP 'B'

COURSE TITLE	:	COMMUNICATION SKILLS IN ENGLISH
PAPER CODE	:	7353
SUBJECT CODE	:	204
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.

2.2 Importance 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.

References:

1. Anjana Tiwari, Communication Skills in English, Khanna Publishing House, New Delhi, 2022.
2. TTTI Bhopal, Communication Skills for Technical Students, Book I, Somaiya Publication Mumbai, New Delhi.
3. Raymond Murphy, Essentials of English Grammar, Cambridge University Press, 2000.
4. Rajendra Pal and J.S. Korlahalli, Essentials of Business Communication, S. Chand & Sons New Delhi, 2019.
5. J. D. O'Connor, Better English Pronunciation, Cambridge University Press, 1980.
6. Lindley Murray, An English Grammar, Comprehending Principles and Rules, Wilson and Sons, London, 1908.
7. Kulbhushan Kumar, Effective Communication Skills, Khanna Publishing House, New Delhi (Revised Edition2018)
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)

****

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

****

DIPLOMA WING
RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

SEMESTER II – GROUP 'B'

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 II – GROUP 'B'

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:

1. S.K. Hajara Chaudhary, Workshop Technology, Media Promoters and Publishers, New Delhi, 2015
2. B.S. Raghuwanshi, Workshop Technology, Dhanpat Rai and sons, New Delhi 2014
3. K. Venkat Reddy, Workshop Practice Manual, BS Publications, Hyderabad 2014
4. 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