



UNITED INSTITUTE OF TECHNOLOGY

(An Autonomous Institution)

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Periyanaickenpalayam, Coimbatore – 641020



DEPARTMENT OF SCIENCE AND HUMANITIES

QUESTION BANK

I YEAR

ODD SEMESTER

ACADEMIC YEAR 2025 – 2026

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HEAD OF THE DEPARTMENT

ACOE

PRINCIPAL

CHAIRMAN

24PHBS101
Physics for Engineers

UNIT 1

OPTICS & FIBRE OPTICS

Reflection and refraction of light waves – total internal reflection -Interference - Air Wedge – Michelson’s Interferometer – Wavelength Determination - Fiber optics: principle, numerical aperture, and acceptance angle - types of optical fibers (material, refractive index, and mode) - losses associated with optical fibers - fiber optic sensors: pressure and displacement.

Q. NO	QUESTION	CO	BTL	Marks
PART – A				
1.	Outline the conditions necessary for total internal reflection to occur.	1	UN	2
2	Define critical angle with equation.	1	RE	2
3.	Define Numerical Aperture (NA) in Fiber optics.	1	RE	2
4.	Distinguish between single-mode and multi-mode fibers.	1	AN	2
5.	What is the acceptance angle of an optical fiber?	1	RE	2
6.	Calculate the refractive indices of core and cladding materials of aoptical fibre if its numerical aperature is 0.22 and a relative refractive index difference is 0.0122.	1	AP	2
7.	Outline two applications of fiber optic sensors.	1	UN	2
8.	Explain why colours are seen over a thin film of petrol on roads	1	UN	2
9	Differentiate between active and passive fiber optic sensors	1	RE	2
10	Calculate the numerical aperature and acceptance angle for an optical fibre whose core and cladding has refractive index of 1.59 and 1.40 respectively.	1	AP	2

PART – B

1.	Explain the theory of Air wedge.	1	UN	16
2.	Using the concept of interference of light waves, demonstrate how an air wedge produces fringes and apply this principle to determine the thickness of a thin wire	1	AP	16
3.	Apply the principle of optical interference to explain the Michelson Interferometer, detailing its construction, fringe formation, and applications.	1	AP	16
4.	Explain the propagation of light through optical fibre and applications of the optical fibre. Or Derive an expression for acceptance angle and numerical aperture of an optical fibre.	1	UN	16
5.	Classification of optical fibre in terms of material, refractive index and modes of propagation	1	AN	16
6.	Write short notes on fibre optic sensors and its applications.	1	UN	16

UNIT 2 LASERS

Theory of laser – characteristics – Spontaneous and Stimulated emission – Einstein’s coefficients – population inversion – Resonant cavity - Optical amplification (qualitative) - Ruby Laser - Nd-YAG laser - CO₂ laser - semiconductor laser (Homojunction and Heterojunction) – LASERS in industry: Drilling, cutting and welding. Lasers in medicine: Dermatology, cardiology, dentistry, and ophthalmology.

Q.NO	QUESTION	CO	BTL	Marks
PART – A				
1.	What is meant by population inversion?	2	RE	2
2.	State the properties of laser beam	2	RE	2
3.	What are the conditions required for laser action?	2	RE	2
4.	Distinguish between spontaneous emission and stimulated emission	2	AN	2
5.	List out the applications of laser beam in industry.	2	RE	2

6.	What are the characteristics of Laser light	2	RE	2
7.	What are the different methods of pumping?	2	RE	2
8.	Can a two level system be used for the production of laser? Why?	2	EV	2
9.	Explain about stimulated emission.	2	UN	2
10.	Explain the modes of vibrations of CO ₂ molecule	2	UN	2

PART – B

1.	Deduce the expressions for the ratio of spontaneous emission rate to the stimulated emission or Derive Einstein coefficients	2	AN	16
2.	Explain the lasing schemes and working of Nd:YAG laser	2	UN	16
3.	Describe the construction and working of CO ₂ laser with necessary diagrams.	2	UN	16
4.	Apply the principle of stimulated emission to explain the construction and working of a Ruby Laser with a neat diagram.	2	AP	16
5.	Examine the construction of a homojunction semiconductor laser and distinguish the function of each component in producing coherent light.	2	AN	16
6.	Explain the principle, construction and working of a heterojunction semiconductor laser	2	UN	16

UNIT 3

QUANTUM PHYSICS

Black body radiation - Planck's theory (qualitative) - Compton Effect: theory and experimental verification - wave-particle duality - the concept of the wave function and its physical significance - Schrödinger's wave equation: time-independent and time-dependent equations - particle in a one-dimensional box - tunnelling (qualitative) - scanning tunnelling microscope.

Q.NO	QUESTION	CO	BTL	Marks
PART – A				
1.	What is a black body?	3	RE	2
2.	Explain Compton shift.	3	RE	2
3.	What is de-Broglie's wave equation?	3	RE	2
4.	State the properties of the matter waves	3	RE	2
5.	Define normalization	3	RE	2
6.	Illustrate the physical significance of the wave function	3	UN	2
7.	What are matter waves?	3	RE	2
8.	Illustrate the expression for the de-Broglie wavelength associated with electron	3	AP	2
9.	What is quantum tunneling?	3	UN	2
10.	Explain the principle of scanning tunnelling microscope.	3	UN	2

PART – B

1.	Derive an expression for energy levels of a particle enclosed in a one-dimensional potential box of width 'a' and infinite height	3	AN	16
2.	Derive the expression for the time-dependent Schrodinger wave equation	3	AN	16

3.	Derive the expression for the time independent Schrodinger wave equation	3	AN	16
4	Demonstrate the principle of scanning tunneling microscope. And explain the construction and working of scanning tunneling microscope with a suitable diagram	3	AP	16
5	Explain the Compton effect and derive an expression for the wavelength of the scattered photon	3	AN	16
6	Describe Planck's contribution to the theory, including the assumptions and implications of his quantum hypothesis	3	AN	16

UNIT 4

QUANTUM COMPUTING AND COMMUNICATION

Global Perspectives – Quantum Bits – Quantum Computation – Quantum Algorithms – Experimental Quantum Information Processing – Quantum Information - Quantum Computing Models: NMR Quantum Computing, Spintronics and QED MODEL, Linear Optical MODEL - Future of Quantum computing.

Q.NO	QUESTION	CO	BTL	Marks
PART – A				
1.	Explain two state quantum system	4	UN	2
2	Differentiate Qubits from classical bits	4	AN	2
3.	Define multiple qubits	4	RE	2
4.	What are quantum algorithms?	4	RE	2
5.	Explain about quantum gates	4	UN	2
6.	What is qubits?	4	RE	2
7.	Differentiate between qubits and multiple qubits	4	AN	2
8.	Mention two global applications of quantum computing.	4	RE	2
9	Name two companies actively developing quantum computers.	4	RE	2

10	Write the general state of a qubit.	4	AP	2
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PART – B

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|----|---|---|----|----|
| 1. | Analyze the principles and applications of Nuclear Magnetic Resonance (NMR) quantum computing. | 4 | AN | 16 |
| 2. | Explain the concept of spintronics and its relevance to quantum computing. | 4 | UN | 16 |
| 3. | Apply the principles of QED to explain how electron-photon interactions can be utilized in spintronics-based quantum computing. | 4 | AP | 16 |
| 4. | Explain any two quantum computer models in detail | 4 | UN | 16 |
| 5 | Compare different types of quantum computing models. | 4 | AN | 16 |
| 6 | Discuss the basics of quantum computing. | 4 | UN | 16 |

UNIT 5

NANO ELECTRONICS

Introduction to Nano electronics – Moore’s law – Size-dependent Fermi energy – Quantum confinement – Quantum dot – Quantum wire – Quantum well – Density of energy states – Waves in electronics – Classical wave – Double slit experiment on electron – Two terminal quantum wire device – Working of FET – Molecular FET – FET Switching – Function of MOSFET – Applications

Q.NO	QUESTION	CO	BTL	Marks
PART – A				
1.	State Moore’s law	5	RE	2
2	Explain size dependence of Fermi energy.	5	UN	2
3.	What are the applications of FET	5	RE	2
4.	Explain ballistic transport in a two-terminal quantum wire device.	5	UN	2
5.	Explain the band gap from bulk to nano-materials with diagram	5	UN	2
6.	Define the term Quantum confinement	5	RE	2

7.	Summarize the advantage of Nano-electronics	5	UN	2
8.	Explain the result of the double slit experiment with electrons	5	UN	2
9	Explain the origin of FET switching	5	UN	2
10	Mention two advantages of nanoelectronic devices.	5	RE	2

PART – B

1.	Derive the expression for the density of states for different quantum confinements	5	AN	16
2.	Categorize the quantum confinement or quantum structure in detail.	5	AN	16
3.	Write detailed notes on quantum dots – principle, properties, and applications.	5	UN	16
4.	List the conclusion of the double slit experiment with electrons	5	RE	16
5.	List and explain the construction, working, types and applications of FET.	5	UN	16
6.	Organize the construction and functions of MOSFET (Metal-oxide-Semiconductor Field Effect transistor).	5	AP	16

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24CHBS101
Applied Chemistry for Engineers

UNIT I
WATER AND ITS TREATMENT

Water - Introduction - Water quality parameters: Colour, turbidity, pH, hardness, and alkalinity, TDS, COD and BOD. Municipal water treatment: primary treatment and sterilization - breakpoint chlorination. Desalination of brackish water: Reverse Osmosis. Boiler troubles: Scale and sludge, Boiler corrosion. Internal treatment - External treatment – Ion exchange process.

Q.No	Question	CO	BTL	Marks
PART A				
1.	Define Hardness.	1	RE	2
2.	State the difference between soft water and demineralised water.	1	RE	2
3.	Indicate the reasons for boiler corrosion.	1	UN	2
4.	State the significance of Alkalinity.	1	RE	2
5.	Mention one reason why hydrazine is ideal when compared to sodium sulphite.	1	UN	2
6.	List out the disadvantages of scale formation in boiler.	1	UN	2
7.	Define BOD and COD.	1	RE	2
8.	What are the advantages of ion exchange method?	1	RE	2
9.	Compare internal and external conditioning of water.	1	RE	2
10.	Name the salts responsible for scale and sludge.	1	RE	2

PART B

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|----|--|---|----|---------|
| 1. | (i) Explain the process of desalination involved in it with a neat sketch.
(ii) Classify sludge and scale. | 1 | UN | 10
6 |
| 2. | (i) Apply the stages of municipal water treatment and show how water is purified using sterilization methods.
(ii) Identify the reasons for the boiler corrosion. | 1 | AP | 10
6 |
| 3. | Explain how the ion exchange resin works to soften hard water with diagrammatic representation. | 1 | UN | 16 |
| 4. | Describe any five water quality parameters with its importance. | 1 | UN | 16 |
| 5. | Explain with neat diagram, the desalination of brackish water of reverse osmosis method. | 1 | UN | 16 |
| 6. | i) Explain how sodium carbonate present in boiler feed water leads to caustic embrittlement. Illustrate the chemical reactions involved. | 1 | UN | 8 |
| | ii) List out the factors for Priming and Foaming in detail. | 1 | UN | 8 |

UNIT II
ELECTROCHEMISTRY AND STORAGE DEVICES

Electrochemical cells - redox reaction - EMF of a cell - electrode potential - single and standard electrode potential - Nernst equation - Electro chemical series-Applications. Batteries: Types of batteries - Lead acid battery and lithium-ion battery; Electric vehicles – working principles; Fuel cells: H₂-O₂ fuel cell. Super capacitors.

Q.No	Question	CO	BTL	Marks
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PART A

1.	Mention the role of salt bridge is used in the construction of a cell.	2	UN	2
2.	What is meant by emf series?	2	RE	2
3.	What are super capacitors?	2	RE	2
4.	Give some applications of fuel cell.	2	UN	2
5.	Define standard electrode potential.	2	RE	2
6.	Write the significance of electrochemical series.	2	RE	2
7.	Why is a salt bridge used in the construction of a cell?	2	UN	2
8.	Mention the factors which affect electrode potential.	2	RE	2
9.	Why lithium battery is regarded as the cell of future?	2	UN	2
10.	Mention the components of EV.	2	RE	2

PART B

1.	Explain the principle and working process of a lithium-ion battery with its advantages.	2	UN	16
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2.	Derive the Nernst equation for electrode potential and write its applications.	2	AP	16
3.	Define electric vehicles and explain their working principle, along with their advantages and disadvantages.	2	UN	16
4.	Discuss the principle and working process of a lead-acid battery with its advantages.	2	AP	16
5.	Explain how a Hydrogen-Oxygen fuel cell generates electricity.	2	AP	16
6.	Explain the storage principle and function of Super capacitors, types and examples.	2	UN	16

UNIT III

FUELS AND COMBUSTION

Fuels: Introduction - Classification - Carbonization of coal - Manufacture of metallurgical coke. Petroleum - Refining of petroleum - Synthetic petrol (Bergius process)- Knocking - octane number and cetane number. Power alcohol and biodiesel. Combustion of fuels: Introduction - Calorific value-Theoretical calculation of calorific value; Ignition temperature: spontaneous ignition temperature. Flue gas analysis by Orsat's method.

Q.No	Question	CO	BTL	Marks
PART A				
1.	What do you mean by refining of Petroleum.	3	RE	2
2.	State Octane number..	3	RE	2
3.	What is meant by combustion of fuel?	3	RE	2
4.	Mention the properties of a Metallurgical coke?	3	UN	2
5.	Define Knocking. How is it improved?	3	RE	2
6.	What do you mean by Carbonisation? Write on its classification.	3	RE	2
7.	Mention the raw materials present in Bio-diesel.	3	UN	2

PART B

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|----|---|---|----|----|
| 1. | Describe with a neat diagram, the manufacture of synthetic gasoline using Bergius Process. | 3 | UN | 16 |
| 2. | How is metallurgical coke manufactured by Otto-Hoffman's by-product oven method? | 3 | UN | 16 |
| 3. | Explain in detail about ORSAT method, significance and precautions. | 3 | UN | 16 |
| 4. | Explain the petroleum refinery process in detail with neat sketches. What are the properties and applications of its various fractions? | 3 | UN | 16 |
| 5. | Describe the different methods by which synthetic petrol can be obtained. | 3 | AP | 16 |
| 6. | What is power alcohol? Explain its manufacturing process and its properties. | 3 | UN | 16 |

UNIT IV
PHOTOCHEMISTRY AND SPECTROSCOPY

Photochemistry: Laws of photochemistry-Stark-Einstein law and Beer-Lambert law. Quantum efficiency-Photo processes-photosensitization-Internal conversion, Inter-system crossing, Fluorescence, Phosphorescence, Chemiluminescence. Spectroscopy: Electromagnetic spectrum- Absorption of radiation-Electronic, vibrational and rotational transitions. UV-visible and IR spectroscopy-principles, instrumentation and application

Q.No	Question	CO	BTL	Marks
PART A				
1.	State the type of photo physical process.	4	RE	2
2.	Define the terms (non-radiative transition) IC and ISC.	4	RE	2
3.	State Stark-Einstein Law.	4	RE	2
4.	What is Chemiluminescence?	4	RE	2
5.	What are photo sensitizers?	4	RE	2
6.	State Lamberts law.	4	RE	2
7.	What is Quantum Efficiency?	4	RE	2
8.	Define Phosphorescence.	4	RE	2
9.	How will you express quantum yield?	4	RE	2
10.	Define electromagnetic spectrum.	4	RE	2

PART B

1.	Describe UV-Visible spectroscopy principle, instrumentation and application.	4	UN	16
2.	Describe IR-spectroscopy principle, instrumentation and its application.	4	UN	16
3.	Apply Beer-Lambert's law to determine the concentration of the unknown solution and explain its application and Limitations	4	AP	16
4.	i) Compare the different types of stretching and bending vibrations in terms of how bond lengths and bond angles change.	4	AN	10
	ii) Analyse the applications of IR spectroscopy in various fields.	4	AN	6
5.	Examine the types of electrons and transition involved in organic molecules in UV-spectroscopy.	4	AN	16
6.	Explain the mechanism of photo physical process using Jablonski diagram.	4	AN	16

UNIT V NANOCHEMISTRY

Introduction- Nanomaterials and bulk materials; Size-dependent properties (optical, electrical, mechanical and magnetic); Types of nanomaterials – Carbon nanotubes – Synthesis of nanomaterials- sol-gel, solvo thermal and chemical vapour deposition. Applications of nanomaterials in medicine, agriculture, energy and electronics.

Q.No	Question	CO	BTL	Marks
PART A				
1.	Define the term Nano rods.	5	RE	2
2.	What is Magic Number?	5	RE	2
3.	Differentiate bulk particles and nano-particles.	5	UN	2
4.	What do you mean by Carbon Nano Tube?	5	RE	2

5.	What are Nano wires?	5	RE	2
6.	What is the basic principle involved in Solvo thermal synthesis of nano-materials.	5	RE	2
7.	What is meant by top-down and bottom-up process?	5	RE	2
8.	What are nano composites?	5	RE	2
9.	What are the applications of electro spinning process?	5	RE	2
10.	Name some important physical methods of synthesizing Nano-materials.	5	RE	2

PART B

1.	Elaborate the synthesis of nano materials using sol-gel method.	5	UN	16
2.	Discuss any four properties of Nano-materials and applications of Nano materials.	5	UN	16
3.	Explain the chemical vapour deposition method for the synthesis of Nano materials.	5	UN	16
4.	Construct a step-by-step procedure for synthesizing nanoparticles using the solvo-thermal method.	5	AP	16
5.	Explain about size dependent properties of nano-materials.	5	UN	16
6.	Write an informative note on the applications of nano-materials.	5	UN	16

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24MABS101
Matrices and Calculus

UNIT I
MATRICES

Eigen values and Eigenvectors of a real matrix – Characteristic equation – Properties of Eigenvalues and Eigenvectors – Statement and simple problems on Cayley - Hamilton Theorem – Diagonalization of matrices – Reduction of a quadratic form to canonical form by orthogonal transformation – Nature of quadratic forms.

Q.No	Question	CO	BTL	Marks
PART A				
1.	Find the characteristic polynomial of $\begin{pmatrix} 1 & 4 \\ 2 & 3 \end{pmatrix}$.	1	RE	2
2.	Find the characteristic equation of the matrix $\begin{pmatrix} 1 & 2 \\ 0 & 2 \end{pmatrix}$.	1	RE	2
3.	If λ is an Eigenvalue of a matrix A, then prove that $1/\lambda$, ($\lambda \neq 0$) is the Eigenvalue of A^{-1} .	1	UN	2
4.	The product of two Eigenvalues of the matrix $A = \begin{pmatrix} 6 & -2 & 2 \\ -2 & 3 & -1 \\ 2 & -1 & 3 \end{pmatrix}$ is 16. Find the third Eigenvalue.	1	AP	2
5.	If $A = \begin{bmatrix} 3 & 1 & 4 \\ 0 & 2 & 6 \\ 0 & 0 & 5 \end{bmatrix}$ then find the eigen values of A^{-1} .	1	AP	2
6.	If 2 and 3 are the eigenvalues of $A = \begin{pmatrix} 3 & 10 & 5 \\ -2 & -3 & -4 \\ 3 & 5 & 7 \end{pmatrix}$. Find the eigenvalues of A^{-1} and A^3 .	1	AP	2
7.	State Cayley – Hamilton Theorem.	1	RE	2

8. Using Cayley-Hamilton theorem find the inverse of $\begin{bmatrix} 2 & -1 \\ 4 & 3 \end{bmatrix}$. 1 AP 2
9. Prove that $x^2 - y^2 + 4z^2 + 4xy + 2yz + 6xz$ is indefinite. 1 UN 2
10. Discuss the nature of the Q.F. $2x^2 + 6y^2 + 2z^2 + 8xz$ without reducing them to Canonical form. 1 UN 2

PART B

- 1 (i) Find the Eigen values and Eigen vectors of the following matrix 1 UN 8
 $\begin{pmatrix} 2 & 0 & 1 \\ 0 & 2 & 0 \\ 1 & 0 & 2 \end{pmatrix}$
- (ii) Using Cayley-Hamilton theorem find A^{-1} when $A = \begin{pmatrix} 1 & 0 & 3 \\ 2 & 1 & -1 \\ 1 & -1 & 1 \end{pmatrix}$. 1 AP 8
- 2 (i) Find the Eigen values and Eigen vectors of the following matrix 1 UN 8
 $\begin{pmatrix} 1 & 1 & 1 \\ 0 & 2 & 1 \\ -4 & 4 & 3 \end{pmatrix}$
- (ii) Verify Cayley- Hamilton theorem for the matrix and hence find A^{-1} 1 AP 8
when $A = \begin{pmatrix} 1 & 3 & 7 \\ 4 & 2 & 3 \\ 1 & 2 & 1 \end{pmatrix}$.
- 3 (i) Diagonalise the following matrix by suitable transformation 1 AP 8
 $\begin{pmatrix} 2 & 1 & -1 \\ 1 & 1 & -2 \\ -1 & -2 & 1 \end{pmatrix}$.
- (ii) If λ is an Eigenvalue of an orthogonal matrix, then $1/\lambda$ also its Eigenvalue. 1 AP 8
- 4 Reduce the quadratic form $x^2 + y^2 + z^2 - 2xy - 2yz - 2zx$ to canonical form through an orthogonal transformation. 1 EV 16
- 5 Reduce the quadratic form $Q = 6x^2 + 3y^2 + 3z^2 - 4xy - 2yz + 4zx$ into canonical form by an orthogonal transformation. Hence find its nature. 1 EV 16

6	Reduce the quadratic form $8x^2 + 7y^2 + 3z^2 - 12xy - 8yz + 4zx$ to the canonical form by an orthogonal transformation. Also find its rank, index, signature and nature of the quadratic form.	1	EV	16
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UNIT II
DIFFERENTIAL CALCULUS

Limits, Continuity- Differentiability of functions- Differentiation rules (Sum, Product, Quotient, Chain rule)- Rolle's theorem- Lagrange's mean value theorem- Cauchy's Mean value theorem- Maxima and minima of functions of one variable.

Q.No	Question	CO	BTL	Marks
PART A				
1.	Define odd and even functions with examples.	2	RE	2
2.	Define limit of a function.	2	RE	2
3.	Find the domain and range of the function $f(x) = 1 + x^2$.	2	UN	2
4.	Find the value $\lim_{x \rightarrow 4} \frac{x^2 - 4x}{x^2 - 3x - 4}$, if it exists.	2	UN	2
5.	Find the domain of the function $f(x) = \sqrt{5x + 10}$.	2	UN	2
6.	Find the domain, range and sketch the graph of the function $f(x) = x^2$.	2	AP	2
7.	Find y' for the following functions (i) $y = \sqrt{x}$ (ii) $y = x^2(1 - 2x)$	2	RE	2
8.	Find $\frac{dy}{dx}$, if $y = xe^x \sin x$.	2	RE	2
9.	Define Rolle's theorem.	2	RE	2
10.	Find the points on the curve $y = 2x^3 + 3x^2 - 12x + 1$ where the tangent is horizontal.	2	UN	2

PART B

- 1 (i) For what value of the constant c is the function f continuous at $(-\infty, \infty)$ 2 AP 8
- $$f(x) = \begin{cases} cx^2 + 2x; & x < 2 \\ x^3 - cx; & x \geq 2 \end{cases}$$
- (ii) If $f(x) = \begin{cases} \frac{x^3 - 8}{x - 2}; & x < 2 \\ ax^2 - bx + 3; & 2 \leq x < 3 \\ 2x - a + b; & x \geq 3 \end{cases}$ is continuous for all real x , find the values of 'a' and 'b'. 2 AP 8
- 2 (i) Evaluate the limit $\lim_{t \rightarrow 1} \frac{t^4 - 1}{t^3 - 1}$. 2 EV 8
- (ii) Find $\lim_{x \rightarrow 1} \frac{x^2 + x - 2}{x^2 - x}$ by eliminating zero denominators algebraically. 2 RE 8
- 3 (i) Sketch the graph of the function $f(x) = \begin{cases} 1 + x; & x < -1 \\ x^2; & -1 \leq x \leq 1 \\ 2 - x; & x \geq 1 \end{cases}$, and use it to determine the values of 'a' for which $\lim_{x \rightarrow a} f(x)$ exists. 2 UN 8
- (ii) Find the tangent line and normal line to the curve at the given point $y = \sqrt{x}$ at the point (1,1). 2 UN 8
- 4 (i) Verify whether the function $f(x) = \sin x$ in $[0, \pi]$ satisfies the conditions of Rolle's theorem and hence find c . 2 AP 8
- (ii) Find the value of c in mean value theorem, where $f(x) = \sqrt{x}$ in $[9, 16]$. 2 UN 8
- 5 If $f(x) = x^4 - 2x^2 + 3$, then (i) find the critical points of f ? (ii) On what interval is f increasing or decreasing? (iii) At what points, if any, does f assume local maximum and minimum values? (iv) Find intervals of concavity and the inflection points. 2 AP 16

6	If $f(x) = 2x^3 + 3x^2 - 36x$, then (i) find the critical points of f ? (ii) On what interval is f increasing or decreasing? (iii) At what points, if any, does f assume local maximum and minimum values? (iv) Find intervals of concavity and the inflection points.	2	AN	16
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UNIT III

APPLICATIONS OF DIFFERENTIAL CALCULUS

Curvature in Cartesian co-ordinates – Centre and radius of curvature – Circle of curvature – Evolutes – Envelopes - Evolute as envelope of normal

Q.No	Question	CO	BTL	Marks
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PART A

1.	What is the radius of curvature of the curve $y=e^x$ at (0,1).	3	RE	2
2.	Find the radius of curvature of the curve $xy = c^2$ at (c,c).	3	UN	2
3.	Find the radius of curvature $x^2 + y^2 = 25$ at (3,4).	3	UN	2
4.	Find the Centre of curvature of $y = x^2$ at the origin.	3	UN	2
5.	What is the curvature of the circle $(x - 1)^2 + (y + 2)^2 = 16$ at any point on it?	3	UN	2
6.	Find the envelope of the family of lines $\frac{x}{t} + yt = 2c$, t being the parameter.	3	UN	2
7.	Find the envelope of family of straight line $y = mx + \frac{a}{m}$, m being the parameter	3	UN	2
8.	Find the envelope of the family of lines $\frac{x}{t} + yt = 2c$, t being the parameter.	3	UN	2
9.	Find the envelope of family of straight line $y = mx + am^2$, m being the parameter.	3	UN	2
10.	Find the envelope of the family of straight lines $x\cos\alpha + y\sin\alpha = p$, α being the parameter.	3	UN	2

PART B

1	(i) Show that the radius of curvature at (-2,2) on $x^2y = x^2 + y^2$ is 2.	3	UN	8
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	(ii) Find the centre of curvature of the curve $y = 3x^3 + 2x^2 - 3$ at (0,-3).	3	UN	8
2	(i) Find the radius of curvature at (0,c) on the curve $y = c \cosh\left(\frac{x}{c}\right)$	3	UN	8
	(ii) Find the circle of curvature of the curve $\sqrt{x} + \sqrt{y} = \sqrt{a}$ at $\left(\frac{a}{4}, \frac{a}{4}\right)$.	3	UN	8
3	(i) Find the radius of curvature for the curve $\sqrt{x} + \sqrt{y} = 1$ at $\left(\frac{1}{4}, \frac{1}{4}\right)$.	3	UN	8
	(ii) Find the equation of the circle of the curvature of the parabola, $y^2 = 12x$ at the point(3,6).	3	UN	8
4	(i) Find the radius of curvature of the curve $xy = c^2$ in (c, c) .	3	UN	8
	(ii) Find the envelope of the family of straight lines $\frac{x}{a} + \frac{y}{b} = 1$ where a and b are connected by $a^2 + b^2 = c^2$, c is a constant.	3	UN	8
5	Construct the evolute of the parabola $y^2 = 4ax$.	3	AP	16
6	Construct the evolute of the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$.	3	AP	16

UNIT IV

DIFFERENTIAL CALCULUS OF SEVERAL VARIABLES

Partial derivatives – Total derivative – Differentiation of implicit functions – Jacobians and Properties – Taylor's series for functions of two variables – Maxima and minima of functions of two variables – Lagrange's method of undetermined multipliers.

Q.No	Question	CO	BTL	Marks
PART A				
1.	Write the sufficient conditions for $f(x, y)$ to have a maximum value at (a, b) .	4	RE	2
2.	Find $\frac{du}{dt}$, if $u = \frac{x}{y}$ where $x = e^t$, $y = \log t$.	4	UN	2
3.	State any two properties of Jacobians.	4	RE	2
4.	If $u = \frac{y^2}{x}$, $v = \frac{x^2}{y}$, find $\frac{\partial(x, y)}{\partial(u, v)}$	4	UN	2

5. If $x = r \cos \theta, y = r \sin \theta$, find $\frac{\partial(x, y)}{\partial(r, \theta)}$ and $\frac{\partial(r, \theta)}{\partial(x, y)}$. 4 UN 2
6. If $x = u(1 + v)$ and $y = v(1 + u)$ find $\frac{\partial(x, y)}{\partial(u, v)}$. 4 UN 2
7. If $u = x^2 + y^2$ and $x = at^2, y = 2at$. 4 UN 2
8. Prove that $\frac{\partial^2 f}{\partial x \partial y} = \frac{\partial^2 f}{\partial y \partial x}$ if $f = x^3 + y^3 + z^3 + 3xyz$. 4 UN 2
9. If $u = (x - y)(y - z)(z - x)$ then show that $\frac{\partial u}{\partial x} + \frac{\partial u}{\partial y} + \frac{\partial u}{\partial z} = 0$. 4 UN 2
10. Define Lagrange's method of undetermined multipliers. 4 RE 2

PART B

- 1 (i) If $u = x^2 + y^2 + z^2$ and $x = e^t, y = e^t \sin t, z = e^t \cos t$, then find $\frac{du}{dt}$ without actual substitution. 4 UN 8
- (ii) If $x + y + z = u, y + z = uv, z = uvw$ prove that $\frac{\partial(x, y, z)}{\partial(u, v, w)} = u^2 v$. 4 AP 8
- 2 (i) Find $\frac{du}{dx}$, given $u = \log xy$ where $x^3 + y^3 = 3xy$. 4 UN 8
- (ii) If $u = \frac{yz}{x}, v = \frac{zx}{y}, w = \frac{xy}{z}$, show that $\frac{\partial(u, v, w)}{\partial(x, y, z)} = 4$. 4 UN 8
- 3 (i) If $g(x, y) = \psi(u, v)$, where $u = x^2 - y^2, v = 2xy$, prove that $\frac{\partial^2 g}{\partial x^2} + \frac{\partial^2 g}{\partial y^2} = 4(x^2 + y^2) \left(\frac{\partial^2 \psi}{\partial u^2} + \frac{\partial^2 \psi}{\partial v^2} \right)$. 4 AP 8
- (ii) Expand $e^x \cos y$ at $(0, \pi/2)$ up to the third term using Taylor's series. 4 AP 8
- 4 (i) If $z = f(x, y)$, where $x = u^2 - v^2, y = 2uv$, prove that $\frac{\partial^2 z}{\partial u^2} + \frac{\partial^2 z}{\partial v^2} = 4(u^2 + v^2) \left(\frac{\partial^2 z}{\partial x^2} + \frac{\partial^2 z}{\partial y^2} \right)$ 4 AP 8
- (ii) Expand $e^x \cos y$ at $(0, \pi/2)$ up to the third term using Taylor's series. 4 AP 8
- 5 (i) Find the extreme value of the function $f(x, y) = x^3 + y^3 - 3x - 12y + 20$. 4 UN 8
- (ii) Find the maximum or minimum values of $f(x, y) = 3x^2 - y^2 + x^3$. 4 UN 8

6	(i) A rectangular box, open at the top, is to have a volume of 32cc. Find the dimensions of the box that requires the least materials for its construction.	4	AP	8
	(ii) Expand $e^x \log(1+y)$ in powers of x and y upto terms of third degree.	4	AP	8

UNIT V
INTEGRAL CALCULUS

Definite and Indefinite Integrals- Integration by Parts- Integration by Partial fraction method- Double integrals in Cartesian coordinates – Area enclosed by plane curves - Triple integrals – Volume of Solids.

Q.No	Question	CO	BTL	Marks
PART A				
1.	Define the term definite integral.	5	RE	2
2.	Evaluate $\int x \sin x dx$ by using integration by parts.	5	UN	2
3.	Evaluate $\int_0^1 (4 + 3x^2) dx$.	5	UN	2
4.	Evaluate $\int_1^2 \int_1^3 \frac{1}{xy} dx dy$.	5	UN	2
5.	Evaluate $\int \frac{(\log x)^2}{x} dx$.	5	UN	2
6.	Evaluate $\int_0^5 \int_0^2 (x^2 + y^2) dx dy$.	5	UN	2
7.	Evaluate $\int_1^2 \int_0^3 x dy dx$.	5	UN	2

8.	Evaluate $\int_0^1 \int_0^2 \int_0^3 xyz dx dy dz$	5	UN	2
9.	Evaluate $\int_0^a \int_0^b \int_0^c e^{x+y+z} dx dy dz$	5	UN	2
10.	Evaluate $\int_0^2 \int_1^3 \int_1^2 x^2 y^2 z dx dy dz$	5	UN	2

PART - B

1	(i) Evaluate $\int x^3 \sin 2x dx$ using integration by parts.	5	AP	8
	(ii) Use partial fraction technique, evaluate $\int \frac{1+6x}{(4x-3)(2x+5)} dx$	5	AP	8
2	(i) Evaluate $\int (\log x)^2 dx$.	5	UN	8
	(ii) Use partial fraction technique, evaluate $\int \frac{10}{(x-1)(x^2+9)} dx$.	5	AP	8
3	(i) Evaluate $\int t^2 e^t dt$ using integration by parts.	5	AP	8
	(ii) Use partial fraction technique, evaluate $\int \frac{1}{(x^2-a^2)} dx$.	5	AP	8
4	(i) Using double integral find the area bounded by the parabolas $y^2 = 4ax$ and $x^2 = 4ay$.	5	AP	8
	(ii) Evaluate $\iint xy dx dy$ over the positive quadrant of the circle $x^2 + y^2 = a^2$.	5	UN	8
5	(i) Evaluate $\int_0^a \int_0^b \int_0^c (x+y+z) dz dy dx$	5	UN	8
	(ii) Find the volume of the sphere $x^2 + y^2 + z^2 = a^2$ using triple integration.	5	AP	8
6	(i) Evaluate $\int_1^3 \int_3^4 \int_1^4 xyz dx dy dz$	5	UN	8

(ii) Find the volume of the tetrahedron bounded by the coordinate planes

5 UN

8

and $\frac{x}{a} + \frac{y}{b} + \frac{z}{c} = 1$.

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24GEES101
Programming in C

UNIT I
INTRODUCTION TO C PROGRAMMING

An overview of C - Expression: Basic Data Types, Enumerations, typedef, Keywords, Identifiers and Variables, Type Qualifier, Storage Classes, Variable Initializations and constants, Operators and Statements.

Q.No	Question	CO	BTL	Marks
PART A				
1.	What is a datatype? List its types.	1	RE	2
2.	Define keywords with an example.	1	RE	2
3.	Interpret the use of ternary or conditional operator.	1	AP	2
4.	What are the rules to declare variable?	1	RE	2
5.	What are the types of storage classes in C?	1	RE	2
6.	Find the output of the programs given below <pre>#include <stdio.h> int main(){ int a = 20, b = 10, c = 15, d = 5; int e = (a + b) * c / d; printf("Value of (a + b) * c / d is : %d\n", e); }</pre>	1	RE	2
7.	Compare constants and variables in C.	1	UN	2
8.	Define type def with an example.	1	RE	2
9.	Compare break and continue statement.	1	UN	2
10.	Compare switch () and nested-if statement.	1	UN	2

PART B

- | | | | | |
|----|---|---|----|----|
| 1. | Describe the structure of a C program with an example. | 1 | UN | 16 |
| 2. | Summarize the various types of operators in 'C' language along with its priority. | 1 | UN | 16 |
| 3. | Develop a C program for the following | | | |
| | a. To check whether a given year is leap or not. | 1 | AP | 4 |
| | b. To find the number is Armstrong number or not. | | | 8 |
| | c. To convert the temperature given in Fahrenheit to Celsius. | | | 4 |
| 4. | Construct a C program for the following | | | |
| | a. Generate an electricity bill for a customer. The program should read the number of units consumed and calculate the bill | 1 | AP | 6 |
| | • For the first 100 units → ₹1.50 per unit | | | |
| | • For the next 200 units (101–300) → ₹2.50 per unit | | | |
| | • For the next 200 units (301–500) → ₹3.50 per unit | | | |
| | • For units above 500 → ₹5.00 per unit. Also add a fixed charge of ₹50 to every bill. The program should print the total bill amount. | | | |
| | b. To find the sum of first 100 integers. | | | 4 |
| | c. To display Fibonacci series up to 10. | | | 6 |
| 5. | Infer following looping statements with appropriate examples: | | | |
| | a. 'for' loop | 1 | AN | 6 |
| | b. 'while' loop | | | 5 |
| | c. 'do...while' loop | | | 5 |
| 6. | Elaborate about the various decision- making statements. | 1 | CR | 16 |

UNIT II
ARRAYS AND STRINGS

Arrays: Single-Dimension Arrays, generating a Pointer to an Array, Passing SingleDimension Arrays to Functions, Two-Dimensional Array, Multidimensional Arrays, Array Initialization.
Strings: Strings, Indexing Pointers, Initializing and accessing String

Q.No	Question	CO	BTL	Marks
PART A				
1.	List out the features of Arrays.	2	RE	2
2.	Define Array and Write the types of an array.	2	RE	2
3.	Define a float array of size 5 and assign 5 values to it.	2	RE	2
4.	How to create a two-dimensional array?	2	RE	2
5.	Compare one dimensional and two-dimensional arrays.	2	UN	2
6.	What is the role of strev()?	2	RE	2
7.	How to find the length of a string using string function?	2	RE	2
8.	Write the output of the following Code: main(){ char x; x='a'; printf("%d\n",x); }	2	UN	2
9.	How is a multidimensional array stored in memory?	2	RE	2
10.	How do you access the element at 2 nd row and 3 rd column in a 2D array arr[4][5]?	2	RE	2
PART B				
1.	Describe the following with suitable examples. Initializing a 2- Dimensional Array and perform matrix multiplication with 3*3 matrix.	2	UN	16

2.	Describe the following functions with examples.			
	(i) strlen()	2	UN	4
	(ii) strcpy()			4
	(iii) strcat()			4
	(iv) strcmp()			4
3.	a. Develop C program to find whether the given string is palindrome or not without using string functions.	2	AP	8
	b. Identify the string is palindrome or not using String functions.			8
4.	a. Develop a C program to search an element in the array and display its position in array.	2	AP	8
	b. Develop a C program to find maximum element in the array.			8
5.	a. Build a C program to reverse the elements of one-dimensional array.	2	CR	8
	b. Build a C program to transpose the matrix.			8
6.	a. Compile a C program to sort the elements in ascending order.	2	CR	8
	b. Compile a C program to pass array to a function and find the sum of its elements.			8

UNIT III
FUNCTIONS AND POINTERS

Functions: Function Prototype, Scope and Function Arguments. Return Statement, Recursion.
Pointers: Introduction to Pointers: Pointer Variables, Pointer Operators, Pointer Expressions, Pointer Assignments, Pointer Conversions, Pointer Arithmetic, Pointer Comparisons, Pointers and Arrays, Arrays of Pointers, Dynamic Allocation Functions - Calloc & Malloc

Q.No	Question	CO	BTL	Marks
PART A				
1.	Define pointer. How will you declare it?	3	RE	2
2.	What is pointer arithmetic?	3	RE	2
3.	Compare between address operator and indirection operator.	3	UN	2
4.	Identify the use of Pointer.	3	UN	2
5.	What is dynamic allocation function and explain its types.	3	RE	2
6.	Write the syntax for function declaration.	3	RE	2
7.	Compare actual parameters and formal parameters.	3	UN	2
8.	What is a recursive function?	3	RE	2
9.	Compare pass by value and pass by reference.	3	UN	2
10.	List out the types of user-defined function.	3	RE	2
PART B				
1.	Explain the types of user-defined functions with example.	3	UN	16
2.	Develop a C program to show the difference between call by value and call by reference.	3	AP	16
3.	Analyze about passing arrays to function and perform arithmetic operation using pointers.	3	AN	16

- | | | | | |
|----|---|---|----|----|
| 4. | Explain in detail about recursive function with | | | |
| | a. a code to find factorial of a number using recursion. | 3 | EV | 8 |
| | b. a code to print Fibonacci series using recursion. | | | 8 |
| 5. | Explain the different types of variable scope in C (local, global, static). | 3 | EV | 16 |

UNIT IV
STRUCTURES AND UNIONS

Structures: Accessing Structure Members, Structure Assignments, Arrays of Structures, Passing Structures to Functions, Structure Pointers, Arrays and Structures within structure, Unions.

Q.No	Question	CO	BTL	Marks
PART A				
1.	What is structure? Write the syntax for structure.	4	RE	2
2.	What is a nested structure?	4	RE	2
3.	Interpret the term Union in C.	4	UN	2
4.	Compare between Structures and union.	4	UN	2
5.	Give the advantages of union over structure.	4	RE	2
6.	Define the meaning of Array of structure.	4	RE	2
7.	Show the difference between Structure from Array.	4	UN	2
8.	What is the use of the sizeof operator in C?	4	UN	2
9.	Show a structure called ID_Card to hold the details of a student.	4	UN	2
10.	How do you pass a structure as an argument to a function?	4	RE	2
PART B				
1.	Explain about the union and its functions.	4	UN	16
2.	Build a C program using structures to prepare the employee payroll of a company with inputs as empid, Name, address, department, gross pay, total salary.	4	AP	16

- | | | | | |
|----|--|---|----|----|
| 3. | Build a C program using union to read the details of book name, author name and price of 200 books in a library and display the total cost of the books. | 4 | AP | 16 |
| 4. | Analyze about the following: | | | |
| | a. Create a student database with student name, roll no., department, address, phone no., marks scored for 100 students. using union concept. | 4 | AN | 8 |
| | b. Create employee database with empid, empname, salary, department, gross pay using union concept. | | | 8 |
| 5. | Discuss in detail about passing structures to function with example. | 4 | CR | 16 |

UNIT V
FILES AND DIRECTIVES

Files: File System Basic, File Types and Modes, access of file, File Functions, Sequential and Random File Access. Preprocessor Directives.

Q.No	Question	CO	BTL	Marks
PART A				
1.	Define file.	5	RE	2
2.	Compare between Sequential access and Random access.	5	UN	2
3.	List out the various file handling function.	5	RE	2
4.	Compare fseek() and ftell() function.	5	UN	2
5.	How to create a file in C?	5	UN	2
6.	Define the various file operation modes and their usage.	5	UN	2
7.	Apply the following with an example (i) getc() and getchar() (ii) scanf and fscanf()	5	AP	2
8.	List out the error handling functions.	5	RE	2
9.	Define binary file.	5	RE	2
10.	What is the need of binary file?	5	RE	2
PART B				
1.	Explain about the various error handling functions.	5	UN	16
2.	Explain sequential access and random access of a file with appropriate illustrative programs.	5	UN	16

3.	Classify the read and write operations on a file with a suitable program.	5	AN	16
4.	Analyze the following file manipulation functions with examples.			
	a. rename()	5	AN	2
	b. freopen()			4
	c. remove()			2
	d. tmpfile(void)			4
	e. fflush()			4
5.	a. Develop a C program to append text to an existing file.	5	AP	8
	b. Develop a C program to rename and delete a file using rename() and remove().			8
6.	Discuss the preprocessor directives in C with examples.	5	CR	16

---- END ----

24ENHS202
PROFESSIONAL ENGLISH FOR ENGINEERS -I

UNIT –I

UNIT I – EFFECTIVE COMMUNICATION ESSENTIALS

Listening – Strategies for lectures, podcasts, interviews, and conversations. **Speaking** – Introducing oneself, accommodation, hometown discussions, family and friends, seminars. **Reading** – Technical and non-technical texts, articles. **Writing** – Developing hints, formal and informal letter writing, email writing. **Grammar** – Word formation, types of sentences, parts of speech.

Q.No	Question	CO	BTL	Marks
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PART A

1	Choose the word that best express that expresses the opposite meaning of the given word.	1	UN	2
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1) EXTRAVAGANCE

- A. Luxury
- B. Poverty
- C. Economy
- D. Cheap

2) PERTINENT

- A. Irrational
- B. Irregular
- C. Insistent
- D. Irrelevant

2	Types of Sentences -Choose the correct option	1	UN	2
---	---	---	----	---

I) Dr. Sid went to the market.

- a) Interrogative
- b) Exclamatory
- c) Assertive
- d) Imperative

- a. verbose
- b. involved
- c. lucid
- d. witty

c) All the characters in this novel are **fictitious**.

- a. unbelievable
- b. unreliable
- c. infamous
- d. unreal

d) Everybody likes him because he is an **industrious** student.

- a. energetic
- b. prompt
- c. excellent
- d. diligent

5 **Read the given sentences carefully and identify the adverb** 1 UN 2

- a. Our students have seen this before.
- b. My uncle visits our home every day.
- c. My father repeated the same words thrice.
- d. The test time is almost ended.

6 **Complete the sentences using the correct pronouns** 1 RE 2

- a. Priya and Nikhil love music play the guitar in a band together.
- b. I met Dr. Ramesh yesterday..... gave me some great advice.
- c. This jacket belongs to Ravi. It's.....
- d. Tara and I are going to the park. Will you join?

7 **Fill in the blanks with appropriate prepositions:** 1 UN 2

The excess energy a) industrial furnaces is reduced with two main reasons b)to align c) environmental standards and to improve performance. This plays a role d)sustainability efforts.

8 **Fill in the blanks with the correct comparative form of the adjectives given in brackets** 1 RE 2

- a. For toddlers, drawing pictures is..... (engaging) than watching television.a
- b. The Amazon River is..... (long) than most other rivers in South America.
- c. A continent is.....(vast) than an island.
- d. Some learners find Japanese.....(challenging) to master than Spanish.

9 **Choose the correct verb form from the options in brackets** 1 RE 2

- a. Neha..... breakfast at 7 a.m. every morning. (eat/eats)
- b. The children.....to school by bus. (go/goes)
- c. Raj..... the door when he heard a knock. (open/opened)
- d. They..... chess after dinner. (play/plays)

10 **Give one word substitute for the following.** 1 RE 2

- a. A device used for using compressed air to spray paint
- b. The basic units of ordinary matter
- c. Consisting of two things or parts, dual
- d. The way of earning for living

PART B

1 AP 16

1 **Read the following passage and answer the questions**

THE LOST CITY OF ATLANTIS

The legend of Atlantis has fascinated explorers, historians, and dreamers for centuries. The earliest known record of Atlantis comes from the writings of the Greek philosopher Plato around 360 BCE. According to Plato, Atlantis was a great island nation located “beyond the Pillars of Hercules” — the ancient name for the Strait of Gibraltar. It was said to be a powerful and advanced civilization, rich in culture, architecture, and technology.

Plato described Atlantis as a utopia, with grand palaces, beautiful gardens, and canals connecting the entire city.

However, the Atlanteans became greedy and corrupt. The gods, angered by their arrogance, sent earthquakes and floods that caused the island to sink into the sea in a single day and night.

For centuries, people debated whether Atlantis was a real place or simply a story meant to teach a moral lesson. Some believe it was based on a real ancient civilization, possibly destroyed by a natural disaster such as a volcanic eruption or tsunami. Others think it is purely fictional.

In modern times, researchers, treasure hunters, and even TV shows have searched for evidence of Atlantis. Some claim it lies under the Mediterranean Sea, while others think it may be in the Caribbean or near Antarctica. Despite all the theories, no one has ever found definitive proof.

The mystery of Atlantis continues to inspire books, films, and countless theories. Whether real or imaginary, it remains a symbol of human curiosity and the desire to explore the unknown.

Questions

1. The earliest known record of Atlantis comes from the writings of

- (i) Aristotle
- (ii) Herodotus
- (iii) Plato
- (iv) Socrates

2. The “Pillars of Hercules” refer to

- (i) the Strait of Gibraltar
- (ii) a temple in Greece
- (iii) two statues
- (iv) a volcano

3. According to Plato, why did Atlantis sink?

- i) It was attacked by enemies
- ii) It was destroyed by earthquakes and floods sent by the gods
- iii) It ran out of resources
- iv) It was buried in sandstorms

4.The word “utopia” in paragraph 2 means

- i) a dangerous city
- ii) an ideal and perfect place
- iii) a busy market
- iv) a small village

5.Which of the following is not mentioned as a possible location for Atlantis?

- (i) Mediterranean Sea
- (ii) Caribbean
- (iii) Antarctica
- (iv) Indian Ocean

6.People still debate about Atlantis because

- (i) no one has found definite proof
- (ii) it is too dangerous to explore
- (iii) it is protected by law
- (iv) scientists refuse to talk about it

7.The story of Atlantis is used as a symbol of

- (i) human greed
- (ii) human curiosity
- (iii) lost technology
- (iv) ancient wars

8.Which of the following best describes the tone of the passage?

- (i) Humorous
- (ii) Mysterious
- (iii) Angry
- (iv) Scientific

2 **Develop the hints**

1 AP 16

A young scientist - curious mind - experiments in a small lab - one day - discovered a new formula - shared with the world - faced challenges - overcame them - formula changed lives - became famous.

3	Assume that you are the Managing Director of a company dealing with electronic equipment. Inform all your employees about the new community hall which the company is going to inaugurate next week. Highlight the important features of both the hall and the inauguration.	1	AP	16
4	Write an E-mail to the Principal of your college requesting him to arrange a charitable show to help the blind and deaf.	1	AP	16
5	Write Introduction Letter to Clients.	1	AP	16
6	Write Introduction Letter to Customer	1	AP	16

UNIT –II

UNIT II – READING SKILLS

Listening – Practicing active listening and responding to video lectures and talks. **Speaking** – Conversational strategies for effective communication, fluency, self-expression, accent, and intonation. **Reading** – Skimming, scanning, silent and loud reading. **Writing** – Biographical writing (places and people), descriptions, instructions, recommendations, single-sentence definitions. **Grammar** – Modal verbs, articles, question tags.

Q.No	Question	CO	BTL	Marks
PART A				
1	Fill in the blanks with suitable vocabulary	2	RE	2
	a. The manager appreciated herin handling the crisis. (confidence, hesitation, confusion, delay)			
	b. The new policy aims to improve..... among team members. (collaboration, isolation, competition, distraction)			
2	Fill in the blanks with suitable articles	2	RE	2
	a. She is honest employee who always meets deadlines.			

- b. We visited ___ Taj Mahal during our vacation.
- 3 **Fill in the blanks with suitable modal verbs** 2 RE 2
 a. Yousubmit the report by 5 p.m. today.
 b..... I borrow your notes for the presentation?
- 4 **Fill in the blanks with suitable question tags** 1 RE 2
 a. She completed the assignment on time, ___?
 b. They will not be attending the meeting, ___?
- 5 **Complete this passage with suitable prepositions** 2 RE 2
Passage:
 The students gathered the auditorium9 a.m. to attend the seminar. The speaker arrived time and spoke various career opportunities.
- 6 **Complete this short dialogue with suitable modal verbs** 2 RE 2
Dialogue:
 a)we reschedule the meeting for tomorrow?
 b) Yes, we That would be more convenient.
- 7 **Fill in the blanks with suitable verb forms** 2 RE 2
 a) She (complete) the training before joining the team.
 b) They..... (attend) the workshop every semester.
- 8 **Fill in the blanks with the most suitable modal verb** 2 RE 2
 a) You..... always wear your ID card.
 b) I leave early today?
- 9 **Fill in the blanks with the correct article** 2 RE 2
 a) He is..... university professor.
 b) I saw..... eagle flying above the hills.
- 10 **Fill in the blanks with suitable question Tags.** 2 RE 2
 a) He isn't coming today,?
 b) You have completed the task,?

PART B

1 Read the following passage and answer the questions

2 RE 16

THE MYSTERY OF DARK MATTER

Dark matter is one of the most puzzling concepts in modern astrophysics. Although it cannot be seen directly, scientists believe it makes up about 27% of the universe. Unlike ordinary matter — which forms stars, planets, and living beings — dark matter does not emit, absorb, or reflect light. Its presence is inferred from its gravitational effects on visible matter.

The idea of dark matter was first proposed in the 1930s by Swiss astronomer Fritz Zwicky. He observed that galaxies in the Coma Cluster were moving faster than expected, suggesting that some unseen mass was exerting gravitational force. Later, in the 1970s, American astronomer Vera Rubin provided further evidence by studying the rotation curves of spiral galaxies. Her data showed that stars far from the galactic center were moving at similar speeds to those near the center — a phenomenon that could only be explained by the presence of invisible matter.

Despite decades of research, scientists have not yet identified what dark matter is made of. Some theories suggest it could consist of weakly interacting massive particles (WIMPs), while others propose axions or sterile neutrinos. Experiments using underground detectors, particle accelerators, and space telescopes continue to search for clues.

Dark matter plays a crucial role in the formation of galaxies and the structure of the universe. Without it, galaxies would not have enough mass to hold themselves together. Its gravitational pull helps explain the large-scale patterns seen in cosmic maps.

Though invisible and elusive, dark matter remains a central focus of cosmological research. It challenges our understanding of physics and inspires scientists to explore the unknown realms of the universe.

Questions

1. The concept of dark matter was first proposed by
 - (i) Vera Rubin
 - (ii) Albert Einstein

- (iii) Fritz Zwicky
- (iv) Edwin Hubble

2. Dark matter cannot be seen directly because

- (i) it is too small
- (ii) it does not interact with light
- (iii) it is hidden behind stars
- (iv) it moves too fast

3. Vera Rubin's research focused on

- (i) black holes
- (ii) galaxy collisions
- (iii) spiral galaxy rotation
- (iv) star formation

4. The term "inferred" in paragraph 1 most nearly means

- (i) ignored
- (ii) proven
- (iii) guessed
- (iv) concluded based on evidence

5. Which of the following is NOT mentioned as a possible component of dark matter?

- (i) WIMPs
- (ii) Axions
- (iii) Sterile neutrinos
- (iv) Protons

6. Why is dark matter important for galaxies?

- (i) It provides light for stars
- (ii) It helps galaxies stay together
- (iii) It causes galaxy collisions
- (iv) It creates black holes

7. Scientists continue to study dark matter because

- (i) it is easy to detect
- (ii) it is the only form of matter in space
- (iii) its nature is still unknown
- (iv) it is dangerous

8. Which of the following best describes the tone of the passage?

- (i) Informative
- (ii) Humorous
- (iii) Critical

(iv) Emotional

- 2 Write a set of eight recommendations to parents to protect their children online. 2 RE 16
- 3 Look at the timeline of a famous scientist's life, below. Complete the paragraph on the right. Write verbs in the boxes and time expressions on the lines. 2 RE 16

Year	Event
1867	born in Warsaw, Poland
1891	moves to Paris to study physics and mathematics
1895	marries Pierre Curie
1898	discovers the elements polonium and radium
1903	wins the Nobel Prize in Physics
1911	wins the Nobel Prize in Chemistry
1914	helps set up mobile X-ray units for battlefield hospitals
1934	dies from illness caused by prolonged exposure to radiation

- 4 Write a process of recycling plastics 2 RE 16
- 5 Describe very briefly the process involved in an air conditioning system. 2 RE 16
- 6 Write a set of recommendations to maintain laptop carefully. 2 RE 16

UNIT –III

UNIT III – INTERACTIVE STRATEGIES

Listening – Telephonic conversations and interviews. **Speaking** – Engaging in group interactions, practicing speaking in formal situations (with teachers, officials, and foreigners). **Reading** – Analysing longer technical texts and identifying transitions within them. **Writing** – Paragraph writing, cohesion and coherence, business letters, exploring different word forms and usages. **Grammar** – Collocations, fixed and semi-fixed expressions.

Q.No	Question	CO	BTL	Marks
------	----------	----	-----	-------

PART A

- | | | | | |
|---|---|---|----|---|
| 1 | Choose the right collocation from the four option to make a Meaningful utterances.

I. She smiled in a highly | 3 | RE | 2 |
| | a. Delicious meal
b. Odd jobs
c. New Invention
d. Suspicious manner | | | |
| | II. Though he is, he is very generous. | | | |
| | a. Delicious meal
b. Short -tempered
c. Rich harvest
d. Suspicious manner | | | |
| 2 | Insert the right collocation in the blanks from the box given below. [advance, complete, present, implement]
a. She decided to _____ her career by taking additional courses.
b. The students were asked to _____ their homework before submitting it.
c. During the meeting, he managed to _____ his point clearly and confidently. | 3 | RE | 2 |

- d. The company plans to _____ a new marketing strategy to attract more customers.
- 3 Rewrite the following sentences using the correct form of fixed expression. 3 RE 2
- a. She's so very pleased of her new car.
 b. I can assure you that it is a happiness to deal with you.
 c. Jack feels very strong about the need for a new park in town.
 d. It has showed to our attention that your daughter has missed five classes.
- 4 Link the sentences given below using appropriate casual words and phrases. 3 RE 2
- a. Atomic power is not available in sufficient quantity. Coal is still a very valuable source of power.
 b. The carburettor may become choked with dirt. An air filter is fitted.
 c. Vertical boilers were installed in the factory. Only a limited floor space was available.
 d. The earlier steam engines could be used only for pumping. The crank had not been invented.
- 5 **Choose which one of the following verbs goes well with the expressions below: (Get, Do and Make)** 3 UN 2
- a. a goal
 b. peace
 c. lost
 d. a home
- 6 Add suitable prefixes for the meaning given against them. 3 RE 2
- a. fortunate
 b. forestation
 c.continent
 d. peccable
- 7 Match the words to form natural collocations 3 UN 2

	A	B
a	Fast	Mistake
b	Make	food
c	Break	respect

d	Deeply	progress

8 **Fill in the blanks with the correct verb:** (*make, do, take, have*) 3 RE 2

- a. We need to _____ a decision by tonight.
- b. She always _____ her homework after school.
- c. Let's _____ a break and relax.
- d. I usually _____ a shower in the morning.

9 Fill in the blanks with suitable Phrasal verbs. 3 RE 2

I.I _____ Mr. Sanders at the shopping mall yesterday.

- A) bump into
- B) bumped into
- C) bumped in

II.1. Children love to _____ for a birthday party.

- A) dress out
- B) dress up
- C) dressed up

III. My friend _____ me _____ at the railway station.

- A) dropped...off
- B) drop...off
- C) dropped...in

IV.. Ah Tien _____ of school due to poverty.

- A) dropped out
- B) dropped to
- C) drop out

10 Select suitable adjectives from the list to fill in the following blanks. 3 RE 2

Unique, characteristic, indestructible, amazing, precious, costly, enormous

Gold is _____ among metals since it possesses certain properties not found in any other metal. It is a rare metal with a _____ yellow colour. The only liquid that can dissolve gold is a mixture of hydrochloric acid and nitric acid. One can, therefore, say that gold is nearly _____. It

has certain _____ qualities that make it a _____ metal. People show their wealth by wearing _____ gold ornaments for which they pay an _____ price.

PART B

- | | | | | |
|---|--|---|----|----|
| 1 | Describe the advantage and disadvantage in using the nuclear energy as an alternative source of power to a paragraph of about 200 words. | 3 | AP | 16 |
| 2 | Read the following passage and answer the questions | 3 | AP | 16 |

THE FUTURE OF REMOTE WORK AND DIGITAL CONNECTIVITY

Remote work has become an integral part of modern employment, driven by advancements in digital technology. Tasks that once required physical presence — such as team meetings, file sharing, and collaboration — are now seamlessly conducted online through various platforms. This transformation has created new opportunities for flexible working arrangements but also presents challenges related to communication and productivity.

According to Lisa Morgan, HR expert at TechSolutions, two new work styles are emerging. The first is the fully remote worker — an individual who performs all tasks from home or any other location outside the traditional office. The second is the hybrid worker — someone who splits their time between office and remote work, adapting to different environments based on task requirements.

The workplace culture is shifting towards greater reliance on digital tools. Instead of face-to-face interactions, employees are encouraged to use video conferencing, instant messaging, and cloud-based applications to stay connected. Soft skills such as self-discipline, clear communication, and adaptability are now considered essential for remote success.

Although some companies worry about decreased team cohesion, industry leaders believe that embracing digital connectivity can enhance collaboration and innovation. Employees who develop strong digital literacy skills and

maintain a proactive attitude will be better equipped to thrive in this evolving landscape.

In summary, remote work is not replacing traditional office roles — it is redefining how work is done. The future workforce will be those who can effectively leverage technology, communicate clearly, and remain adaptable to change.

Questions:

1. Tasks that are now performed online instead of in person include:

- (i) Team meetings and file sharing
- (ii) Manufacturing products
- (iii) Physical office cleaning
- (iv) Customer service in stores

2. The “new work styles” mentioned in the article are:

- (i) Fully remote worker and hybrid worker
- (ii) Factory worker and office clerk
- (iii) Freelance artist and corporate executive
- (iv) Part-time and full-time jobs

3. Which is NOT one of the workplace culture shifts highlighted?

- (i) Greater reliance on digital tools
- (ii) Use of video conferencing and cloud apps
- (iii) Increased in-person meetings
- (iv) Emphasis on soft skills like communication

4. A hybrid worker is described as:

- (i) An employee working only from home
- (ii) An employee splitting time between office and remote work
- (iii) An employee working only in the office
- (iv) A manager overseeing remote teams

5. The soft skills considered critical for remote work include:

- (i) Self-discipline and communication
- (ii) Cooking and gardening
- (iii) Physical strength and endurance
- (iv) Artistic talent

6. Industry leaders believe that digital connectivity can:

- (i) Decrease innovation
- (ii) Improve collaboration and innovation
- (iii) Replace managers entirely
- (v) Eliminate the need for soft skills

7. According to the passage, the future of work will depend on workers who:

- (i) Avoid using technology
- (ii) Effectively leverage digital tools and communicate clearly
- (iii) Only work in physical offices
- (iv) Rely solely on traditional methods

8. The article suggests that remote work is:

- (i) Replacing all traditional office roles
- (ii) Redefining how work is done
- (iii) Making offices obsolete overnight
- (iv) Only suitable for tech companies

3	Write a letter of application for the post of Software Engineer.	3	AP	16
4	Write a letter to the Editor about the loud speaker menace in bus stand due to election.	3	RE	16
5	Write a letter to the Health Department, Government of Tamil Nadu to conduct Free Health Check-up camp in your area for detecting skin diseases.	3	RE	16
6	Write a letter to the Editor of The Indian Express about the misuse of social media platforms and the importance of promoting digital discipline among youth.	3	RE	16

UNIT -IV

CREATIVE WRITING

Listening-Identify topics, context, function, speakers, and opinions from audio content. **Speaking**-Respond to questions. Explore different interview formats. **Reading**-Identify relationships between characters, facts, and ideas. Compare facts and figures. **Writing**: Focus on email etiquette, summarization, and paragraphing. Use single-word substitutes. Practice free writing on various topics (e.g., favourite place, hobbies, school life). **Grammar**: synonyms, antonyms, Tenses, Adjectives, Cause and Effect expressions.

Q.No	Question	CO	BTL	Marks
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PART A

- | | | | | |
|---|--|---|----|---|
| 1 | Find out antonym for the following words:

I.GENEROUS
a) Benevolent b) Selfish c) Kind d) Considerate

II.EFFICIENT
a) Effective b) Wasteful c) Productive d) Successful | 4 | RE | 2 |
| 2 | I. Which pair of statements show a comparison of facts?
a) "John went to the park. Mary baked a cake." b) "John scored 90%, while Mary scored 95% on the test." c) "Mary likes cats. John dislikes dogs." d) "The sky is blue. Grass is green."

II. Which statement shows comparison?
a) She ran faster than her brother. b) He is playing football.
c) I went to school. d) She has a book. | 4 | RE | 2 |
| 3 | Read the given sentences below and find out the adjectives:

a. The homeless beggar hasn't eaten in day
b. The girl is a state-level boxer.
c. The brave army marched through the streets. | 4 | RE | 2 |

- d. The ship sustained heavy damage
- Choose a single-word substitute for the following:
- 4 a) “a person who writes books” 4 RE 2
 a) Artist b) Author c) Editor d) Reader
- b) “a place where books are kept.”
 a) Bookstore b) Library c) Hall d) Shelf
- 5 I. Which is the best summary for the following sentences? 4 RE 2
 a) “Ravi studied for weeks and scored the highest marks in class.”
 b) Ravi failed the test. b) Ravi studied and topped the class.
 c) The class had a party d) Ravi skipped the exam.
- II. “The school organized a science fair with many creative student projects, judged by teachers and visitors.”
 a) Students played games at school
 b) A science fair was held with student projects judged by others.
 c) Visitors came to see students d) The teachers gave homework
- 6 I. Which sentence demonstrates a cause-and-effect relationship? 4 RE 2
 a) Because she studied hard, she passed the exam
 b) He loves coffee and tea.
 c) I enjoy hiking, especially in the mountains
 d) She went to the party after school.
- II. Choose the correct cause-and-effect statement:
 a) Due to the heavy rain, the game was postponed
 b) He eats pizza and burgers every weekend.
 c) She helped me with my homework after school
 d) They went to the market in the evening
- 7 Fill in with proper adjectives: 4 RE 2
 1. My apartment is (small) _____ than hers.
 2. Shakespeare is known as one of the (great) _____ men in English Literature.
 3. He is the (smart) _____ student in the class.
 4. This book is (interesting) _____ than the one I read yesterday.
- 8 Identify the adjective and mention its type in the following sentences: - 4 RE 2
 a. The food was delicious.
 b. Whose pencil box is this?

- c. I did not find those books.
 d. Both girls were present at the meeting.
- I. Identify the future tense sentence:
- 9 a) I went to the market. 4 RE 2
 b) I am going to the market.
 c) I will go to the market.
 d) I have gone to the market.
- II. What sentence is in the past continuous tense?
- a) They were studying all night.
 b) She had gone by the time I arrived.
 c) He travels to Paris every year.
 d) We will go to the movies tonight.
- Change tense as directed.
- 10 1. I will talk to him. (Change into simple past) 4 RE 2
 2. I waited for an hour. (Change into present perfect)

PART B

- 1 Write a email to the principal of your college requesting him to give permission to arrange a charitable show to help the blind and deaf people through college student committee. 4 AP 16
- 2 Write a free-form essay on the topic on the Influence of Globalization on Traditional Cultural Practices. 4 AP 16
- 3 Write a free-form essay on The Benefits and Drawbacks of Multiculturalism in Modern Cities. 4 AP 16
- 4 Write a paragraph of 150 words on your favourite place, ensuring you use descriptive details and proper paragraph structure. 4 AP 16
- Summarise the following article in your own words: 4 AP 16
- 5 Living a healthy lifestyle is essential for maintaining physical fitness, mental well-being, and overall quality of life. A healthy lifestyle is not just about avoiding illness; it is about making daily choices that support your body and mind. The first and most important aspect is balanced nutrition. Eating a variety of fresh fruits, vegetables, whole grains, lean proteins, and healthy fats provides the body with essential nutrients. Limiting processed foods, sugary snacks, and excessive salt helps reduce the risk of obesity, heart disease, and diabetes.
- Physical activity is equally important. Regular exercise, such as brisk walking, cycling, swimming, or yoga, strengthens muscles, improves cardiovascular health, and

boosts energy levels. Experts recommend at least 30 minutes of moderate exercise most days of the week. Physical activity also helps reduce stress and improve mood by releasing endorphins.

Adequate sleep is another vital habit. Most adults need 7–8 hours of quality sleep per night to allow the body to recover, repair tissues, and maintain proper brain function. Poor sleep can lead to fatigue, poor concentration, and weakened immunity.

Managing stress is critical for mental health. Stress management techniques like meditation, deep breathing, listening to music, spending time in nature, or engaging in hobbies can help keep the mind calm and focused.

Avoiding harmful habits such as smoking, excessive alcohol consumption, and a sedentary lifestyle is crucial for long-term health. These habits are linked to serious conditions such as cancer, liver disease, and heart problems.

In conclusion, a healthy lifestyle is a combination of balanced eating, regular exercise, proper rest, stress control, and avoiding harmful substances. Making these habits a consistent part of your daily routine will lead to better physical health, emotional stability, and a happier, more energetic life.

- 6 Assume the role of a journalist and draft a detailed interview with a climate activist. The conversation should focus on the recent natural disasters, their causes, and the possible preventive measures that can be taken to reduce their impact.

4 AP 16

UNIT –V

COMPREHENSIVE SKILL

Listening-Exercises based on dialogues and conversations. Listen to specific task-focused audio tracks. **Speaking-** Participate in short/group conversations. Engage in role-play scenarios. **Reading-** Understand specific meanings in texts. Take notes and extend vocabulary. Practice cloze reading. **Writing-** Explore different types of essays and story writing. Practice dialogue writing. Use abbreviations and acronyms. **Grammar-** Adverbs, and phrasal verbs.

Q.No	Question	CO	BTL	Marks
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PART A

- | | | | | |
|---|---|---|----|---|
| 1 | Fill in the blanks in the following sentences choosing the correct option from those given in the brackets.
a.He will bear (in/out/with/as) the truth of my statement.
b.The storm has blown (away/out/over/in).
c.The war broke (down/into/up/out) In China.
d.I tried to bring him (about/out/round/up). | 4 | RE | 2 |
| 2 | I.What does the word “reluctantly” most likely mean in this sentence:
<i>“He reluctantly handed over his phone to the teacher.”</i>
A. Happily
B. Willingly
C. Unwillingly
D. Quickly

II.What does the word “gloomy” most likely mean in this sentence:
<i>“It was a gloomy day, with dark clouds covering the sky.”</i>
A. Bright
B. Cheerful
C. Sad or dark
D. Noisy | 4 | RE | 2 |

- 3 write the abbreviations for the following: 4 RE 2
- a. NASA
 - b. PDF
- 4 I. Which sentence uses an adverb correctly? 4 RE 2
- A. She runs quick.
 - B. She runs quickly.
 - C. She quick runs.
 - D. She run quick.
- II. What is the adverb in this sentence: "He sings beautifully."
- A. He
 - B. Sings
 - C. Beautifully
 - D. None
- 5 Choose the correct phrasal verb for the following sentences: 4 RE 2
- I. "I will _____ the form before submitting it."
- A. look on
 - B. look up
 - C. look over
 - D. look in
- II. "Don't forget to _____ your shoes before entering the house."
- A. take up
 - B. take-off
 - C. take in
 - D. take over
- 6 I. You are listening to an announcement at an airport. What should you focus on? 4 RE 2
- A. The type of plane
 - B. The travel history of the announcer
 - C. Gate number, flight time, and destination
 - D. Airport lighting
- II. You are listening to an announcement on a bus. What should you focus on?
- A. The driver's lunch plan
 - B. The bus model number
 - C. Next stop, route changes, and safety instructions
 - D. The brand of the bus engine

- 7 Choose the correct phrasal verb from the options given. 4 RE 2
- a. 1.She finally ___ (gave up / turned down) after trying for hours.
 - b. 2.We need to ___ (call off / bring up) this topic at our next meeting.
 - c. 3.He always tries to ___ (get away with / put up with) his mistakes.
 - d. 4.Can you help me ___ (look after / take off) my plants while I'm gone?

- 8 Write the abbreviations for the following 4 RE 2
- a. RADAR
 - b.GIF

- 9 Choose the best word to fill in the blank: 4 RE 2
- a. "She was very _____ to hear about her promotion."
- A. bored
 - B. excited
 - C. angry
 - D. sleepy

- b.Choose the best word to fill in the blank:
"He felt very _____ after running a marathon."
- A. energetic
 - B. exhausted
 - C. hungry
 - D. tall

- 10 I. Which of the following is an abbreviation? 4 UN 2
- A. Prof.
 - B. School
 - C. Book
 - D. Teacher

- II.What abbreviation is written incorrectly?
- A. Feb.
 - B. Mon.
 - C. Decm
 - D. Ave.

PART B

- 1 Write an essay on "Discuss the role of technology in transforming education systems". 4 AP 16

2	Draft a speech for a university sports event inauguration, highlighting the role of sports in character building, teamwork, and maintaining a healthy lifestyle.	4	A	16
3	Create a speech for the International Day celebration at the university, discussing the value of cultural exchange, global unity, and respecting diversity.	4	AP	16
4	Discuss the importance of mental health awareness in modern society.	4	AP	16
	Read the following passage and answer the questions	4	AP	8

5 Reading has always been regarded as one of the most effective ways to develop language skills. Unlike casual conversations or social media interactions, reading exposes learners to a wide range of vocabulary, sentence structures, and styles of expression. A person who reads regularly develops not only a better command over grammar and usage but also a deeper understanding of how ideas can be communicated effectively.

One of the greatest benefits of reading is vocabulary enrichment. Every book, article, or newspaper introduces new words in context, making it easier for readers to understand and remember them. Over time, this practice helps learners use the right word in the right situation. For example, novels and short stories often expose readers to descriptive words and dialogues, while academic texts improve formal vocabulary.

Reading also plays a crucial role in improving writing skills. By observing how authors structure paragraphs, build arguments, or narrate events, learners unconsciously adopt similar techniques in their own writing. Exposure to different genres—such as fiction, non-fiction, poetry, or essays—broadens one’s style and creativity.

Furthermore, reading enhances comprehension skills. A student who regularly reads learns to identify the main idea, supporting details, and hidden meanings in a passage. This ability is especially useful in academic success, where students are often required to analyze texts critically and respond thoughtfully.

Beyond academics, reading also stimulates imagination and critical thinking. When readers engage with a story, they visualize characters, settings, and events, which sharpens creativity. Non-fiction texts, on the other hand, provide knowledge, perspectives, and arguments that encourage independent thinking.

In today's digital age, where quick and shallow content dominates, the habit of sustained reading is even more valuable. It not only strengthens language development but also cultivates patience, focus, and lifelong learning. Ultimately, reading is not just a skill—it is a gateway to knowledge, communication, and personal growth.

1. What are two unique ways reading helps in vocabulary development? (2 marks)
2. How does reading improve writing skills? Give two points. (2 marks)
3. Explain how different genres contribute to language learning. (2 marks)
4. What role does reading play in developing comprehension skills? (2 marks)
5. According to the passage, how does reading enhance creativity and imagination? (2 marks)
6. Why is sustained reading especially important in the digital age? (2 marks)
7. Pick out two words/phrases from the passage that suggest academic benefits of reading. (2 marks)
8. Write the central idea of the passage in your own words. (2 marks)

- 6 Dialogue writing: Imagine you and your friend are planning a group project. One of you prefers working online, while the other prefers meeting in person. Present your point of view clearly and respond politely to your partner's suggestions

4 AP 16

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24TAHS101
HERITAGE OF TAMILS

அலகு - I : மொழிமற்றும் இலக்கியம்
UNIT- I : LANGUAGE AND LITERATURE

இந்தியமொழிக்குடும்பங்கள் - திராவிடமொழிகள் - தமிழ்ஒருசெம்மொழி - தமிழ்செவ்விலக்கியங்கள் - சங்கஇலக்கியத்தின்சமயச்சார்பற்றதன்மை - சங்கஇலக்கியத்தில்பகிர்தல்அறம் - திருக்குறளில்மேலாண்மைக்கருத்துக்கள் - தமிழ்க்காப்பியங்கள், தமிழகத்தில்சமணபௌத்தசமயங்களின்தாக்கம் - பக்திஇலக்கியம், ஆழ்வார்கள்மற்றும்நாயன்மார்கள் - சிற்றிலக்கியங்கள் - தமிழில் நவீன இலக்கியத்தின் வளர்ச்சி - தமிழ் இலக்கிய வளர்ச்சியில் பாரதியார் மற்றும் பாரதிதாசன் ஆகியோரின் பங்களிப்பு.

Language Families in India – Dravidian Languages – Tamil as a Classical Language - Classical Literature in Tamil - Secular Nature of Sangam Literature – Distributive Justice in Sangam Literature – Management Principles in Thirukural – Tamil Epics and Impact of Buddhism & Jainism in Tamil Land – Bakthi Literature Azhwars and Nayanmars – Forms of minor Poetry – Development of Modern literature in Tamil – Contribution of Bharathiyar and Bharathidhasan.

PART – A

Q.N	QUESTION	CO	BTL	Marks
1.	தமிழ்மொழி எந்த மொழிக் குடும்பத்தைச் சேர்ந்தது? Which family of languages does Tamil belong to?	1	RE	2
2.	திராவிட மொழிகள் மொத்தம் எத்தனை? How many Dravidian – Languages are there?	1	RE	2
3.	தேவாரம் பாடிய மூவர் யார்? Who are the three authors of Devaram?	1	RE	2
4.	சிற்றிலக்கியங்களின் பெயரை முதலில் கூறிய நூல் எது? Which book mentioned the names of Sitrilakiyam first?	1	RE	2
5.	தென் – திராவிடமொழிகள் யாவை? Which are called South – Dravidian languages?	1	RE	2
6.	செம்மொழி என்றால் என்ன? What is meant by classical language?	1	RE	2

7.	தமிழில் தோன்றிய முதல் காப்பியம் எது? Which was the first kaapiyam to appear in Tamil?	1	RE	2
8.	இரட்டைக்காப்பியங்கள் எவை? What are Irattaikaapiyangal?	1	RE	2
9.	பாரதியார் எழுதிய நூல்கள் சிலவற்றைக் கூறுக? Write some of the books written by Bharathiyar?	1	RE	2
10.	ஆழ்வார்களில் பெண் ஆழ்வார் யார்? Who is the woman among the Alwars?	1	RE	2

PART - B

Q.NO	QUESTION	CO	BTL	Marks
1.	திருக்குறளில் மேலாண்மைக் கருத்துகள் பற்றி எழுதுக? Management concept in Thirukural?	1	UN	16
2.	செம்மொழிக்கான தகுதிப்பாட்டை விளக்குக. Explain the Qualification for Classical Language.	1	UN	16
3.	தமிழ் இலக்கிய வளர்ச்சியில் பாரதியாரின் பங்களிப்பு? Bharatiyar's contribution to the Development of Tamil Literature?	1	UN	16

- | | | | | |
|----|--|---|----|----|
| 4. | சிற்றிலக்கியங்கள் எத்தனை வகைப்படும்?
அவற்றில் வழக்கில் உள்ள சிற்றிலக்கியங்கள்
பற்றி விளக்குக. | 1 | UN | 16 |
| | How many types of Sittrilakiyangal? Explain the
Sittrilakiyangal in the case. | | | |
| 5. | ஐம்பெருங்காப்பியங்கள் பற்றி ஒரு கட்டுரை
எழுதுக? | 1 | AP | 16 |
| | Write an essay on Aimperungaapiyangal? | | | |
| 6. | தமிழ் இலக்கிய வளர்ச்சியில்
பாரதிதாசனின் பங்களிப்பு? | 1 | AP | 16 |
| | Bharathidasan's contribution to the Development of Tamil
Literature? | | | |

அலகு – II-மரபு – பாறைஓவியங்கள்முதல்நவீனஓவியங்கள்வரை- சிற்பக்கலை
UNIT- II -HERITAGE – ROCK ART PRINTINGS TO MODERN ART – SCULPTURE

நடுகல் முதல் நவீன சிற்பங்கள் வரை – ஐம்பொன் சிலைகள் – பழங்குடியினர் மற்றும் அவர்கள் தயாரிக்கும் கைவினைப் பொருட்கள், பொம்மைகள் – தேர் செய்யும் கலை – சுடுமண் சிற்பங்கள் – நாட்டுப்புற தெய்வங்கள் – குமரிமுனையில் திருவள்ளுவர் சிலை - இசைக்கருவிகள் – மிருதங்கம், பறை, வீணை, யாழ், நாதஸ்வரம் – தமிழர்களின் சமூக மற்றும் பொருளாதார வாழ்வில் கோவில்களின் பங்கு.

Hero stone to modern sculpture – Bronze icons – Tribes and their handicrafts – Art of temple car making- Massive Terracotta sculptures, village deities, Thiruvalluvar statue at kanyakumari, making of musical instruments – Mridhangam, Parai, Veenai, Yazh and Nadhaswaram- Role of Temples in Social and Economic Life of Tamils.

PART - A

Q.NO	QUESTION	CO	BTL	Marks
1.	நடுகல் என்றால் என்ன? What is Nadukal?	2	RE	2
2.	உலகிலேயே மிகப் பெரிய தேர் எது? Which is the biggest chariot in the world?	2	RE	2
3.	ராஜவாத்தியம் என்று அழைக்கப்படும் இசைக்கருவி எது? Which Musical instrument is called the Raja Vadhyam?	2	RE	2
4.	காற்று வாத்தியங்கள் சிலவற்றை கூறுக? Name some KaatruKaruvigal?	2	RE	2
5.	இசைக்கருவிகளில் நரம்புக்கருவி சிலவற்றைக் கூறுக? Name some Narambukaruvi?	2	RE	2

6.	சிறு தெய்வங்கள் என்றால் என்ன? What are minor deities?	2	RE	2
7.	சுடுமண்சிற்பங்கள் என்றால் என்ன? What are Terracotta Sculptures?	2	RE	2
8.	ஐம்பொன் சிலை என்றால் என்ன? What does Impon Silai mean?	2	RE	2
9.	இசைக்கருவிகள் எத்தனை வகைப்படும்? அவை யாவை? What are the types of musical Instruments?	2	RE	2
10.	திருவள்ளுவர் சிலை எங்கு நிறுவப்பட்டது? Where was the Tiruvalluvar statue installed?	2	RE	2

PART - B

1.	நடுகல் – விளக்கவும் Nadukal – Explain	2	UN	16
2.	பழங்குடியினர் மற்றும் அவர்களின் கைவினைப் பொருட்கள் பற்றி விளக்கவும் Tribals and their handicrafts – Explain	2	UN	16
3.	மிருதங்கம் – விளக்கவும் Mridangam – Explain	2	UN	16
4.	கிராமங்களில் உள்ள நாட்டுப்புற தெய்வங்கள் பற்றி விரிவாக எழுதுக? Explain - Folk Deities	2	UN	16

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| 5. | குமரிமுனையில் உள்ள திருவள்ளுவர் சிலை பற்றி விரிவாக எழுதுக?
Explain - Thiruvalluvar statue at Kumarimuna | 2 | AP | 16 |
| 6. | வீணை - விளக்கவும்
Explain – Veena | 2 | UN | 16 |

**அலகு – III -நாட்டுப்புறக்கலைகள்மற்றும்வீரவிளையாட்டுகள்.
UNIT- III - FOLK AND MARTIAL ARTS**

தெருக்கூத்து, கரகாட்டம், வில்லுப் பாட்டு, கணியான் கூத்து, ஒயிலாட்டம், தோல்பாவைக் கூத்து, சிலம்பாட்டம், வளரி, புலியாட்டம், தமிழர்களின் விளையாட்டுகள்.

Therukoothu, Karagattam, Villu Pattu, Kaniyan Koothu, Oyillattam, Leather puppetry, Silambattam, Valari, Tiger dance – Sports and Games of Tamils.

PART - A

Q.NO	QUESTION	CO	BTL	Marks
1.	தெருக்கூத்து பற்றி சிறுகுறிப்பு எழுதுக? Write the short notes on Therukoothu?	3	UN	2
2.	கரகாட்டம் பற்றி சிறுகுறிப்பு எழுதுக? Write short notes on Karagattam?	3	UN	2
3.	தோல் பாவைக் கூத்து சிறுகுறிப்பு எழுதுக? Write short notes on Tholpaavaikoothu?	3	UN	2

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| 4. | வில்லுப்பாட்டு பற்றி சிறுகுறிப்பு எழுதுக?
Write the short notes on Villupaatu? | 3 | UN | 2 |
| 5. | ஓயிலாட்டம்- குறிப்புரைக?
Describe Oyilaatam? | 3 | UN | 2 |
| 6. | சிலம்பாட்டம் வரைக?
Describe Silambattam? | 3 | UN | 2 |
| 7. | தமிழர்களின் வீரவிளையாட்டுகள் சிலவற்றைக் குறிப்பிடுக?
Mention some of the heroic sports of tamilians? | 3 | UN | 2 |
| 8. | பெண்களின் ஏதேனும் நான்கு நாட்டுப்புற விளையாட்டுகளைக் குறிப்பிடவும்.
Mention the any four folk games of women. | 3 | UN | 2 |
| 9. | வளரி என்றால் என்ன?
What is Valari? | 3 | UN | 2 |
| 10. | புலியாட்டம் பற்றி எழுதுக?
Write about puliyattam? | 3 | UN | 2 |

PART - B

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| 1. | தெருக்கூத்து பற்றி விளக்கவும்
Explain – Therukoothu | 3 | AP | 16 |
| 2. | கரகாட்டம்- விளக்கவும்
Explain – Karagattam | 3 | AP | 16 |
| 3. | சிலம்பாட்டம் பற்றி விளக்கவும்
Explain – Silambattam | 3 | AP | 16 |

4.	இந்திய தமிழர்களால் உருவாக்கப்பட்ட விளையாட்டுகளின் நோக்கங்களை தெளிவுபடுத்துக. Clarify the objectivities of games developed by Tamils of India	3	UN	16
5.	தமிழர்களின் வாழ்வில் வில்லுப் பாட்டின் முக்கியத்துவத்தை விவரிக்க? Describe the importance of Villu Paatu in the lives of Tamils?	3	AP	16
6.	ஓயிலாட்டம்- விளக்கவும் Explain –Oyilaatam?	3	AP	16

அலகு – IV - தமிழர்களின்திணைக்கோட்பாடுகள்
UNIT -IV-THINAI CONCEPT OF TAMILS

தமிழகத்தின்தாவரங்களும், விலங்குகளும் – தொல்காப்பியம் மற்றும் சங்க இலக்கியத்தில் அகம் மற்றும் புறக் கோட்பாடுகள் – தமிழர்கள் போற்றிய அறக்கோட்பாடு – சங்ககாலத்தில் தமிழகத்தில் எழுத்தறிவும், கல்வியும் – சங்ககால நகரங்களும் துறைமுகங்களும் – சங்ககாலத்தில் ஏற்றுமதி மற்றும் இறக்குமதி – கடல் கடந்த நாடுகளில் சோழர்களின் வெற்றி.

Flora and Fauna of Tamils & Aham and Puram Concept from Tholkappiyam and Sangam Literature – Aram concept of Tamils – Education and Literacy during Sangam Age – Ancient Cities and Ports of Sangam Age – Export and import during sangam Age – Overseas Conquest of Cholas.

PART - A

Q.NO	QUESTION	CO	BTL	Marks
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| 1. | ஐந்து வகையான நிலங்களைக் குறிப்பிடுங்கள்?
Mention the five types of Land? | 4 | RE | 2 |
| 2. | மலை மற்றும் மலை தொடர்பான பகுதிகள் எவ்வாறு அழைக்கப்படுகின்றன?
How are the mountain and mountain related regions called? | 4 | RE | 2 |
| 3. | புறம் என்றால் என்ன?
What is meant by Puram? | 4 | RE | 2 |
| 4. | சோழசாம்ராஜ்யத்தின் சில துறைமுகங்களைக் குறிப்பிடவும்?
Mention some ports of chola kingdom? | 4 | RE | 2 |
| 5. | அறம் என்றால் என்ன?
What is meant by Virtue? | 4 | RE | 2 |
| 6. | ஆதிச்சநல்லூர் எந்த மாவட்டம்?
Which district is AadichaNaloor? | 4 | RE | 2 |
| 7. | அகம் என்றால் என்ன?
Explain: Agam concept | 4 | RE | 2 |
| 8. | சங்க காலத்தில் இருந்த ஏதேனும் நான்கு நகரங்களின் பெயர்களை எழுதுங்கள்.
Write any four names of cities in the Sangam era. | 4 | RE | 2 |
| 9. | தொல்காப்பியத்திற்கு முதலில் உரை எழுதியவர் யார்?
Who wrote the first text of Tolkaapiyam? | 4 | RE | 2 |
| 10. | கல்வியின் பயன்கள் யாவை?
What are the benefits of education? | 4 | RE | 2 |

PART - B

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|----|--|---|----|----|
| 1. | தமிழர்களால் போற்றப்படும் அறக்கோட்பாடு பற்றிய சிறு குறிப்புகளை எழுதுங்கள்
Write short notes on Arakotpadu Cherished by Tamilians | 4 | UN | 16 |
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2.	சங்ககாலத்தில் தமிழ்நாட்டில் எழுத்தறிவு மற்றும் கல்வியறிவு பற்றி விவரிக்க? Literacy and education in Tamil nadu during the Sangam period	4	UN	16
3.	கடல்கடந்த நாடுகளில் சோழர்களின் வெற்றியை விவரிக்க? The victory of the cholas in the overseas countries	4	UN	16
4.	தமிழர்களின் 'திணைக்கோட்பாடுகள்' பற்றி எழுதுக? Write about 'Thinai concept' of Tamils ?	4	UN	16
5.	சங்க காலத்தில் நடைப்பெற்ற ஏற்றுமதி மற்றும் இறக்குமதி வணிகங்களை விளக்குக. Explain Exports and Imports during the Sangam period	4	UN	16
6.	சங்க கால நகரங்கள் மற்றும் துறைமுகங்களை விளக்குக. Explain Cities and Ports during Sangam period.	4	UN	16

அலகு - V

இந்திய தேசிய இயக்கம் மற்றும் இந்திய பண்பாட்டிற்குத் தமிழர்களின் பங்களிப்பு UNIT -V

CONTRIBUTION OF TAMILS TO INDIAN NATIONAL MOVEMENT AND INDIAN CULTURE

இந்திய விடுதலைப் போரில் தமிழர்களின் பங்கு – இந்தியாவின் பிறப்பகுதிகளில் தமிழ்ப் பண்பாட்டின் தாக்கம் – சுயமரியாதை இயக்கம் – இந்திய மருத்துவத்தில், சித்த மருத்துவத்தின் பங்கு – கல்வெட்டுகள், கையெழுத்துப் படிகள் – தமிழ்ப் புத்தகங்களின் அச்சு வரலாறு.

Contribution of Tamils to Indian Freedom struggle – The culture influence of Tamils over the other parts of India – Self-Respect Movement – Role of siddha medicine in indigenous systems of medicine – Inscriptions & Manuscripts – Print History of Tamil Books.

PART - A

Q.NO	QUESTION	CO	BTL	Marks
1.	இந்தியாவின் சுதந்திரத்திற்காகப் போராடிய விடுதலைப் போராட்ட வீரர்களைக் குறிப்பிடுங்கள்? Mention the freedom fighters who fought for the independence of India?	5	RE	2
2.	"தமிழகவரலாறு – மக்கள் மற்றும் கலாச்சாரம்" என்ற நூல் யாரால் எழுதப்பட்டது? Whom was the book "The History of Tamilnadu – People and culture written?	5	RE	2
3.	தமிழில் அச்சிடப்பட்ட முதல் நூல் எது? Which was the first printed book in tamil?	5	RE	2
4.	சுயமரியாதை இயக்கம் யாரால் தொடங்கப்பட்டது? Who initiated the self – respect movement?	5	RE	2
5.	தமிழ் அச்சகத்தின் தந்தை யார்? Who is the father of the Tamil printing press?	5	RE	2

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| 6. | சித்தமருத்துவம் என்றால் என்ன?
What is Siddha Medicine? | 5 | RE | 2 |
| 7. | இந்திய தேசிய இயக்கத்தில் பங்கேற்ற தமிழ்நாட்டைச் சேர்ந்த நான்கு பெண் போராளிகளைக் குறிப்பிடவும்.
Mention any four woman warries from Tamil Nadu who took part in Indian National movement | 5 | RE | 2 |
| 8. | வேறுபடுத்துக- பண்பாடு, நாகரிகம்
Differentiate between – culture civilization | 5 | RE | 2 |
| 9. | தமிழ்நாட்டில் கல்வெட்டுகள் காணப்படும் இடங்கள் சிலவற்றைக் கூறுக?
Where can inscriptions be found in Tamilnadu? | 5 | RE | 2 |
| 10. | தமிழ்நாட்டின் முதல் அச்சுக்கூடம் எங்கு நிறுவப்பட்டது?
Where was the first printing press in Tamilnadu started? | 5 | RE | 2 |

PART - B

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|----|--|---|----|----|
| 1. | இந்திய சுதந்திரப் போரில் தமிழர்களின் பங்களிப்பை விவரிக்க?
Role of Tamilians in the Indian Independence war | 5 | UN | 16 |
| 2. | இந்திய மருத்துவத்தில் சித்தமருத்துவத்தின் பங்கை விளக்குக.
The role of Siddha medicine in Indian medicine | 5 | UN | 16 |
| 3. | சுயமரியாதை இயக்கத்தின் முக்கிய நோக்கங்கள் பற்றி விவரிக்க?
The main objective of the SuyamariyadhaiIyakkam? | 5 | UN | 16 |
| 4. | இந்தியாவின் பிறபகுதிகளில் தமிழ்பண்பாட்டின் தாக்கம் குறித்து ஒரு கட்டுரை எழுதவும்
Write an essay on the cultural influence of Tamils in other parts of India | 5 | UN | 16 |

5. தமிழ் புத்தகங்களின் அச்ச வரலாற்றைக் குறிப்பிடவும். 5 UN 16
Explain - Print history of Tamil books
6. கல்வெட்டுகள் மற்றும் கையெழுத்துப் படிகள் பற்றி ஒரு சிறு குறிப்பு எழுதுங்கள். 5 UN 16
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