UNITED INSTITUTE OF TECHNOLOGY

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Periyanaickenpalayam, Coimbatore – 641020

Learn Research
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DEPARTMENT OF SCIENCE AND HUMANITIES

QUESTION BANK

I YEAR

SEMESTER – 02

ACADEMIC YEAR 2025 – 2026

INDEX

HEAD OF THE DEPARTMENT

ACOE **PRINCIPAL** **CHAIRMAN**

24PHBS202

MATERIAL SCIENCE FOR SENSORS AND DEVICES

UNIT 1

SEMICONDUCTOR PHYSICS

Introduction to semiconductor -Types of semiconductors - Intrinsic Semiconductors-expression for Carrier Concentration in Intrinsic Semiconductors, Extrinsic Semiconductors and its expression for Carrier Concentration, variation of Fermi Level with temperature in Intrinsic and Extrinsic Semiconductors, Hall Effect and its Applications.

Q. NO	QUESTION	CO	BTL	Marks
	PART – A			
1.	What is meant by a semiconductor? Give examples.	CO1	RE	2
2.	Distinguish between elemental and compound semiconductors	CO1	UN	2
3.	Write a short note on direct bandgap semiconductor with diagram	CO1	UN	2
4.	Explain indirect bandgap semiconductor with diagram.	CO1	RE	2
5.	Find the resistance of an intrinstic Ge rod 1 cm long, 1 mm wide and 1 mm thick at 300 K	CO1	AP	2
6.	Distinguish between intrinsic and extrinsic semiconductor	CO1	UN	2
7.	Distinguish between n-type and p-type semiconductor	CO1	AN	2
8.	Discuss the variation of Fermi level with temperature for p and n type semiconductors	CO1	UN	2
	PART – B			
1.	Derive an expression for the density of electrons in an intrinsic semiconductor	CO1	AP	16
2.	Derive an expression for the density of holes in an intrinsic semiconductor	CO1	AP	16
3.	Derive the expression for carrier concentration in intrinsic semiconductor.	CO1	AP	16
4	Derive the expressions for carrier concentration in a n-type semiconductor	CO1	AP	16

5	Obtain an expression for the Hall coefficient and Hall voltage for n-type and p-type semiconductor.	CO1	AP	16

UNIT 2

OPTICAL PROPERTIES OF MATERIALS AND OPTOELECTRONIC DEVICES

Optical processes in conductor, semiconductor, and insulator - Charge injection and recombination process - Light detectors - Solar Cell - Light emitting diode - Optical processes in semiconductor devices - Electro-optics and nonlinear optics: Modulators and switching devices - Optical data storage and its applications.

Q.NO	QUESTION	CO	BTL	Marks
	PART – A			
1.	What are Optical materials? Give its types.	CO2	RE	2
2.	What is the effect of optical absorption in semiconductors	CO2	RE	2
3.	Why group III and group IV elements alone should be chosen for manufacturing LED's	CO2	AN	2
4.	Mention any two optical sources with principles.	CO2	RE	2
5.	What is modulation?	CO2	RE	2
6.	In what way OLED is advantage than LED/LCD	CO2	AP	2
7.	What are the parameters and operating speed of switching device?	CO2	RE	2
8.	Calculate the long wavelength limit of an extrinsic semiconductor if the ionization energy is 0.02 eV	CO2	AN	2
	PART – B			
1.	Describe the principle, construction and applications of light detectors	CO2	AN	16
2.	Explain the theory and working of LED. And write its advantages, disadvantages and its applications	CO2	AN	16
3.	Describe the principle, construction, working, advantages, disadvantages and applications of solar cell	CO2	AN	16
4.	Explain the optical data storage and its applications.	CO2	AN	16
5	Discuss the charge injection and recombination process in detail.	CO2	AN	16

UNIT 3

MAGNETIC MATERIALS AND THEIR APPLICATIONS

Origin of Magnetic Moment, Bohr Magnetron - Classification of Dia, Para and Ferro Magnetic Materials - Domain theory of Ferromagnetism - Hysteresis Curve based on Domain Theory - Soft and Hard Magnetic Materials - Ferrites and their Applications - Magnetic properties in data storage - GMR sensor and its applications.

Q.NO	QUESTION	CO	BTL	Marks
	PART – A			
1.	A magnetic field of 2000 A/m is applied to a material which has a susceptibility of 1000. Calculate the intensity of magnetization and flux density	CO3	AN	2
2	On the basis of spin how the materials are classified as para, Ferro, and Ferri magnetic materials	CO3	AP	2
3.	What are hard magnetic materials with its example?	CO3	RE	2
4.	Explain domains in ferromagnetic materials	CO3	RE	2
5.	Classify the magnetic moments based on their magnetic moments.	CO3	UN	2
6.	Define Bohr magnetron.	CO3	RE	2
7.	State the applications of ferrites.	CO3	RE	2
8.	What are the required magnetic parameters for recording?	CO3	RE	2
	PART – B			
1.	Distinguish between dia, para and ferro magnetic materials.	CO3	AN	16
2.	Discuss the domain structure in ferromagnetic materials.	CO3	UN	16
3.	(i) Explain the Hysteresis curve on the basis of domain theory. (ii) Distinguish between soft and hard magnetic materials	CO3	UN	16
4	Describe the writing and reading of data in magnetic hard disk using GMR sensor.	CO3	AN	16
5	Discuss magnetic storage techniques in detail.	CO3	AN	16

UNIT 4

SENSORS

Introduction to sensors – Characteristics and terminology – Static and dynamic characteristics – Micro and nano-sensors – Fundamentals of sensors – Biosensors – Micro fluids – Packaging and characterization of sensors – Sensors for aerospace and defence – Organic and inorganic nanosensors.

Q.NO	QUESTION	CO	BTL	Marks
	PART – A			
1.	What is a sensor, and how does it convert a physical stimulus into an electrical signal?	CO4	RE	2
2	Explain the role of sensors in modern technology. Can you name a few common applications?	CO4	AP	2
3.	What is the difference between accuracy and sensitivity in sensors?	CO4	AN	2
4.	How does the resolution of a sensor affect its performance?	CO4	UN	2
5.	What are micro-sensors?	CO4	RE	2
6.	Explain the advantages of nano-sensors	CO4	RE	2
7.	What basic physical principles underlie the operation of most sensors?	CO4	RE	2
8.	How do sensors convert physical phenomena like temperature, pressure, or light into electrical signals?	CO4	AN	2
	PART – B			
1.	Describe the static and dynamic characteristics of sensors	CO4	UN	16
2.	What is a biosensor, and how does it differ from other types of sensors? Describe some common applications of biosensors in healthcare.	CO4	UN	16
3.	What are microfluidic sensors, and how do they work?	CO4	UN	16
4.	What are organic nanosensors, and how do they differ from inorganic nanosensors?	CO4	UN	16
5	Discuss the nano sensors in detail	CO4	UN	16

UNIT 5

DIELECTRIC MATERIALS AND SUPERCONDUCTORS

Dielectric materials - Definition - Dielectric Breakdown – Claussius Mossotti relation. Introduction to Superconducting materials - Properties - Meissner effect - Type I & Type II superconductors – BCS theory (Qualitative), High-temperature superconductors and Applications of superconductors - Smart materials- Shape memory alloy - Piezoelectric materials.

Q.NO	QUESTION	CO	BTL	Marks
	PART – A			
1.	What are dielectric materials?	CO5	RE	2
2	What are superconducting materials, and what makes them different from normal conductors?	CO5	UN	2
3.	What are high-temperature superconductors?	CO5	RE	2
4.	Differentiate between type I and type II semiconductors.	CO5	AN	2
5.	Define Meissner effect in superconductors.	CO5	RE	2
6.	What are the applications of superconductor?	CO5	RE	2
7.	What are smart materials?	CO5	RE	2
8.	What is meant by dielectric breakdown.	CO5	UN	2
	PART – B			
1.	Explain the concept of dielectric breakdown. What factors affect dielectric breakdown in a material?	CO5	AN	16
2.	Derive the Claussius-Mossotti relation for dielectric material	CO5	UN	16
3.	Explain the BCS theory and how it accounts for superconductivity in materials at low temperatures.	CO5	AN	16
4.	What are shape memory alloys, and how do they work in practical applications?	CO5	UN	16
5.	Difference between type I and type II superconductors with diagram.	CO5	AN	16

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24MABS202

STATISTICS AND NUMERICAL METHODS

UNIT I

TESTING OF HYPOTHESIS

Sampling distributions – Tests for single mean and difference of means (Large and small samples) – Tests for single variance and equality of variances – Chi square test for goodness of fit.

Q.No	Question	CO	BTL	Marks
	PART A			
1.	Define Type-I and Type-II errors.	CO1	RE	2
2.	Define the following terms: Statistics, Parameter, Standard Error and Random Sampling.	CO1	RE	2
3.	What is sampling distribution?	CO1	RE	2
4.	Mention the various steps involved in testing of hypothesis.	CO1	UN	2
5.	An airline claims that the typical flying time between two cities is 56 minutes. Formulate a test of hypothesis with the intent of establishing that the population mean flying time is different from the published time of 56 minutes.	CO1	UN	2
6.	State the important properties of 't' distribution.	CO1	RE	2
7.	Define χ^2 test for goodness of fit.	CO1	RE	2
8.	Give the application of χ^2 test.	CO1	RE	2
	PART B			
1.	A sample of 900 members has a mean 3.4 cm and standard deviation 2.61 cm. Is the sample from large population of mean 3.25 cm and standard deviation 2.61 cm?	CO1	UN	8
2.	A simple sample of heights of 6400 Englishmen has a mean of 170 inches and a standard deviation of 6.4 inches, while a simple sample of heights of 1600 Australians has a mean of 172 inches and a standard deviation of 6.3 inches. Do the data indicate that Australians are on the average taller than Englishmen?	CO1	AP	8
3.	A Mathematics test was given to 50 girls and 75 boys. The girls made an average grade of 76 with SD of 6, while boys made an average grade of 82 with SD of 2. Test whether there is any significant difference between the	CO1	AP	8

performance of boys and girls.

4. Given a sample mean of 83, a sample standard deviation of 12.5 and a sample size of 22, test the hypothesis that the value of the population mean is 70 against the alternative that it is more than 70. Use the 0.025 significance level. CO1 UN 8

5. A certain injection administered to each of 12 patients resulted in the following increases of blood pressure: 5, 2, 8,-1, 3, 0, 6, -2, 1, 5, 0, 4.Can it be concluded that the will be in general, accompanied by an increase in B.P? CO1 AP 8

6. Samples of two types of electric bulbs were tested for length of life and the following data were obtained. CO1 AP 8

	Size	Mean	S.D.
Sample I	8	1234 hours	36 hours
Sample II	7	1036 hours	40 hours

If the difference in the means sufficient to warrant that sample I bulbs are superior to sample II bulbs?

7. Two horses A and B were tested according to the time(in seconds) to run a particular race with the following results: CO1 AP 8

Horse A	28	30	32	33	33	29	34
Horse B	29	30	30	24	27	29	

Test whether the horse A is running faster than B at 5% level.

8. The following data gives the number of aircraft accidents that occurred during the various days of a week. Test whether the accidents are uniformly distributed over the week. CO1 AP 8

Days	Mon	Tue	Wed	Thu	Fri	Sat
No.of accidents	15	19	13	12	16	15

9. A group of 10 rats fed on diet A and another group of 8 rats fed on diet B recorded the following increase in weight CO1 UN 8

Diet A:	5	6	8	1	12	4	3	9	6	10
Diet B	2	3	6	8	10	1	2	8		

Find if the variances are significantly different.

10. An instructor has two classes A and B, in a particular subject, class A has 16 students while class B has 25 students. On the same examination, although these was no significant difference in mean grade class A has standard CO1 AP 8

deviation of 9, while class B had a standard deviation level of 12.Can we conclude at the 0.01 level of significance that the variability of class B is greater than that of class A.

UNIT II

DESIGN OF EXPERIMENTS

One way and two way classifications – Completely randomized design – Randomized block design – Latin square design.

Q.No	Question	CO	BTL	Marks
	PART A			
1.	What are the basic principles in the design of experiment?	CO2	RE	2
2.	Explain the ANOVA table for one way classification.	CO2	UN	2
3.	Summarize the assumptions involved in ANOVA.	CO2	UN	2
4.	What is ANOVA?	CO2	RE	2
5.	List any two differences between RBD and CRD.	CO2	RE	2
6.	What are the advantages of Latin square design.	CO2	RE	2
7.	Compare the advantages and disadvantages of Randomized block design.	CO2	UN	2
8.	Compare and contrast LSD and RBD.	CO2	UN	2
	PART B			
1.	The following table shows the lives in hours of four brands of electric lamps,	CO2	AN	16

Brand A	1610	1610	1650	1680	1700	1720	1800	
Brand B	1580	1640	1640	1700	1750			
Brand C	1460	1550	1600	1620	1640	1660	1740	1820
Brand D	1510	1520	1530	1570	1600	1680		

Perform an analysis of variance test the homogeneity of the mean lives of the four brands of lamps.

2. The following data represent the number of units production per day turned out by different workers, using 4 different types of machines. CO2 AN 16

Machine Type					
Workers		A	B	C	D
	1	44	38	47	36
	2	46	40	52	43
	3	34	36	44	32
	4	43	38	46	33
	5	38	42	49	39

Test whether the five men differ with respect to mean productivity and test whether the mean productivity is the same for the four different machine types.

3. Analyze the variance in the Latin Square of yields (in kgs) paddy where P, Q, R, S denote the different methods of cultivation. CO2 AN 16

S122	P121	R123	Q122
Q124	R123	P122	S125
P120	Q119	S120	R121
R122	S123	Q121	P122

Examine whether the different methods of cultivation have given significantly different yields.

4. A farmer wishes to test the effect of 4 different fertilizers A, B, C, D on the yield of wheat. The fertilizers are used in a LSD and the result are tabulated. CO2 AN 16

A 18	C 21	D 25	B 11
D 22	B 12	A 15	C 19
B 15	A 20	C 23	D 24
C 22	D 21	B 10	A 17

Perform an analysis of variance.

UNIT III

SOLUTION OF EQUATIONS AND EIGENVALUE PROBLEMS

Solution of algebraic and transcendental equations – Fixed point iteration method - Newton Raphson method- Solution of linear system of equations – Gauss elimination method – Pivoting – Gauss Jordan method – Iterative methods of Gauss Jacobi and Gauss Seidel – Eigen values of a matrix by Power method.

Q.No	Question	CO	BTL	Marks
	PART A			
1.	What is the condition for convergence and order of convergence for fixed point iteration method?	CO3	RE	2
2.	State the Newton-Raphson method formula and condition for convergence.	CO3	RE	2
3.	What are the various methods of solving simultaneous linear equations?	CO3	RE	2
4.	Explain the term pivot elements.	CO3	UN	2
5.	Compare Gauss elimination method and Gauss Seidal method	CO3	UN	2
6.	What is the sufficient condition for Gauss – Seidel method to converge.	CO3	RE	2
7.	Infer which of the iterative methods for solving linear system of equations converge faster? Why?	CO3	UN	2
8.	Find the dominant Eigen value of the matrix $\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ by power method.	CO3	AP	2
	PART B			
1.	Find the positive root for the equations given below by Newton-Raphson method (i) $3x - \cos x = 1$ (ii) $x \log_{10} x = 1.2$ (iii) $x^4 - x - 9 = 0$	CO3	UN	16
2.	(i)Solve the following system of equations by Gauss elimination and Gauss Jordan methods 10x-2y+3z=23, 2x+10y-5z=-33, 3x-4y+10z=41. (ii) Using Gauss Jordan method solve the following equations 2x+y+4z=12, 8x-3y+2z=20, 4x+11y-z=33.	CO3	AP	16
3.	Solve the following system of equations by Gauss-Jacobi and Gauss-Seidel method 27x+6y-z=85, x+y+54z=110, 6x+15y+2z=72.	CO3	AP	16

4.	(i)Solve by Gauss-Jacobi method, the system of following equations correct to three decimal places 30x-2y+3z=75,x+17y-2z=48,x+y+9z=15. (ii) Using Power method, find the numerically largest Eigen value of $A=\begin{bmatrix}1 & -3 & 2\\ 4 & 4 & -1\\ 6 & 3 & 5\end{bmatrix}$	CO3	AP	16
5.	Using Power method, find all the Eigenvalues of $A=\begin{bmatrix}5 & 0 & 1\\ 0 & -2 & 0\\ 1 & 0 & 5\end{bmatrix}$	CO3	AP	16

UNIT IV

INTERPOLATION, NUMERICAL DIFFERENTIATION AND NUMERICAL INTEGRATION

Newton's forward and backward difference interpolation – Approximation of derivatives using interpolation polynomials – Newton's divided difference interpolations - Numerical single and double integrations using Trapezoidal and Simpson's 1/3 rules.

Q.No	Question	CO	BTL	Marks
	PART A			
1.	State Newton's divided difference interpolation formula.	CO4	RE	2
2.	State Gregory-Newton forward difference interpolation formula.	CO4	RE	2
3.	State any two properties of divided differences.	CO4	RE	2
4.	What is inverse interpolation?	CO4	RE	2
5.	State the Newton's backward difference formula for $\frac{dy}{dx}, \frac{d^2y}{dx^2}$.	CO4	RE	2
6.	List the errors in Trapezoidal and Simpson's rules of numerical integration.	CO4	RE	2
7.	What is the condition about the intervals for using Simpson's 1/3 rule.	CO4	RE	2
8.	List two practical applications of Simpson's one third rule.	CO4	RE	2

PART B

1. Using Newton's forward interpolation formula find the polynomial f(x) satisfying the following data. Hence, evaluate y at x=5 — CO4 AP 16

X	4	6	8	10
Y	1	3	8	10

2. (i)Compute f(8) by Newton's divided differences formula for the data — CO4 AP 16

x	4	5	7	10	11	13
f(x)	48	100	294	900	1210	2028

(ii)The following data are taken from the steam table:

Temp. ^{o}C	140	150	160	170	180
Pressure kg/cm^2	3.685	4.854	6.302	8.076	10.225

Calculate the pressure at temperature $t=142^{o}$ and $t=175^{o}$

3. Compute the first, second and third derivatives of the function f(x) at x=1.5 — CO4 AP 16

x :	1.5	2.0	2.5	3.0	3.5	4.0
f(x) :	3.375	7.0	13.625	24.0	38.875	59.0

4. CO4 AP 16

(i)By dividing the range into ten equal parts evaluate $\int_0^{\pi} \sin x dx$ by Trapezoidal and Simpson's rule .Verify your answer with integration.

(ii)Evaluate $\int_0^6 \frac{dx}{1+x}$ by using Trapezoidal rule and Simpson's 1/3 rule and compare with its exact solution.

5. Evaluate $\int_1^{1.4}\int_2^{2.4} \frac{1}{xy} dxdy$ by Simpson's rule and Trapezoidal rule. Verify your result by actual integration. — CO4 AP 16

UNIT V

NUMERICAL SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS

Single step methods: Taylor's series method – Euler's method – Modified Euler's method – Fourth order Runge-Kutta method for solving first order differential equations – Multi step methods: Milne's and Adams – Bash forth predictor corrector methods for solving first order differential equations.

Q.No	Question	CO	BTL	Marks
	PART A			
1.	What are the different methods of solving an ordinary differential equations?	CO5	RE	2
2.	State the disadvantages of Taylor's series method.	CO5	RE	2
3.	Using Euler's method, find y(0.2) given y'= x^2+y, y(0)=1.	CO5	UN	2
4.	Compute y at x=0.25 by Modified Euler method given $y' = 2xy$, $y(0) = 1$.	CO5	UN	2
5.	Compare Runge-Kutta methods and Predictor-Corrector methods for solution of initial value problem.	CO5	UN	2
6.	Write the Adam's-Bashforth Predictor and Corrector formulae.	CO5	RE	2
7.	Compare Single-step method and Multi-step method?	CO5	UN	2
8.	How many prior values are required in Milne's method to predict the next value?	CO5	RE	2
	PART B			
1.	Compute y(0.1) and y(0.2) correct to 4 decimal places if y(x) satisfies y'=x+y , y(0)=1 by Taylor's series method.	CO5	AP	16
2.	(i) Using Taylor's series expansion find y at x=0.1 correct to three significant digits given $\frac{dy}{dx} - 2y = 3e^x, y(0) = 0$. (ii)Using Euler's method find y(0.2),y(0.4) and y(0.6) from $\frac{dy}{dx} = x + y$, y(0) = 1 with h = 0.2.	CO5	AP	16
3.	(i) Using Euler's method find the solution of the initial value problem $\frac{dy}{dx} = \log(x + y), y(0) = 2$ at x=0.2 by assuming h = 0.2. (ii)Compute y(0.2) by modified Euler's Method for the equation	CO5	AP	16

$\frac{dy}{dx} = y - x^2 + 1, y(0) = 0.5.$

4.	Using R- K method of 4th order , solve $\frac{dy}{dx} = \frac{y^2 - x^2}{y^2 + x^2}$ given y(0) = 1 at x = 0.2 , 0.4.	CO5	AP	16
5.	(i)Using Milne's predictor corrector method, find y(4.4) given $5xy' + y^2 - 2 = 0$ given y(4) = 1, y(4.1) = 1.0049 , y(4.2) = 1.0097 , y(4.3) = 1.0143. (ii) Using Adam,s Bashforth predictor corrector method, find y(1.4) given $\frac{dy}{dx} = x^2(1+y), y(1) = 1, y(1.1) = 1.233, y(1.2) = 1.548, y(1.3) = 1.979.$	CO5	AP	16

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24ENHS202

PROFESSIONAL ENGLISH FOR ENGINEERS -II

UNIT I
EFFECTIVE SPEAKING OVERVIEW

- **Reading**: Employ skimming and scanning techniques and analyze complex texts, identifying implicit meanings and drawing connections.
- **Writing**: Word formation, sentence types, and informal letters.
- **Grammar**: homonyms, homophones, and homograph and exhibit impeccable subject verb agreement.

Q.No	Question	CO	BTL	Marks
	PART A			
1.	**Fill in the blanks with the correct homophone.** a) I need to ___ (buy/by) some groceries. b) The ___ (knight/night) rode on his horse. c) The ___ (sun/son) is shining brightly. d) She wants to ___ (write/right) a letter.	CO1	RE	2
2.	**Identify and correct the homonym error in each sentence:** a) She placed the vail on her head. b) He threw the ball threw the window. c) The bear ate all the berries. d) She could sea the dolphins from the shore.	CO1	RE	2
3.	**Write sentences for each pair of homonyms:** a) Bow b) Bat c) Close d) Date	CO1	RE	2
4.	**Fill in the blanks with the correct homonym.** a) Either the students or the teacher ___ (is/are) going to present the project. b) The committee ___ (has/have) made its decision. c) Each of the books ___ (is/are) on the shelf. d) The team ___ (was/were) celebrating its victory.	CO1	UN	2
5.	**Match the subject with the correct verb to complete each sentence**	CO1	RE	2

a) The bouquet of flowers ___ (are beautiful/is beautiful)
b) The pair of shoes ___(is in the closet/are in the closet)

6.	**Word Formation Exercises** a) Form a noun from the verb -**decide.** b) Form an adjective from the noun-**beauty**. c) Form a verb from the noun -**success.** d) Form an adverb from the adjective -**quick.**	CO1	RE	2
7.	**Transform the following sentences.** a) She was tired. She went to bed early. (Complex) b) I finished my homework. I watched TV. (Compound) c) Although it was raining, we went for a walk. (simple) d) The sun set, and the stars appeared. (simple)	CO1	UN	2
8.	**Write sentences for the following Sentence types.** a) Write a **declarative** sentence about your favourite hobby. b) Write an **interrogativ**e sentence inquiring about someone's favourite subject in school. c) Write an **exclamatory** sentence expressing fear about a loud noise. d) Write a **declarative** sentence about your plans for the next vacation.	CO1	RE	2

PART B

1	**Read and respond to the following comprehension passage.** **The Impact of IoT on Modern Engineering** The Internet of Things (IoT) is revolutionizing various sectors, including engineering. IoT refers to the network of interconnected devices that communicate and exchange data. Engineering applications of IoT are vast, ranging from smart homes to industrial automation. One of the primary benefits of IoT in engineering is enhanced efficiency. For instance, smart sensors in manufacturing plants can monitor equipment health, predict failures, and schedule maintenance, thereby reducing downtime and increasing productivity. Moreover, IoT enables real-time data collection and analysis, which is crucial for making informed decisions. In civil engineering, IoT can be used for structural health monitoring of bridges and buildings. Sensors can detect	CO1	AN	16

anomalies and send alerts, ensuring timely maintenance and preventing catastrophic failures. In transportation engineering, IoT aids in traffic management by providing real-time traffic data, helping to optimize traffic flow and reduce congestion.

Another significant advantage of IoT in engineering is its role in energy management. Smart grids leverage IoT to balance energy supply and demand, leading to more efficient energy usage and reduced costs. Additionally, IoT is pivotal in the development of autonomous vehicles. Engineers use IoT to integrate various sensors and systems, enabling vehicles to communicate with each other and their surroundings, enhancing safety and efficiency.

Despite its numerous benefits, IoT also presents challenges, such as security concerns and data privacy issues. Engineers must address these challenges to harness the full potential of IoT in engineering.

Questions:

1. What is the Internet of Things (IoT)?
2. How does IoT enhance efficiency in manufacturing plants?
3. What role does IoT play in civil engineering?
4. How does IoT contribute to traffic management in transportation engineering?
5. What is the significance of IoT in energy management?
6. How is IoT used in the development of autonomous vehicles?
7. What are some challenges associated with IoT in engineering?
8. Give an example of how IoT can prevent catastrophic failures in civil engineering.

2.	Write a letter to your friend persuading them to join you in a weekend volunteering program and explain its personal and social benefits.	CO1	AN	16
3.	Write a letter to your younger brother/sister advising them on how to deal with negative peer pressure.	CO1	UN	16

4.	Assume you are the Student Chairman. Write a dialogue between you and your College Principal in which you submit and explain a proposal to initiate a new student club (such as a Debate Club / Innovation Club / Environment Club). The dialogue should include objectives, benefits, and the principal's response.	CO1	UN	16
5.	Your friend who is anxious about a major change (new course, new job, relocation). Write a letter helping them see change as an opportunity.	CO1	UN	16

UNIT II
READING STRATEGIES

- **Reading**: comprehension passages, -Differentiate between facts and opinion articles from newspapers and magazines, and practice cloze exercises.
- **Writing**: Instructions, Recommendations.
- **Grammar**: Parts of speech, articles.

Q.No	Question	CO	BTL	Marks

PART A

1.	**Underline the noun in each sentence:** a) She loves reading science fiction novels. b) The children played in the park all afternoon. **Identify the prepositions in the following sentences:** c) The cat is under the table. d) We walked through the forest to reach the lake.	CO2	RE	2
2.	**Fill in the blanks with the correct article (a, an, the):** a) ___ apple a day keeps the doctor away. b) He is ___ engineer by profession. c)She adopted ___ cat from the shelter. d)We visited ___ Eiffel Tower during our trip to Paris.	CO2	RE	2
3.	**Correct the errors in the use of articles in the following sentences:** a) She bought a new car from the dealership. b) He is an honest man and a good friend.	CO2	RE	2

4.	**Fill in the blanks with suitable words given below.** In the middle of the night, there was a loud **…….**(a). Everyone in the house woke up, startled. They quickly realized that it was coming from the **…….** (b). The father went downstairs to check, and found the **……..**(c) had fallen. He **…….**(c) it up and made sure everything was okay before going back to **……** (d). **Words to Choose From** *noise, scream, whisper, basement, attic, kitchen* *picture, lamp, vase, picked, looked, cleaned* *bed, work, sleep*	CO2	UN	2
5.	**Fill in the blanks with suitable verbs** a) She ___ (read) a book every evening. b) They ___ (play) soccer on weekends. c) They ___ (leave) before we arrived. d) He ___ (write) the letter before I could reply.	CO2	RE	2
6.	**Word Formation Exercises** a) Noun from the verb **achieve** b) Adjective from the noun **danger** c) Verb from the noun **strength** d) Adverb from the adjective **happy**	CO2	RE	2
7.	**Fill in the blanks with suitable adverbs.** a) The lecture was very ____ delivered. b) She wrote a ___ poem.	CO2	UN	2
8.	**Correct the errors in the use of articles in the following sentences:** a) She bought a new car from the dealership. b) He is a honest man and a good friend.	CO2	RE	2

PART B

1.	Write eight recommendations to preserve our natural resources.	CO2	AN	16

2.	Write eight recommendations to fulfil the academic responsibility	CO2	AN	16
3.	Write 8 instructions to follow when preparing for an exam.	CO2	UN	16
4.	Write 8 instructions to follow when using a computer lab.	CO2	UN	16
5.	Write 8 recommendations to keep environment clean	CO2	UN	16

UNIT III
GROUP INTERACTION ESSENTIALS

- **Reading**: Identify lexical and contextual meanings in reading materials.
- **Writing**: Draft formal letters, for seeking permission, essays and inviting guests.
- **Grammar**: Phrasal verbs and single-sentence definitions, modifiers -adjectives and adverbs.

Q.No	Question	CO	BTL	Marks

PART A

1.	**Fill in the blanks with the correct phrasal verb** a) The car ___ (broke down / broke up) on the way to the office. b) She decided to ___ (give up / give out) smoking. c) He ___ (set up / set off) a new business in town. d)They ___ (ran out of / ran into) milk and had to go to the store.	CO3	RE	2
2.	**Choose the correct adjective or adverb to complete the sentence** a) The ___ (happy/happily) children played in the park. b) She danced ___ (graceful/gracefully) on the stage. c) The ___ (large/largely) house is on the corner of the street. d) He ran ___ (quick/quickly) to catch the bus.	CO3	RE	2
3.	**Write the correct meaning for the following phrasal verbs** a) Break down b) Carry out	CO3	RE	2

4.	**Write a definition for the following words** a) photosynthesis b) ecosystem	CO3	UN	2
5.	**Complete the Cloze passage** The **…….** (a) was packed with people waiting for the concert to begin. The lights dimmed, and the……. (b) walked onto the stage. The crowd cheered loudly. The music started, and everyone began to **……** (c) along. It was an amazing performance that lasted for **…….** (d) hours. Everyone left the venue feeling **…….** (e). **Words to Choose From:** *stadium, cinema, park,band, actors, dancers,sing, dance, talk,one, two, three, happy, sad, excited*	CO3	RE	2
6.	**Complete the Cloze passage** The old clock in the living room had stopped **……**(a). He decided to fix it himself. He carefully opened the **…..**(b) and examined the gears. After tinkering with it for a while, he found the problem and fixed it. He wound the clock, and it started **……**(c) again. He smiled, satisfied with his work, and placed the clock back on the **……..**(d). It was nice to have **…….**(e) working again. Words to Choose From: **Words to Choose From** *working, moving, chiming,case, window, book,ticking, ringing, stopping,shelf, table, floor,it, him, her*	CO3	RE	2
7.	**Choose the correct one.** a) Turn down a) To increase volume b) To reject or refuse b) Run out of a) To deplete the supply b) To restock	CO3	UN	2
8.	Write sentences for the following phrasal verbs a) turn down b) take off	CO3	RE	2

PART B

1.	Draft a formal letter seeking permission from the principal to organize a cultural event in your school auditorium. Mention the purpose of the event, the date and time, and the activities planned.	CO3	AN	16
2.	Write an essay on **The Problem of Plastic Waste** and Discuss the causes of plastic pollution, its environmental consequences, and possible alternatives to reduce plastic use.	CO3	AN	16
3.	Draft a formal invitation letter to a guest speaker for your school's annual science fair. Mention the date, time, venue, and purpose of the event, and express your enthusiasm about their participation.	CO3	UN	16
4.	Write a formal invitation letter to a distinguished alumnus to be the chief guest at your college's graduation ceremony. Provide details about the date, time, venue, and the significance of the event.	CO3	UN	16
5	You can explore how renewable energy sources like solar; wind, hydro, and geothermal power can contribute to sustainable development. Discuss the environmental, economic, and social benefits of renewable energy, the challenges in its adoption, and potential solutions to overcome these obstacles.	CO3	UN	16

UNIT IV
EFFECTIVE WRITING

- **Reading**: Summarize and paraphrase texts.
- **Writing:** Business letters, email etiquette, and free writing.
- **Grammar**: compound nouns and Degrees of Comparison.

Q.No	Question	CO	BTL	Marks

PART A

1.	**Find the compound nouns in the following sentences** a) My grandmother loves to read bedtime stories to us every night. b) The football match was intense and kept everyone on the edge of their seats. c) During our road trip, we visited several small towns	CO4	RE	2

and met many friendly people.

d) Make sure to pack your toothbrush and toothpaste for the trip.

2.	**Complete the sentences by choosing the correct form of the adjective from the options provided** a) This book is _____ (interesting, more interesting, most interesting) than the one I read last week. b) Mount Everest is the _____ (high, higher, highest) mountain in the world. c) Today feels _____ (cold, colder, coldest) than yesterday. d) He is the _____ (smart, smarter, smartest) student in the class.	CO4	RE	2
3.	**Write a sentence using the positive, comparative, and superlative forms of each adjective** a) Bright b) Intelligent c) Friendly d) Brave	CO4	RE	2
4.	**Complete the sentences by choosing the correct compound noun from the options provided.** a) He bought a new _____ for his morning jog. (water bottle, post office, ice cream) b) She loves to read _____ before going to bed. (football, basketball, bedtime stories) c) They sent the package at the _____. (post office, well-being, football) d) The _____ was very scenic and enjoyable. (road trip, mother-in-law, laptop	CO4	UN	2
5.	**Complete the sentences by choosing the correct form of the adjective from the options provided.** a) This puzzle is _..... (difficult, more difficult, most difficult) than the previous one. b) He is the…….. (fast, faster, fastest) runner in the team. c) She is…….. (tall, taller, tallest) than her brother. d) This is the ……(expensive, more	CO4	RE	2

expensive, most expensive) dress in the store.

6.	**Complete the sentences by choosing the correct form of the adjective from the options provided.** a) The professor's explanation was far _____ (clear, clearer, clearest) than the textbook description. b) Of all the candidates interviewed, she gave the _____ (impressive, more impressive, most impressive) presentation. c) This research paper is _____ (relevant, more relevant, most relevant) to our current project than the others. d) The opera performance was the _____ (memorable, more memorable, most memorable) cultural event of the year.	CO4	RE	2
7.	**Identify the errors form of the adjectives to complete the comparisons** a) He is the more smartest boy in the class. b) Today is the colder than yesterday. c) That was the most happiest moment of my life. d) Between the two cars, this one is the most faster.	CO4	UN	2
8.	**Match the correct form of the adjectives from the column A to B**	CO4	RE	2

	A	B
a	This book is interesting.	Comparative
b	This book is more interesting than that one.	Positive
c	This is the most interesting book in the library.	Positive
d	She is tall.	Superlative

PART B

1.	Write a business letter to a supplier requesting a quotation for office supplies. Include necessary details such as quantities, specifications, and delivery timelines.	CO4	AN	16
2.	Draft an email to a client apologizing for a delay in project delivery. Ensure your email follows proper email etiquette, including a clear subject line, polite language, and a	CO4	AN	16

professional closing.

3.	Write a free-form essay on the topic 'The Impact of Social Media on Modern Communication.' Discuss both positive and negative aspects, providing relevant examples and personal insights.	CO4	UN	16
4.	**Summarize the following passage in your own words:** "In today's digital age, cybersecurity has become a critical concern for individuals, businesses, and governments around the world. With the rapid advancement of technology, the ways in which we communicate, work, and store information have drastically changed, making us more reliant on digital systems than ever before. However, this increased reliance on technology has also made us more vulnerable to cyber threats. Cybersecurity involves protecting computer systems, networks, and data from unauthorized access, theft, and damage. Cyber threats can come in various forms, such as hacking, phishing, ransomware attacks, and malware. These threats can have severe consequences, ranging from financial losses to compromising sensitive information and even endangering national security. One of the primary reasons for the growing concern about cybersecurity is the increasing number of cyberattacks. High-profile data breaches, such as those affecting major corporations and government agencies, have highlighted the potential risks and the need for robust cybersecurity measures. These breaches often result in the theft of personal information, financial data, and intellectual property, causing significant damage to the affected entities and individuals. To combat cyber threats, it is essential to implement strong cybersecurity practices. This includes using firewalls, encryption, and multi-factor authentication to protect systems and data. Regular software updates and patches are also crucial in addressing vulnerabilities and preventing attacks. Additionally, educating employees and users about safe online practices can help reduce the risk of falling victim to cyber threats. Governments and organizations must also invest in advanced cybersecurity technologies and collaborate with cybersecurity experts to stay ahead of evolving threats. International cooperation is vital in addressing cybercrime, as cybercriminals often operate across borders, making it challenging to track and apprehend them.	CO4	UN	16

	In conclusion, as we continue to embrace the digital age, cybersecurity will remain a top priority. By implementing robust cybersecurity measures and staying vigilant, we can protect our digital assets and ensure a safer online environment for everyone."			
5	Write a letter to a bank manager regarding unauthorized transactions in your company account and request immediate investigation.	CO4	UN	16

UNIT V
GRAPHICAL REPRESENTATION OF WRITING

- **Writing**: Prepare Cover letter & resume, transcripts for speeches and create pictorial representations (charts, graphs, etc.).
- **Grammar**: Learn single-word substitutes, abbreviations, and identify sentence errors.

Q.No	Question	CO	BTL	Marks
	PART A			
1.	**Find the Single-Word Substitute for the following sentences** a) A person who writes novels b) One who studies the stars and planets c) A speech given by one person d)A remedy for all diseases	CO5	RE	2
2.	**Expand the following Acronyms** a) CEO b) NASA c) FBI d) WHO.	CO5	RE	2
3.	**Identifying Sentence Errors and rewrite it correctly.** a) She don't like to play football. b) The informations provided by him were very useful. c) Each of the students were given a prize. d) He works hardly to achieve his goals.	CO5	RE	2
4.	**Choose the best choices given below.** 1.**IT** stands for: a. International Trade b. Information Technology c. Income Tax d. Industrial Training	CO5	UN	2

2.**PC** can mean:
a. Personal Computer
b. Police Constable
c. Private Company
d. Postal Code

3.**MB** is the abbreviation for:
a. Megabyte
b. Medical Board
c. Member of Parliament (MP)
d. Management Board

4.Choose the correct expansion of **ATM**:
a. Automated Teller Machine
b. Air Traffic Management
c. At The Moment
d. Advanced Technology Module

5.	**Fill in the blanks with the appropriate adjective form:** a) She is _____ (smart) than her sister. b) This is the _____ (good) movie I've seen. c) He is as _____ (strong) as an ox. d) This road is _____ (narrow) than that one.	CO5	RE	2
6.	**Add the correct prefix to form a new word.** a) ___possible (im / un / dis / re) b) ___active (in / re / mis / pre) c) ___legal (il / un / dis / re) d) ___happy (un / dis / re / mis	CO5	RE	2
7.	**Complete the sentences by using the correct form of the word in brackets.** a) The new policy aims to improve the _____ of public transport in the city. (EFFICIENT) b) She spoke so _____ that everyone was convinced by her argument. (PERSUADE) c) The company is seeking _____ candidates who can adapt quickly to change. (INNOVATE) d) His sudden _____ during the meeting surprised all the participants. (ARRIVE)	CO5	UN	2
8.	**Transform the following sentences into indirect speech:** a) He said, "I am going to the market." b) She asked, "Can you help me with this task?" c) They said, "We have finished our work." d) The doctor said, "You need to rest."	CO5	RE	2

PART B

1.	Write a cover letter addressing the Hiring Manager, introducing yourself, explaining why you are interested in the position, highlighting your relevant skills and experience, and expressing your enthusiasm for the role.	CO5	AN	16
2.	Prepare a resume that includes your contact information, objective statement, education, work experience, technical skills, and any relevant certifications or projects.	CO5	AN	16
3.	Write a transcript for a 5-minute speech to be delivered at a university's annual cultural festival. Include an introduction, main points to cover (such as the importance of cultural diversity, student involvement, and future aspirations), and a conclusion.	CO5	UN	16
4.	Create a bar graph to visually represent survey data on students' favorite extracurricular activities. The data is as follows: Sports (40%), Music (30%), Art (20%), and Drama (10%). Label the axes, title the graph, and use different colors for each category.	CO5	UN	16
5.	Write a job application with a cover letter for the position of Data Analyst. Emphasize analytical skills, tools known, and problem-solving ability.	CO5	UN	16

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24GEES203

ENGINEERING GRAPHICS

UNIT I
PLANE CURVES

Basic Geometrical constructions, Conic-Construction of ellipse, parabola and hyperbola by eccentricity method- Construction of cycloid-construction of involutes of square and circle - Drawing of tangents and normal to the above curves.

Q.No	Question	CO	BTL	Marks
	PART A			
1.	Construct a curve when the distance between focus and the directrix is equal to 60 mm and eccentricity is 2/3. Name the curve. Draw the tangent and normal at any point on the curve.	CO1	AP	20
2.	Construct a curve when the distance between focus and the directrix is equal to 50 mm and eccentricity is 2/3. Name the curve. Draw the tangent and normal at any point on the curve.	CO1	AP	20
3.	Construct a curve when the distance of the focus from directrix is 30 mm and eccentricity is equal to 5/4. Name the curve. Draw the tangent and normal at any point on the curve.	CO1	AP	20
4.	Construct a curve when the distance of the focus from directrix is 40 mm and eccentricity is equal to 4/3. Name the curve. Draw the tangent and normal at any point on the curve.	CO1	AP	20
5.	Construct a curve when the distance of the focus from directrix is 30 mm and eccentricity is equal to 1. Name the curve. Draw the tangent and normal at any point on the curve	CO1	AP	20
6.	Construct a curve when the distance of the focus from directrix is 40 mm and eccentricity is equal to 1. Name the curve. Draw the tangent and normal at any point on the curve	CO1	AP	20
7.	Draw a cycloid for a circle of diameter 40 mm. Also draw the tangent and normal at any point on the curve.	CO1	AP	20
8.	Draw a cycloid for a circle of diameter 30 mm. Also draw the tangent and normal at any point on the curve.	CO1	AP	20
9.	Draw an involute of a circle of diameter 40 mm. Also draw the tangent and normal at any point on the curve.	CO1	AP	20
10.	Draw an involute of a circle of diameter 30 mm. Also draw the tangent and normal at any point on the curve.	CO1	AP	20

UNIT II
PROJECTION OF POINTS, LINES AND PLANE SURFACE

Projection of points, Projection of straight lines (only First angle projections) inclined to both the principal planes-Determination of true lengths and true inclinations by rotating line method. Projection of planes (polygonal and circular surfaces) inclined to both the principal planes by rotating object method.

Q.No	Question	CO	BTL	Marks
	PART A			
1.	Mark the projections of the following points on a common reference line. Take 30 mm distance between the projectors. A.10 mm above HP and 60 mm infront of VP. B.45mm above HP and 5 mm infront of VP. C.20 mm above HP and50mm behind VP. D.25 mm above HP and on VP. E.55mmbehind and 30 mm below HP F.is on both HP and VP.	CO2	AP	20
2.	A line AB, 60 mm long has its end A, 20 mm above the H.P and 10 mm in front of V.P. It is inclined at 40° to the H.P and 50° to the V.P. Draw its projections.	CO2	AP	20
3.	A line EF, 85 mm long has its end E, 25 mm above the H.P and 20 mm in front of the V.P. The top and front views of the lengths of 55 mm and 70 mm respectively. Draw the projections of the line and find its true inclinations with the V.P and the H.P.	CO2	AP	20
4.	A line AB 75 mm long has its one end A 20 mm above H.P, 25 mm in front of V.P, while the other point B is 50 mm above H.P and 60 mm in front of V.P. Draw its projections. Determine the true inclinations with H.P & V.P.	CO2	AP	20
5.	A triangular lamina of sides 40 mm is resting on H.P with one of its corner touching it such that the lamina makes 60° to H.P. If the side opposite to this corner makes 30° to V.P. draw its projections.	CO2	AP	20
6.	Square lamina ABCD of 60 mm side with one of its edge on H.P and lamina inclined at an angle 45° to H.P and one of its edge inclined at an angle of 30° to V.P. Draw its projections.	CO2	AP	20
7.	A rectangular plate ABCD of sides 75 X 25 mm is resting on one of its shorter side on H.P and the surface is inclined at 30° to H.P. The resting edge is inclined at an angle of 35° to V.P. Draw its projections.	CO2	AP	20
8.	Draw the projection of a hexagon of side 30 mm having one of its side in H.P and inclined at 60° to V.P. and the surface is inclined at 35° to H.P.	CO2	AP	20
9.	A regular Pentagonal lamina of 30 mm sides has one edge in H.P and inclined at an angle of 30° to V.P. Draw its projections, when its surface is inclined at an angle of 45° to H.P. Draw its projections.	CO2	AP	20
10.	Draw the projections of a circular thin plate of diameter 50 mm resting on the ground on a point A on the circumference, its plane inclined at 45° to H.P and plan of the diameter AB making 25° with V.P.	CO2	AP	20

UNIT III
PROJECTION OF SOLIDS

Projection of simple solids like prisms, pyramids, cylinder, cone and truncated solids when the axis is inclined to one of the principal planes and parallel to the other by rotating object method.

Q.No	Question	CO	BTL	Marks
	PART A			
1.	Draw the projections of a triangular prism of base side 25 mm and axis 60 mm resting on H.P on one of its base sides with the axis inclined at 40° to H.P and parallel to V.P.	CO3	AP	20
2.	A pentagonal prism of base side 35 mm and axis length 65 mm is resting on H.P. on one of its base corners with its base inclined at 40° to H.P and parallel to V.P. Draw its projections.	CO3	AP	20
3.	A hexagonal prism of base side 40 mm and axis length 75 mm is resting on H.P. on one of its base sides with its axis inclined at 40° to H.P and parallel to V.P. Draw its projections.	CO3	AP	20
4.	Draw the projections of a cube of side 40 mm when it rests on one of its corner with the diagonal of the solid horizontal.	CO3	AP	20
5.	A cylinder of base diameter 50 mm and axis length 70 mm resting on the ground with its axis making an angle of 50° with H.P. Its axis is parallel to V.P. Draw its projections.	CO3	AP	20
6.	A cone of base diameter 45 mm and axis length 65 mm is resting on H.P on a point on the circumference of the base. Its base is inclined at 50° with H.P and axis is parallel to V.P. Draw its projections.	CO3	AP	20
7.	A hexagonal pyramid of base side 25 mm and axis length 75 mm with rest on one of its base edges on the H.P, with its base inclined at 30° to the H.P and parallel to the V.P. Draw its projection.	CO3	AP	20
8.	Draw the projection of a pentagonal pyramid of base 25 mm sides and axis 60 mm long, when it is lying on the H.P on one of its base edges, such that the axis is parallel to V.P and inclined at 30^0 to H.P.	CO3	AP	20
9.	Draw the projections of a square pyramid of 40mm side and axis 60mm long, when it lies on the H.P with its slant edge and axis parallel to V.P.	CO3	AP	20
10.	Draw the projection of a pentagonal pyramid of base side 25mm and axis height 60mm with a triangular face perpendicular to H.P.	CO3	AP	20

UNIT IV
PROJECTION OF SECTIONED SOLIDS AND DEVELOPMENT OF SURFACES

Sectioning of above solids in simple vertical position when the cutting plane is inclined to the one of the principal planes and perpendicular to the other — obtaining true shape of section. Development of lateral surfaces of simple and sectioned solids — Prisms, pyramids cylinders and cones.

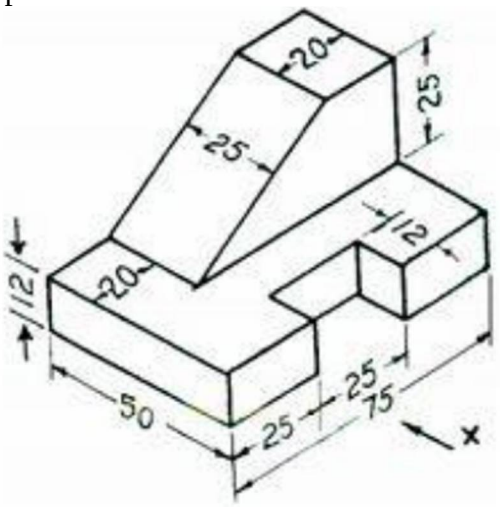
Q.No	Question	CO	BTL	Marks
	PART A			
1.	A square pyramid of side of base 25 mm and height 60 mm rests on the H.P on its base with a base perpendicular to V.P. It is cut by plane perpendicular to V.P and inclined at 30^0 to H.P. The cutting plane meets the axis at 25 mm from the vertex. Draw the elevation, sectional plan and true shape of the section.	CO4	AP	20
2.	A pentagonal pyramid of base side 20 mm and altitude 55 mm rests on its base on the H.P with one of its base edges perpendicular to V.P. It is cut by plane perpendicular to V.P and inclined at 50^0 to H.P. The cutting plane meets the axis at 15 mm above the base. Draw the elevation, sectional plan and true shape of the section.	CO4	AP	20
3.	A hexagonal pyramid of base side 25 mm and altitude 70 mm rests on its base on the H.P with one of its base side parallel to V.P. It is cut by plane perpendicular to V.P and inclined at 35^0 to H.P and bisecting the axis. Draw the elevation, sectional plan and true shape of the section.	CO4	AP	20
4.	A Cylinder of diameter 48 mm and altitude 55 mm rests on its base on H.P. It is cut by plane perpendicular to V.P and inclined at 45^0 to H.P. The cutting plane meets the axis at a distance of 16 mm from the top. Draw the elevation, sectional plan and true shape of the section.	CO4	AP	20
5.	A Cone of base diameter 65 mm and axis length 80 mm, resting on the H.P on its base. It is cut by plane perpendicular to V.P and inclined at 45^0 to H.P and is bisecting the axis. Draw the elevation, sectional plan and true shape of the section.	CO4	AP	20
6.	A pentagonal prism of side of base 30 mm and height 60 mm rests on the H.P with one of its rectangular face parallel to V.P. It is cut by a plane perpendicular to V.P and inclined at 35^0 to H.P passes through the axis at a height of 35 mm above the base. Draw the development of the lower portion of the solid.	CO4	AP	20
7.	A Cylinder of diameter 50 mm and height 70 mm is resting vertically on one its base on the H.P. It is cut by a plane perpendicular to V.P and inclined at 40^0 to H.P, and bisecting the axis. Draw the development of the lateral surface of the lower portion of the truncated cylinder.	CO4	AP	20

8.	A Square pyramid of base side 50 mm and height 60 mm rests on its base on H.P with two of its base edges parallel to V.P is cut by a plane perpendicular to V.P and inclined at 45^0 to H.P and intersecting it at a point of distance 40 mm from the base. Draw the development of the pyramid.	CO4	AP	20
9.	A hexagonal prism of base side 25 mm and height 65 mm stands with its base on HP such that one of the base edge is parallel to VP. It is cut by a section plane perpendicular to the V.P and inclined at 30^0 to HP, bisecting the axis. Draw the development of the surface of the cut solid.	CO4	AP	20
10.	A hexagonal pyramid of base side 30 mm and height 60 mm rests on HP with its base perpendicular to V.P. It is cut by a plane perpendicular to the V.P and inclined at 30^0 to H.P meeting the axis at 20 mm above the HP. Draw the development of the lateral surface of the solid.	CO4	AP	20

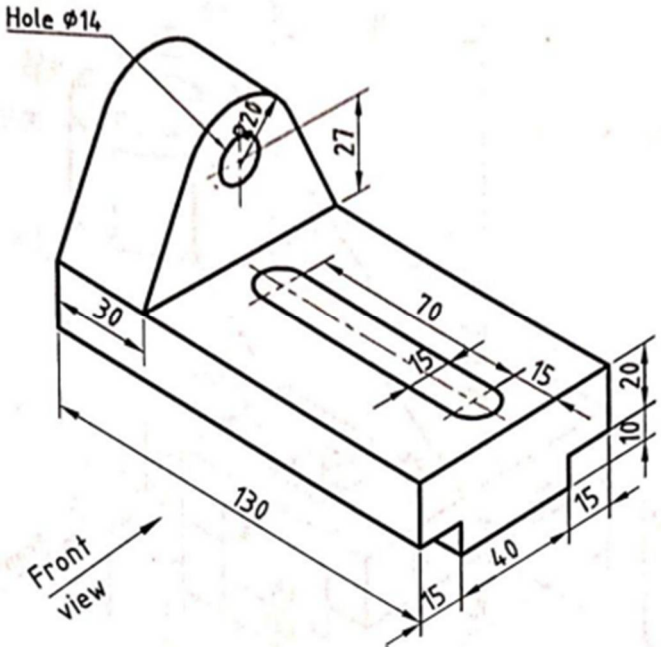
UNIT V
ORTHOGRAPHIC AND ISOMETRIC PROJECTIONS

Orthographic projection- principles-Principal planes-First angle projection-projection of points. Projection of straight lines (only First angle projections) inclined to both the principal planes. Principles of isometric projection — isometric scale — Isometric projections of simple solids and truncated solids - Prisms, pyramids, cylinders, cones- combination of two solid objects in simple vertical positions.

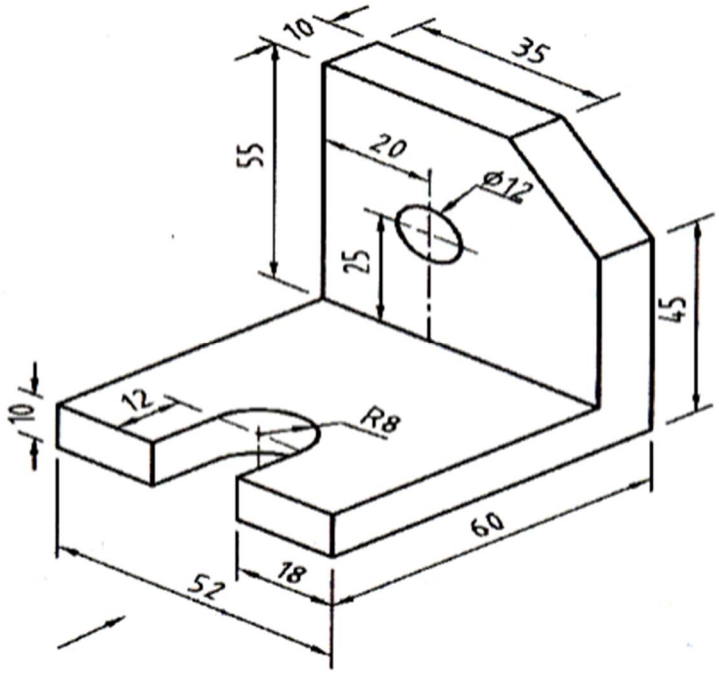
Q.No	Question	CO	BTL	Marks
	PART A			
1.	Draw the front, top and side view of the solid shown in fig.	CO5	AP	20



2.	Draw the front, top and side view of the solid shown in fig.	CO5	AP	20



3.	Draw the front, top and side view of the solid shown in fig.	CO5	AP	20



4.	A frustum of cone of bottom diameter 60 mm, top diameter 30 mm and height 40 mm. Draw the isometric view of the frustum.	CO5	AP	20

5.	A hexagonal prism of base side 25 mm and height 65 mm stands with its base on HP such that one of the base edge is parallel to VP. Draw the isometric view.	CO5	AP	20

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24GEES204

PYTHON PROGRAMMING

UNIT I

PYTHON BASICS AND CONTROL STRUCTURES

Introduction to Python, Tokens in Python – Variables, Keywords, Comments, Literals, Data types, Indentation, Operators and its precedence, Expressions, Input and Print functions. Sequential approach. Selective statements – if, if-else, nested if, if –elif ladder statements Iterative statements - while, for, Nested loops, else in loops, break, continue and pass statements

Q.No	Question	CO	BTL	Marks
	PART A			
1.	Define tokens in Python.	CO1	RE	2
2.	List data types in Python.	CO1	RE	2
3.	Define a variable in Python with example.	CO1	RE	2
4.	What is a keyword in Python? Give examples.	CO1	RE	2

5.	What will be the output of the following code?
	x = 10
	if x > 5:
	  print("Greater")
	else:
	  print("Smaller")
		CO1	RE	2

6.	Compare if and if-else.	CO1	UN	2
7.	Compare break and continue in Python.	CO1	UN	2
8.	Interpret use of the pass statement in Python.	CO1	UN	2
	PART B			
1.	a) Explain Python tokens with examples. b) Explain data types in Python with examples.	CO1	UN	8 8
2.	Explain Iterative statements with examples.	CO1	UN	16
3.	Explain Selective or Conditional Statements with examples.	CO1	UN	16
4.	a) Develop a program to find the largest of three numbers using if-elif. b) Develop a program to print the multiplication table of a given	CO1	AP	8 8

	number using a for loop.			
5.	a) Develop a program to print Fibonacci series up to n terms. b) Develop a program to print numbers from 1 to 100 skipping multiples of 5.	CO1	AP	8 8

UNIT II

COLLECTIONS AND STRINGS

List: Create Access, Slicing, Negative Indices, List Methods, and comprehensions **Tuples:** Create Indexing and Slicing, Operations on tuples. **Dictionary:** Create, add, and replace values, operations on dictionaries. **Sets:** Create and operations on set. **Strings:** Formatting, Comparison, Slicing, Splitting, Stripping, Negative indices, String functions. Regular expression: Matching the patterns, Search and replace.

Q.No	Question	CO	BTL	Marks
	PART A			
1.	How do you create a list in Python?	CO2	RE	2
2.	Compare List and Tuple.	CO2	UN	2
3.	Define dictionary.	CO2	RE	2
4.	What is slicing?	CO2	RE	2
5.	Define negative indexing. Give an example.	CO2	RE	2
6.	Define set with an example.	CO2	RE	2
7.	What will be the output of the following code? tup = (10, 20, 30, 40) print(tup[1:3])	CO2	RE	2
8.	Define splitting in strings.	CO2	RE	2
	PART B			
1.	a) Explain list operations and methods with examples.	CO2	UN	16
2.	a) Explain dictionary creation and operations. b) Explain set operations with examples.	CO2	UN	8 8

3.	a) Develop a program to find the largest and smallest elements in a list.	CO2	AP	8
	b) Explain tuples and their operations.			8
4.	a) Develop a program to count the frequency of each word in a sentence.	CO2	AP	8
	b) Develop a program to remove duplicates from a list using a set.			8
5.	a) Explain string functions in Python.	CO2	UN	8
	b) Explain regular expressions in Python.			8

UNIT III

FUNCTIONS

Functions: Types, parameters, arguments: positional arguments, keyword arguments, parameters with default values, functions with arbitrary arguments, Scope of variables: Local and global scope, Recursion and Lambda functions

Q.No	Question	CO	BTL	Marks
	PART A			
1.	Define a function.	CO3	RE	2
2.	Define arbitrary arguments.	CO3	RE	2
3.	What is a parameter with a default value?	CO3	UN	2
4.	Interpret the use of keyword arguments in a function call. Provide an example.	CO3	UN	2
5.	Compare global variable and a local variable with an example.	CO3	UN	2
6.	What is the scope of a variable in Python?	CO3	RE	2
7.	Define lambda function in Python.	CO3	RE	2
8.	Compare a normal function and a lambda function in terms of syntax.	CO3	UN	2
	PART B			
1.	Classify the types of functions in Python. Explain each type with suitable example.	CO3	UN	16

2.	Explain the scope of variables in Python.	CO3	UN	16
3.	Develop a program	CO3	AP	8
	a) To find the sum of elements in a list using a function.			8
	b) To find the factorial of a number using recursion.			
4.	Develop a program using function	CO3	AP	8
	a) To generate the Fibonacci series.			8
	b) To check whether the given number is prime or not.			
5.	a) Explain the types arbitrary arguments in Python functions.	CO3	CR	8
	b) Explain the call by value and call by reference.			8

UNIT IV

FILES, EXEPTIONS

File I/O, Exception Handling, introduction to basic standard libraries, Installation of pip, Demonstrate Modules: Turtle, pandas, numpy, Explore packages.

Q.No	Question	CO	BTL	Marks
	PART A			
1.	What is File I/O in Python?	CO4	RE	2
2.	What is the function used to write data to a file in Python?	CO4	RE	2
3.	Compare w and a modes when opening a file in Python.	CO4	UN	2
4.	What are the main functions of the Turtle module? How do you draw a simple square using it?	CO4	UN	2
5.	What is the syntax for importing a module in Python?	CO4	RE	2
6.	Define pandas library in Python.	CO4	RE	2
7.	What is the purpose of the finally block in exception handling?	CO4	RE	2
8.	Define try and except.	CO4	RE	2
	PART B			
1.	Explain various exception handling function with suitable programs.	CO4	UN	16
2.	a) Interpret the use of Pip Installs Packages.	CO4	UN	8
	b) Summarize NumPy(Numerical Python).			8
3.	Develop a Python program to create a file, write data into it, and read it back.	CO4	AP	16

4.	a) Develop a program to use the Turtle library to draw a square. b) Develop a program using pandas to create a DataFrame and display it.	CO4	AP	8 8

UNIT V

OBJECT ORIENTED CONCEPTS IN PYTHON

Introduction - Objects and Classes - Creating Python Classes - Basic Inheritance - Multiple Inheritance - Polymorphism - Abstract Base Classes.

Q.No	Question	CO	BTL	Marks
	PART A			
1.	What is OOP?	CO5	RE	2
2.	What is a class in Python?	CO5	RE	2
3.	Define abstraction.	CO5	RE	2
4.	What is constructor?	CO5	RE	2
5.	Define inheritance and its types.	CO5	RE	2
6.	What is polymorphism in Python?	CO5	RE	2
7.	What is method overriding in Python?	CO5	RE	2
8.	Interpret the use of __init__() method in a Python class?	CO5	UN	2
	PART B			
1.	Explain inheritance and its types.	CO5	UN	16
2	a) Explain constructors and methods. b) Demonstrate the use of __init__() with a program.	CO5	UN	8 8
3.	Construct a Python program using OOP concepts.	CO5	AN	16
4.	Build a python program using Abstract Base Class.	CO5	AN	16
5.	Build a program to demonstrate method overriding (polymorphism).	CO5	AN	16

---- END ----

24GEES205

BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

UNIT I

AC CIRCUITS

Alternating voltages and currents, RMS, average, maximum values, Single Phase RL, RC, RLC series circuits, Power in AC circuits, Power Factor, Three phase balanced systems, Star and delta Connections, Electrical Safety, Fuses and Earthing.

Q. No.	Question	CO	BTL	Marks
	PART A			
1.	Define power factor, peak factor and form factor.	CO1	RE	2
2.	Define RMS value of ac quantity.	CO1	RE	2
3.	What is the purpose of earthing in an electrical installation? State any one advantage.	CO1	RE	2
4.	Write down the expression for active power and apparent power.	CO1	UN	2
5.	An electric iron is rated 1000w,240 V. Find the current drawn and resistance of the heating element.	CO1	UN	2
6.	A sinusoidal current has an RMS value of 5 A. Determine Maximum (peak) value and Average value over one half cycles.	CO1	UN	2
7.	What is the time constant in an RL circuit?	CO1	RE	2
8.	Differences between star and delta connections in a three-phase system.	CO1	UN	2
	PART B			
1.	Discuss about the working principles of RLC series circuits and its relationships. Give the necessary phasor diagram.	CO1	AN	16
2.	(i)Derive the rms value of alternating quantity.	CO1	UN	6
	(ii) Discuss the steady state analysis of the RC series circuit and derive its relationships. Draw the phasor diagram			10
3.	A series circuit has R=5Ω,L= 0.15mH,C=100μF and is supplied with 230V,50Hz. Find Impedance, Current, Power, Power factor,	CO1	AP	16

	the phase difference between voltage and current, State whether the circuit is inductive or capacitive, draw the phasor diagram and Voltage drop across each element.			
4.	(i) The voltage of $v(t)=100\sin\omega t$ is applied to a circuit the current flowing through the circuit is $i(t)=15\sin(\omega t-30^{o})$.Find average power delivered to the circuit.	CO1	AP	6
	(ii) A 100 Ω resister and a 20mH inductor are connected in series across a 230V,50 Hz supply. Find circuit impedance ,Admittance ,current ,voltage cross inductor, apparent power ,Active Power and power Factor	CO1	AP	10
5.	A sinusoidal voltage V = 200 sin 314t is applied to a 10Ω resistor. Find (a) Frequency (b) RMS Voltage (c) RMS current and (d) Power dissipated as heat.	CO1	AP	16

UNIT II

DC CIRCUITS

Basic circuit elements and sources, Ohms law, Kirchhoff's laws, Series and Parallel connection of circuit elements, Star-delta transformation, Mesh current analysis, Node voltage analysis, Theorems: Thevenin's, Maximum power transfer and Superposition theorem.

Q.No.	Question	CO	BTL	Marks

PART A

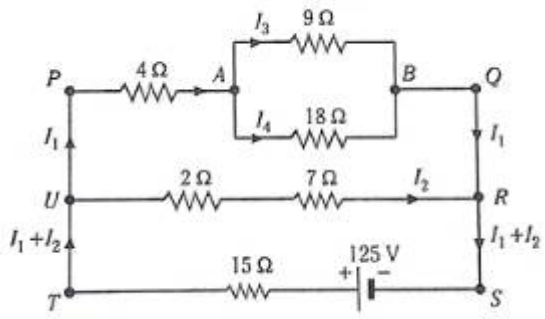
1.	State Ohm's law and its limitations.	CO2	RE	2
2.	State Kirchoff's laws.	CO2	RE	2
3.	Write the expressions for current division and voltage division rules.	CO2	RE	2
4.	Summarize the key distinctions between series and parallel circuits.	CO2	UN	2
5.	Two resistors are connected in parallel across 200V supply take 10A from the mains. If the power dissipated in R_1 is 1200W. Find the value	CO2	AP	2

of the R_2 and current in the same branch.

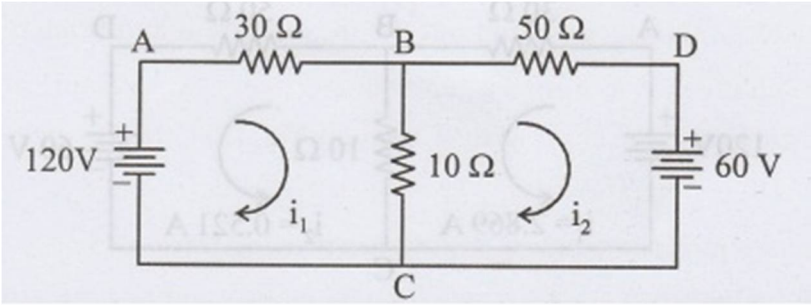
6.	State Superposition theorem and its limitations.	CO2	RE	2
7.	Recall the Thevenin's theorem.	CO2	UN	2
8.	State maximum power transfer theorem.	CO2	RE	2

PART B

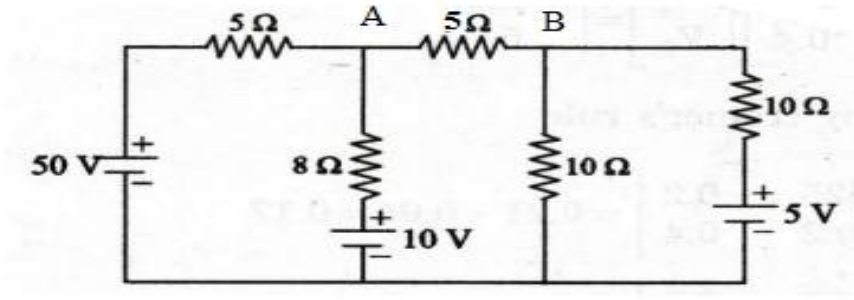
1.	(i) Three loads A, B and C are connected in parallel across a 250V source. Load A takes 50A, load B is a resistor of 10Ω and load C takes 6.25kW. Calculate: R_A and R_C, I_B and I_C, Power in loads A and B, Total current, Total power and Total effective resistance.	CO2	AP	8
	(ii) Calculate the current in the 15Ω resistor, the voltage across the 18Ω resistor and the power dissipated in the 7Ω resistor in the given circuit.	CO2	AP	8



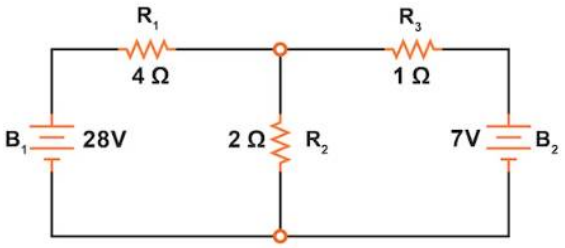
2.	Determine the current supplied by 10Ω resistor in the circuit shown in figure using mesh analysis.	CO2	AP	16



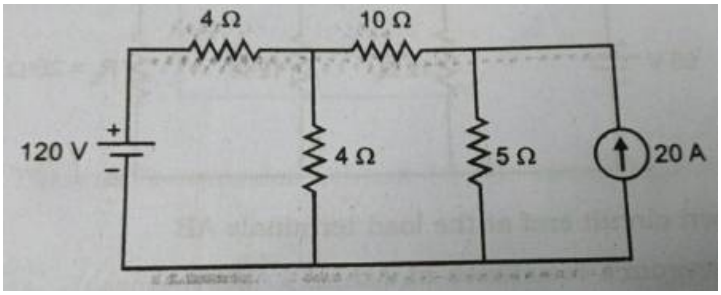
3.	(i) For the circuit of figure, find the current through 5Ω resistor which is located between the A and B by nodal method.	CO2	AP	8



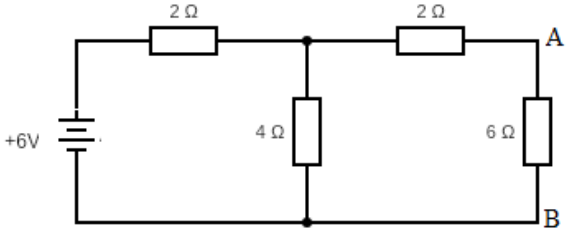
(ii) Find the current in the 2Ωload resistor by using Superposition theorem. CO2 AP 8



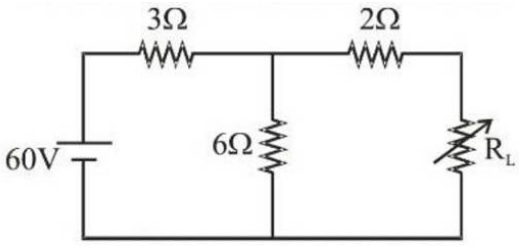
4. For the circuit shown in figure, determine the current in 10Ω resistor by applying Superposition theorem. CO2 AP 16



5. (i) Determine the open circuit voltage and Thevenin's resistance across AB for the given circuit shown in figure. CO2 AP 8



(ii) Find the maximum power and load resistance for the given circuit by using maximum power transfer theorem. CO2 AP 8



UNIT III

ANALOG ELECTRONICS

Semiconductor Materials: Silicon & Germanium – PN Junction Diodes, Zener Diode – Characteristics and Applications – Rectifiers, Bipolar Junction Transistor - Biasing, JFET, SCR, MOSFET, IGBT – I-V Characteristics and Applications- Inverters.

Q. No.	Question	CO	BTL	Marks
	PART A			
1.	Differentiate intrinsic and extrinsic semiconductors.	CO3	UN	2
2.	Name the Four operating regions of the transistor.	CO3	RE	2
3.	What do you mean by transistor biasing?	CO3	RE	2
4.	Define Knee voltage or Junction barrier voltage for PN Junction.	CO3	RE	2
5.	Draw the I-V characteristics of PN junction diode and Zener diode.	CO3	RE	2
6.	Differentiate rectifiers and inverters.	CO3	UN	2
7.	List the applications of a Zener diode.	CO3	RE	2
8.	JFET is a voltage operated device - Justify.	CO3	UN	2
	PART B			
1.	Explain the working of a PN junction diode with a neat diagram and its V–I characteristics.	CO3	AN	16
2.	Describe the working of a Zener diode with neat diagrams. Also explain its V-I characteristics.	CO3	UN	16
3.	Describe the construction and working of BJT. Explain its input	CO3	UN	16

	and output characteristics.			
4.	Explain the construction and operation of JFET. Also explain about its characteristics.	CO3	AN	16
5.	Explain the operation of Half Wave and Full Wave rectifiers with circuit diagrams and derive efficiency, ripple factor, TUF and PIV.	CO3	AN	16

UNIT IV

DIGITAL SYSTEMS

Number Systems, Logic Gates and Truth Table, Boolean algebra: simplification of Boolean functions using K-maps, Basics of combinational circuits and Sequential Circuits - Adders- Subtractors - Counters - Synchronous and Asynchronous.

Q. No.	Question	CO	BTL	Marks
	PART A			
1.	List the types of number systems.	CO4	RE	2
2.	What are Combinational circuits?	CO4	RE	2
3.	Mention the significance of K-Map.	CO4	RE	2
4.	Add binary numbers 1111 and 0101.	CO4	RE	2
5.	Compare Sequential logic with combinational logic.	CO4	UN	2
6.	Differentiate between Sum of Products and Product of Sums with examples.	CO4	UN	2
7.	What are universal gates?	CO4	RE	2
8.	Convert $(634)_8$ into Binary.	CO4	AP	2
	PART B			
1.	Simplify the Boolean function, i) F (W, X, Y, Z) = W X' Y'+W Y+W' Y Z' ii) A = X Y + X (Y+Z) + Y (Y+Z).	CO4	AP	16
2.	What is a K-Map? Simplify the Boolean function F (w, x, y, z) = ∑m (0, 3, 4, 7, 8, 9, 10, 11, 12, 13, 15) using K-Map.	CO4	AP	16

3.	i) Design and explain the working of Gray to BCD Converter.	CO4	AP	10
	ii) Convert $(95.0625)_{10}$ to Binary.			6
4.	i) Implement Full Adder using two Half Adders.	CO4	AN	8
	ii) Implement Full Subtractor using NAND gates.			8
5.	For the Truth Table 1, obtain the simplifies sum of products expression using K Map and realize it using only NAND gate. Observe that this is the output of a majority voting circuit.	CO4	AP	16

Truth Table 1

A	B	C	Y
0	0	0	0
0	0	1	0
0	1	0	0
0	1	1	1
1	0	0	0
1	0	1	1
1	1	0	1
1	1	1	1

UNIT V

LINEAR INTEGRATED CIRCUITS

Ideal OP-AMP characteristics, Basic applications of op-amp – Inverting and Non-inverting Amplifiers, summer, differentiator and integrator-S/H circuit, D/A converter (R- 2R ladder), A/D converters - Flash type ADC using OP-AMPS.

Q.No.	Question	CO	BTL	Marks

PART A

1.	Outline the ideal characteristics of an operational amplifier.	CO5	UN	2

2.	Define offset voltage of an Op-amp.	CO5	RE	2
3.	Define operating modes of OP-AMP and its main application.	CO5	RE	2
4.	Interpret the function of an op-amp integrator.	CO5	UN	2
5.	Illustrate the principle of operation of an op-amp differentiator.	CO5	UN	2
6.	State the concept of quantization error in A/D conversion.	CO5	UN	2
7.	What is a sample/hold circuit?	CO5	RE	2
8.	State the advantages of an R–2R ladder DAC.	CO5	UN	2

PART B

1.	Analyze the effect of various performance parameters on the behaviour of an operational amplifier in practical circuits.	CO5	AN	16
2.	Demonstrate the operation of integrator circuit by relating input and output waveforms.	CO5	AP	16
3.	Demonstrate the operation of differentiator circuit by relating input and output waveforms.	CO5	AP	16
4.	Compare the voltage-mode and current-mode configurations of an R–2R ladder DAC with appropriate examples.	CO5	AN	16
5.	Explain in detail about inverting and non- inverting Amplifiers.	CO5	UN	16

----- END ----

24TAHS202

TAMILS AND TECHNOLOGY

அலகு - I : நெசவு மற்றும் பானைத் தொழில்நுட்பம்

UNIT – 1 : WEAVING AND CERAMIC TECHNOLOGY

சங்ககாலத்தில் நெசவுத்தொழில் - பானைத் தொழில்நுட்பம் - கருப்பு சிவப்பு பாண்டங்கள் -பாண்டங்களில் கீறல் குறியீடுகள்.

Weaving Industry during Sangam Age – Ceramic technology – Black and Red Ware Potteries (BRW) – Graffiti on Potteries.

Q. NO	QUESTION	CO	BTL	Marks
	PART – A			
1.	நெசவுத்தொழில் என்றால் என்ன?	CO1	RE	2
	What is weaving industry?			
2.	பருத்திப்பெண்டீர் குறிப்பு எழுதுக?	CO1	RE	2
	Write a note on Paruthi Pendir?			
3.	நெசவுத் தொழிலில் வண்ணமிடுதலுக்குப் பயன்படுத்தப்பட்ட செடி எது ?	CO1	RE	2
	Which plant was used for dyeing in textile industry?			
4.	மட்பாண்டம் என்றால் என்ன?	CO1	RE	2
	What is Pottery?			
5.	திருவைகளின் வகைகள் யாவை?	CO1	RE	2
	What are the types of rotators (Thiruvai)?			
6.	கருப்பு - சிவப்பு மண் பாண்டங்கள் என்றால் என்ன?	CO1	RE	2
	Describe Black and Red tiles?			
7.	கருப்பு – சிவப்பு மட்பாண்டங்களில் பயன் படுத்தப்படும் மூலப்பொருட்கள் என்ன?	CO1	RE	2
	What are the raw materials used in Black – Red Pottery?			
8.	மட்பாண்ட தயாரிப்பாளர்கள் எவ்வாறு அழைக்கப் படுகிறார்கள்?	CO1	RE	2
	What are Pottery makers called?			

PART – B

1.	சங்ககாலத்தில் நெசவுத்தொழில் என்னும் தலைப்பில் கட்டுரை வரைக Write and explain weaving technology in sangam literature	CO1	UN	16
2.	ஆடைகளின் பெயர்களை எடுத்துக்காட்டுகளுடன் விளக்குக? Explain the names of clothes with examples?	CO1	UN	16
3.	மட்பாண்டங்கள் என்றால் என்ன? பண்டைய தமிழர்களின் தொல் பொருளில் காணப்படும் கீறல் குறியீடுகள் மூலம் தெரிவிக்கப்பட்ட செய்திகளை விளக்குக. What are Potteries? Explain the messages conveyed through the graffiti symbols found on the artifact of the ancient Tamils.	CO1	UN	16
4	மட்பாண்டங்கள் செய்யும் செயல்முறைகள் என்ன? பல்வேறு வகையான பானைகளை விவரிக்கவும். What are processes of pottery making?Describe the different types of pots.	CO1	UN	16
5	கருப்பு - சிவப்பு பானை ஓடுகளில் நானோ தொழில்நுட்பத்தின் சிறப்புகளை விளக்குக . Explain the salient features of nano – technology in black red pottery.	CO1	UN	16

அலகு - II : வடிவமைப்பு மற்றும் கட்டிடத் தொழில்நுட்பம்

UNIT – II : DESIGN AND CONSTRUCTION TECHNOLOGY

சங்ககாலத்தில் வடிவமைப்பு மற்றும் கட்டுமானங்கள் &சங்ககாலத்தில் வீட்டுப்பொருட்களில் வடிவமைப்பு – சங்ககாலத்தில் கட்டுமான பொருட்களும் நடுகல்லும் – சிலப்பதிகாரத்தில் மேடை அமைப்பு பற்றிய விவரங்கள் – மாமல்லபுரச் சிற்பங்களும்,கோவில்களும் – சோழர்காலத்துப் பெருங்கோயில்கள் மற்றும் பிறவழிபாட்டுத் தலங்கள் – நாயக்கர் காலக் கோயில்கள் – மாதிரி கட்டமைப்புகள் பற்றி அறிதல்,மதுரை மீனாட்சிஅம்மன் ஆலயம் மற்றும் திருமலைநாயக்கர் மஹால் – செட்டிநாட்டு வீடுகள் - பிரிட்டிஷ்காலத்தில் சென்னையில் இந்தோ – சாரோசெனிக் கட்டிடக்கலை.

Designing and Structural construction House & Designs in house hold materials during Sangam Age – Building materials and Hero stones of Sangam age – Details of stage constructions in Silappathikaram – Sculptures and Temples of Mamallapuram – Great Temples of Cholas and other worship places – Temples of Nayaka Period – Type study (Madurai Meenakshi Temple) – Thirumalai Nayakar Mahal – Chetti Nadu

Houses, Indo – Saracenic architecture at Madras during British Period.

Q.NO	QUESTION	CO	BTL	Marks
	PART – A			
1.	சங்ககாலத்தில் வீட்டின் வடிவமைப்பு எப்படி இருந்தது? How was the design of the house during the Sangam period.	CO2	RE	2
2.	மதுரை மீனாட்சிஅம்மன் கோவிலின் கோபுரங்களை கட்டியவர் யார்? Who built the towers of Madurai Meenakshi Amman Temple?	CO2	RE	2
3.	சங்ககாலத்தில் முக்கியமான கட்டுமானப் பொருட்கள் எவை? What were the important building materials during the sangam period?	CO2	RE	2
4.	மாமல்லபுரத்தில் உள்ள குகைக்கோயில்கள் என்ன? What are the cave temples in Mamallapuram?	CO2	RE	2
5.	பஞ்சபாண்டவர்கள் ரதங்கள் யாவை? Which is Pancha Pandava Rathas?	CO2	RE	2
6.	இந்தோ –சாராசெனிக் கட்டிடக்கலைக்கு உதாரணம் தருக? Give examples for Indo – Saracenic Architecture?	CO2	RE	2
7.	செட்டிநாட்டு கட்டிடக்கலை என்றால் என்ன? What is Chettinad Architecture?	CO2	RE	2
8.	எழினிகள் (அல்லது) திரைகளின் வகைகள் யாவை? What are the types of Ezhinigal (or) Screens?	CO2	RE	2
	PART – B			
1.	மாமல்லபுரச் சிற்பங்கள் மற்றும் கோவில்களில் இருந்து நாம் பெறக்கூடிய தொழில்நுட்ப உண்மைகள் பற்றி சுருக்கமாக விளக்குக. Briefly explain about the technical facts we can obtain from Mamallapuram Scultures and temples.	CO2	UN	16

2.	நடுகல் வழிபாடு என்றால் என்ன? அதன் அமைப்பினை விளக்கி நடுகல் வழியாக அறியப்படும் பழந்தமிழர் தொடர்பான செய்திகளை விவரிக்க What is Hero Stones? Explain its structure and describe the facts related to Tamils as known through hero stones.	CO2	UN	16
3.	சிலப்பதிகாரத்தில் கொடுக்கப்பட்டுள்ள மேடை கட்டுமானங்களின் தொழில் நுட்ப மதிப்புகளை எழுதவும். Write of the Technical values of the stage constructions as given in SILAPATHIKARAM.	CO2	UN	16
4.	மதுரை மீனாட்சி அம்மன் கோயிலின் மாதிரி கட்டமைப்புகளை விவரிக்கவும்? Describe the model structures of Madurai Meenakshi Amman Temple?	CO2	UN	16
5	தஞ்சை பெரிய கோயில் கட்டுமானத்துக்கும் ,தமிழ் எழுத்துக்களுக்கும் உள்ள தொடர்பினை விளக்குக . Explain the relate the construction of the Tanjore Big Temple with Tamil alphabets.	CO2	UN	16

அலகு – III : உற்பத்தித் தொழில்நுட்பம்

UNIT – III : MANUFACTURING TECHNOLOGY

கப்பல்கட்டும்கலை – உலோகவியல் – இரும்புத்தொழிற்சாலை – இரும்பை உருக்குதல், எஃகு – வரலாற்றுச் சான்றுகளாக செம்பு மற்றும் தங்கநாணயங்கள் – நாணயங்கள் அச்சடித்தல் – மணிஉருவாக்கும் தொழிற்சாலைகள் – கல்மணிகள், கண்ணாடிமணிகள் – சுடுமண்மணிகள் – சங்குமணிகள் –எலும்புத்துண்டுகள் – தொல்லியல்சான்றுகள் – சிலப்பதிகாரத்தில் மணிகளின் வகைகள்.

Art of Ship Building – Metallurgical studies – Iron industry – Iron smelting, steel – Copper and gold – Coins as source of history – Minting of Coins – Beads making – industries Stone beads – Glass beads – Terracotta beads – Shell beads/bone beats – Archeological evidences – Gem stone types described in Silappathikaram.

Q.NO	QUESTION	CO	BTL	Marks
	PART – A			
1.	கம்மியர் யார்?	CO3	RE	2
	Who is Commier?			
2	நீகான் என்பவர் யார்?	CO3	RE	2
	Who is Neekan?			
3.	பீட்டாவெண்கலம் என்றால் என்ன?	CO3	RE	2
	What is Beta Bronze?			
4.	செந்நாக்குழி நெருப்பு உலை என்பதன் பொருளை விளக்குக?	CO3	RE	2
	Explain the meaning of Chennakuzhi fire furnace?			
5.	கார்னீலியன் என்றால் என்ன?	CO3	RE	2
	What is meant by Carnelian?			
6.	சிலப்பதிகாரத்தில் காணப்படும் மணிகளின் வகைகளுள் நான்கினை எழுதுக?	CO3	RE	2
	Write any four types of gem stones found in Silapathikaram?			
7.	கப்பல்களின் வகைகள் யாவை?	CO3	RE	2
	What are the types of vessels?			
8.	குயினர்கள் என்று அழைக்கப்படுபவர்கள் யாவர்?	CO3	RE	2
	Who are called Kuyinars?			
	PART – B			
1.	உலோகவியல் துறையில் தமிழர்களின் தொழில்நுட்ப திறன்களை எழுதுக.	CO3	UN	16
	Write of technical skills of the Tamils in Metallurgical field.			
2.	செம்பு மற்றும் தங்க நாணயங்கள் மூலம் தமிழர்களின் பண்பாட்டுப் பதிவுகளை விளக்குக.	CO3	UN	16
	Explain the cultural values of the Tamils through copper and gold coins.			
3.	சிலப்பதிகாரத்தில் மணிகளின் வகைகளை எழுதுக.	CO3	UN	16
	Write the types of Beads in Silapathikaram.			

4	கல்மணிகள் மற்றும் கண்ணாடி மணிகள் செய்யும் முறையை ஆதாரத்துடன் எழுதுக. Write the method of making stone beads and glass beads with evidence.	CO3	UN	16
5	சங்க இலக்கியத்தில் காணலாகும் பழத்தமிழர்களின் இரும்பு மற்றும் எ.'.கு பற்றிய தொழில்நுட்ப செய்திகளைத் தொகுத்து எழுதுக Compile and write down the information about the iron and steel industry of the ancient Tamils found in Sangam literature.	CO3	UN	16

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அலகு - IV : வேளாண்மை மற்றும் நீர்ப்பாசனத் தொழில்நுட்பம்

UNIT – 4 : AGRICULTURE AND IRRIGATION TECHNOLOGY

அணை,ஏரி,குளங்கள்,மதகு – சோழர்காலக் குமிழித்தூம்பின் முக்கியத்துவம் – கால்நடை பராமரிப்பு – கால்நடைகளுக்காக வடிவமைக்கப்பட்ட கிணறுகள் – வேளாண்மை மற்றும் வேளாண்மைச் சார்ந்த செயல்பாடுகள் – கடல்சார் அறிவு – மீன்வளம் – முத்து மற்றும் முத்துக் குளித்தல் – பெருங்கடல் குறித்த பண்டைய அறிவு –அறிவுசார் சமூகம்.

Dam, Tank, ponds, Sluice, Significance of Kumizhi Thoompu of Chola Period, Animal Husbandry – Wells designed for cattle use – Agriculture and Agro Processing – Knowledge of Sea – Fisheries – Pearl – conche diving – Ancient Knowledge of Ocean – Knowledge Specific Society.

Q.NO	QUESTION	CO	BTL	Marks
	PART – A			
1.	சங்க இலக்கியம் குறிப்பிடும் நீர் நிலைகளின் பெயர்கள் யாவை ? What are the names of water bodies mentioned in the sangam literature?	CO4	RE	2
2	ஊருணி - குறிப்பு வரைக. Ooruni - explain	CO4	RE	2
3.	மதகு என்றால் என்ன? What is a Sluice?	CO4	RE	2
4.	இயற்கை உரங்கள் என்றால் என்ன? What are natural fertilizers?	CO4	RE	2
5.	கடல் என்றால் என்ன?	CO4	RE	2

	What is ocean?			
6.	மீன் வகைகளை பட்டியலிடுக?	CO4	RE	2
	List the species of fish?			
7.	முத்துவின் மருத்துவ குணங்கள் என்ன?	CO4	RE	2
	What are the medical properties of Pearl?			
8.	அறிவு என்றால் என்ன? அதன் வகைகள் யாவை?	CO4	RE	2
	What is knowledge? What are its types?			

PART – B

1.	“கல்லணை”யின்தொழில்நுட்பம்பற்றிஒருகட்டுரை எழுதவும்.	CO4	UN	16
	Write an essay on the technology behind “Kallanai”.			
2.	பண்டையத் தமிழர்களின் வேளாண்மை சார்ந்த தொழில்நுட்பத் திறன்கள் பற்றி ஆதாரங்களுடன் விவரிக்கவும்.	CO4	UN	16
	Describe with evidence about the technical skills of the ancient Tamils in agriculture field.			
3.	நீர் மேலாண்மைக்கான “குமிழிதூம்பு” தொழில்நுட்பத்தின் படத்தை விளக்கவும்.	CO4	UN	16
	Explain the picture “Kumizhi Thoombu” technology meant for water management.			
4.	சங்ககாலத்தில் கால்நடை வளர்ப்பு பற்றிய அறிவை தெளிவுபடுத்தவும்.	CO4	UN	16
	Elucidate the knowledge of animal husbandry during sangam era.			
5	`கடல்சார் அறிவியல் தமிழர்கள் சிறந்தவர்கள்' இக்கூற்றினை நிறுவுக.	CO4	UN	16
	`Tamils are the best in marine knowledge’ – Establish this statement.			

அலகு - V : அறிவியல்தமிழ்மற்றும்கணித்தமிழ்

UNIT –5 : SCIENTIFIC TAMIL & TAMIL COMPUTING

அறிவியல் தமிழின் வளர்ச்சி – கணித்தமிழ் வளர்ச்சி – தமிழ்நூல்களை மின்பதிப்பு செய்தல் – தமிழ் மென்பொருட்கள் உருவாக்கம் – தமிழ்இணையக் கல்விக்கழகம் – தமிழ் மின்நூலகம் – இணையத்தில் தமிழ் அகராதிகள் – சொற்குவைத் திட்டம்.

Development of Scientific Tamil – Tamil computing – Digitalization of Tamil Books – Development of Tamil Software – Tamil Virtual Academy – Tamil Digital Library – Online Tamil Dictionaries – Sorkuvai Project.

Q.NO	QUESTION	CO	BTL	Marks
	PART – A			
1.	“அறிவியல் தமிழ்”நூலின் ஆசிரியர் யார்? Who is the author of the book “Ariviyal Tamil”?	CO5	RE	2
2	தமிழ் மின் புத்தகங்களின் கோப்பு வகைகள் யாவை? What are the file types of Tamil e-books?	CO5	RE	2
3.	தமிழ் இணையக் கல்வி கழகம் எங்குள்ளது ? Where is Tamil Virtual Academy located?	CO5	RE	2
4.	தமிழ் இணையக் கல்விக் கழகத்தின் பணித்திட்டத்தின் மூன்று நிலைகள் யாவை? What are the three levels of the Tamil Internet Education Corporation?	CO5	RE	2
5.	மின்னணு நூலக அமைப்பின் ஐந்து கருத்துக்கள் யாவை? What are the five concepts of electronic library system?	CO5	RE	2
6.	தமிழ் மின் நூலகத்தின் ஏதேனும் இரண்டு நன்மைகளை எழுதவும். Write any two advantages of Tamil e-library.	CO5	RE	2
7.	அறிவியல் தமிழ் இதழ்களின் செயல்பாடுகள் என்ன? What are the functions of science Tamil magazines?	CO5	RE	2
8.	**தமிழாக்கம் தருக** : Unicode, Domain Name ,Tech Park, Blogspot, Font. Give Tamil meaning:Unicode, Domain Name, Tech Park, Blogspot, Font	CO5	RE	2

PART – B

1.	கணினித் தமிழ் வளர்ச்சி பற்றி கட்டுரை எழுதுக? Write an essay on the development of Computer Tamil?	CO5	UN	16
2.	அறிவியல் தமிழ் என்னும் தலைப்பில் ஒரு கட்டுரையை எழுதுக. Write an essay on “Contribution of Tamils to Indian freedom Struggle”.	CO5	UN	16
3.	தமிழ் மென் பொருளின் வளர்ச்சி பற்றி விளக்கி எழுதவும். Explain and write about development of Tamil Software.	CO5	UN	16
4.	சொற்குவைத் திட்டம் என்றால் என்ன? அதன் நோக்கங்களையும்,பணிகளையும் விவரிக்கவும். What is Sorkuvai Project? Describe the objectives and functions.	CO5	UN	16
5.	இணைய தமிழ் அகராதிகள் குறித்து விளக்கி , அதன் பயன்களை எடுத்துரைக்க . Explain about online Tamil dictionaries and highlight their benefits.	CO5	UN	16

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