

M.Sc. DEGREE EXAMINATION, APRIL 2023.

First Semester

Physics

MATHEMATICAL PHYSICS – I

(CBCS – 2017 onwards)

Time : 3 Hours

Maximum : 75 Marks

Part A $(10 \times 2 = 20)$

- 1. What do you mean by line, surface and volume integral?
- 2. Define linear vector space.

3. Find the eigen values of
$$A = \begin{bmatrix} 1 & 2 & 0 \\ 2 & 4 & 0 \\ 4 & 8 & 0 \end{bmatrix}$$

4. Solve the differential equation
$$\frac{d^2y}{dx^2} - 3\frac{dy}{dx} + 2y = 0.$$

- 5. State Cauchy Riemann conditions for analyticity of a function of complex variable in cartesian and polar coordinates.
- 6. Define pole and residue of a pole.
- 7. What happens to Fouriers series expansion of a periodic function, if the function is even in nature.

- 8. List out the uses of Fourier series.
- 9. Find Fourier transform of the function.

 $f(x) = \begin{cases} 1, \text{ for } |x| < a \\ 0, \text{ for } |x| > a \end{cases}$

10. State shifting property of Fourier transform.

Part B
$$(5 \times 5 = 25)$$

Answer all questions, choosing either (a) or (b).

11. (a) Evaluate by Stoke's theorem.

$$\int (e^{x}dx + 2ydy - dz) \text{ where } C \text{ is the curve}$$
$$x^{2} + y^{2} = 4, z = 2.$$

- (b) From the set of vectors (1, 0, 1) (0, 0, 1) and (1, 1, 0) construct a set of orthonormal vectors.
- 12. (a) Find eigen values and eigen vectors of the matrix $\begin{bmatrix}
 1 & 2 & 3 \\
 2 & -1 & 1 \\
 3 & 1 & 1
 \end{bmatrix}$

Or

- (b) Find a power series solution to the differential equation $\frac{d^2y}{dx^2} + \lambda^2 y = 0$, $\lambda = \text{constant}$.
- 13. (a) Find the first three terms of the Tayler series expansion of $f(z) = \frac{1}{z^2 + 4}$ about z = -i. Also find the region of convergene.

Or

 $\mathbf{2}$

- (b) Find the residue of $f(z) = \frac{e^z}{z^2 + a^2}$ at its singularities.
- 14. (a) Expand in Fourier series, the function $f(x) = x^2$ for $0 < x < 2\pi$

Or

Verify the representation directly at the point x = 0

15. (a) Find sine Fourier transform for the function

$$f(x) = \begin{cases} x^2, \text{ for } 0 \le x < \pi \\ 0, \text{ elsewhere.} \end{cases}$$

 \mathbf{Or}

(b) Find the finite cosine transform of f(x) if $f(x) = \frac{\pi}{3} - x + \frac{x^2}{2\pi}$.

Part C (3 × 10 = 30)

Answer any three questions.

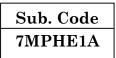
16. Describe the Schmidt orthogonalisation procedure of constructing an orthogonal set of functions from a non orthogonal set.

17. Diagonalise the matrix
$$A = \begin{bmatrix} 3 & -1 & 1 \\ -1 & 5 & -1 \\ 1 & -1 & 3 \end{bmatrix}$$

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- 18. Apply calculus of residues to show that $\int_{0}^{2\pi} \frac{d\theta}{a+b\cos\theta} = \frac{2\pi}{\sqrt{a^2 b^2}}, a > b > 0$
- 19. Expand the function $f(x) = \sin x$ as a cosine series in the interval $(0, \pi)$.
- 20. Find Fourier cosine transform of the function $f(x) = e^{-x^2}$.

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M.Sc. DEGREE EXAMINATION, APRIL 2023.

First Semester

Physics

Elective – NUMERICAL METHODS

(CBCS – 2017 onwards)

Time : 3 Hours

Maximum : 75 Marks

Part A $(10 \times 2 = 20)$

- 1. An approximate value of Pi is given by $X_1 = \frac{22}{7} = 3.1428571$ and its value is X = 3.1415926. Find the absolute and relative errors.
- 2. What is regression?
- 3. State the order of convergence and convergence condition for Newton-Raphson method.
- 4. Compare Gauss Elimination and Gauss Jordan method.
- 5. Define Linear interpolation.
- 6. Write any two properties of divided difference.
- 7. State Eulers formula.
- 8. State the second order Runge-Kutta algorithm.
- 9. What advantage has Lagrange's formula over Newton?
- 10. State Simpson's one-third rule.

Part B $(5 \times 5 = 25)$

Answer all the questions, choosing either (a) or (b).

- 11. (a) Give the general formula for errors and their types. Or
 - (b) Find the best values of a_0 and $a_{1,}$ if the straight line $y = a_0 + a_1 x$ is fitted to the data (x_i, y_i) (1, 0.6), (2, 2.4), (3, 3.5), (4, 4.8), (5, 5.7) Also find the correlation co-efficient.
- 12. (a) Using Newton Raphson method, find a real root, correct to 3 decimal places, of the equation $\sin x = \frac{x}{2}$ given that the roots lies between $\pi/2$ and π .

Or

(b) Solve the system

6x + y = z = 20x + 4y - z = 6x - y + 5z = 7

By Gauss Seidal method.

13. (a) Using Newton's forward difference formula, find the sum $S_n = 1^3 + 2^3 + 3^3 + \dots + n^3$.

Or

(b) Write a C program for Lagrange Interpolation.

14. (a) Using Euler's method, solve
$$y' = \frac{3}{5}x^3y$$
, $y(0) = 1$.

- Or
- (b) Use the Runge-Kutta Fourth order method to estimate y(0.4). When $y'(x) = x^2 + y^2$ with y(0) = 0. Assume h = 0.2.

- 15. (a) Estimate the value of $\sin \theta$ at $\theta = 38^{\circ}$ using Newton-forward difference formula with the help of the following table.
 - θ 15 20 25 30 35 40

 $\sin\theta \ 0.2588190 \ 0.3420201 \ 0.4226183 \ 0.5 \ 0.5735764 \ 0.6427876$

 \mathbf{Or}

(b) Write a C program to evaluate given integral using Simpson's method.

Part C (3 × 10 = 30)

Answer any **three** questions.

16. Fit a second order polynomial to the data in the table

x	1.0	2.0	3.0	4.0
у	6.0	11.0	18.0	27.0

- 17. Write a C-program for solution of linear equations using simple Gaussian Elimination method.
- 18. The following data gives the melting point of an alloy of lead and zinc. Where t is the temperature in deg -c and p is the percentage of lead in the alloy.

p:	40	50	60	70	80	90	
t:	184	204	226	250	276	304	

using the interpolation in Newton formula find the melting point of the alloy containing 84% of lead.

- 19. Write a 'C' program for solving ordinary differential equation using Runge-Kutta method.
- 20. Compute derivative using Newton's forward and backward difference formulae.

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M.Sc. DEGREE EXAMINATION, APRIL 2023

Second Semester

Physics

SOLID STATE PHYSICS

(CBCS – 2017 Onwards)

Time : 3 Hours

Part A $(10 \times 2 = 20)$

Maximum: 75 Marks

- 1. What is Bravis lattice?
- 2. Define defects and dislocations of crystal.
- 3. What is meant by Phonon momentum?
- 4. Define stiffness constants.
- 5. State ohm's law.
- 6. Mention the order of bandgap for a metal, a semiconductor and an Insulator.
- 7. What is Polarizability?
- 8. Define Quenching.
- 9. What is Coherence length?
- 10. Define Magnons.

Answer **all** questions choosing either (a) or (b).

11. (a) Explain the ZnS Structure with diagram.

 \mathbf{Or}

- (b) Describe the rotating crystal method for diffraction of X-rays.
- 12. (a) Define primitive cell. Explain the Quantization of lattice vibrations.

Or

- (b) Explain Inelastic Scatterings of neutrons and phonons.
- 13. (a) Explain the Energy levels and density of orbital in one dimension.

Or

- (b) Describe the Effective mass and density of status.
- 14. (a) Discuss the theory of Paramagnetism for conduction electrons.

Or

- (b) Explain the different types of polaization mechanisms with neat diagram.
- 15. (a) Derive first and second London equation.

Or

(b) Define Magnetic domains. Explain ferromagnetic on the basis of domain theory.

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Part C $(3 \times 10 = 30)$

Answer any **three** questions.

- 16. Explain the structure of diamond with a neat diagram.
- 17. (a) Describe the lattice thermal conductivity and umklapp processess.
 - (b) Explain the vibrations of mono atomic laltices.
- 18. (a) Explain the effect of temperature on the Fermi-Dirac distribution.
 - (b) Discuss the crystal momentum of an electron energy bands in metals.
- 19. (a) Determine the expression for paramagnetic susceptibility of conduction electrons.
 - (b) Explain the adiabatic demagnetization.
- 20. (a) Explain the experimental and theoritical survey of superconductors.
 - (b) Describe the cryoelectronics.

3

M.Sc. DEGREE EXAMINATION, APRIL 2023

Second Semester

Physics

MATHEMATICAL PHYSICS – II

(CBCS – 2017 onwards)

Time : 3 Hours

Maximum : 75 Marks

Part A $(10 \times 2 = 20)$

- 1. Write down the Laplace transform of F(t) = Sinat.
- 2. Give the boundary value problem of Laplace transform.
- 3. Give the partial differential equation for vibrating string.
- 4. Write a note on separation of values.
- 5. Define summation convention.
- 6. Write an example for metric tensors.
- 7. Define subgroup.
- 8. Give the properties of isomorphism.
- 9. Show that $H_n(-x) = (-1)^n H_n(x)$.
- 10. Write down the generating function for Legendre polynomial.

Answer **all** questions choosing either (a) or (b).

11. (a) Find the Laplace transforms of $Sin\sqrt{t}$.

Or

- (b) Obtain the Laplace transform of $e^{-t} \cos t$.
- 12. (a) Deduce the heat conducting equations using partial differential equations.

 \mathbf{Or}

- (b) Derive the general solution to boundary value problem.
- 13. (a) Describe covariant and Contravariant tensor.

Or

- (b) Show that symmetry properties of a tensor are invariant.
- 14. (a) Elucidate the elementary properties of group.

Or

- (b) Construct the C_{2v} character table.
- 15. (a) Discuss about generating function of hermibe polynomial.

Or

(b) Obtain the Rodigue's formula for Laguerre polynomial.

Part C $(3 \times 10 = 30)$

Answer any three questions.

16. Obtain inverse Laplace transform of $\frac{5S-6}{S^2+9}$.

- 17. Derive the partial differential equation for Longitudinal and transverse vibration of a beam.
- 18. Prove that the Kronecker delta is a mixed tensor of rank two.
- 19. Find all the permutations of four letters a, b, c, d which leave the expression ab + cd invariant.
- 20. Solve the Legendre differential equation and prove that if $P_n(x)$ is a solution of the equation then $P_n(-x) = (-1)^n P_n(x).$

3

M.Sc. DEGREE EXAMINATION, APRIL 2023

Second Semester

Physics

ELECTROMAGNETIC THEORY

(CBCS – 2017 onwards)

Time : 3 Hours

Maximum : 75 Marks

Part A $(10 \times 2 = 20)$

- 1. Define electric field.
- 2. Write down the Poisson and Laplace equation.
- 3. State Biot Savart law.
- 4. Define permeability.
- 5. Define Lorentz gause.
- 6. State poynting theorem.
- 7. State Fresnel's law.
- 8. Define group velocity.
- 9. What is thomson scattering?
- 10. Define dispersion.

Part B $(5 \times 5 = 25)$

Answer **all** questions choosing either (a) or (b).

11. (a) Elucidate the potential of a localized charge distribution.

Or

- (b) Obtain the energy in an electric field.
- 12. (a) Explain the applications of Biot Savart law.

Or

- (b) Discuss the charged particle in the magnetic field.
- 13. (a) Derive the energy in the magnetic field.

Or

- (b) Outline Dirac quantization condition.
- 14. (a) Describe the reflection of electromagnetic waves at a plane interface between dielectric.

Or

- (b) Write a short note on transmission lines.
- 15. (a) Explain the radiation of a localized oscillating source.

Or

(b) Elucidate the dispersion in liquids.

 $\mathbf{2}$

Part C $(3 \times 10 = 30)$

Answer any **three** questions.

- 16. Apply electrostatic boundary conditions to solve boundary value problems in Cartesian coordinates.
- 17. Explain multipole expansion of Vector potential.
- 18. Obtain Maxwell's equations in free space and in linear isotropic media.
- 19. Explain the waves in a dissipative medium.
- 20. Discuss the scattering by a bound electron.

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M.Sc. DEGREE EXAMINATION, APRIL 2023

Second Semester

Physics

QUANTUM MECHANICS – II

(CBCS – 2017 onwards)

Time : 3 Hours

Maximum : 75 Marks

Part A $(10 \times 2 = 20)$

- 1. What do you mean by time dependent perturbation theory?
- 2. Give the conditions for adiabatic approximation.
- 3. Define differential cross section.
- 4. What is Phase shift?
- 5. What are Einstein's coefficients?
- 6. Define density matrix.
- 7. State current density.
- 8. What are negative energy states?
- 9. What is a Lagrangian density?
- 10. What is a number operator?

Answer **all** questions choosing either (a) or (b).

11. (a) State and explain Fermi Golden rule.

Or

- (b) Write a brief note on Adiabatic approximation.
- 12. (a) Derive an expression for differential cross section of a particles by a coulomb potential.

 \mathbf{Or}

- (b) Describe the validity condition for Born approximation.
- 13. (a) Differentiate spontaneous and Induced emission of radiation.

Or

- (b) Write note on Density matrix.
- 14. (a) Describe probability density and current density.

Or

- (b) Show that the Dirac matrices are even dimensional.
- 15. (a) Quantize the electromagnetic field in the absence of the charge and currents. Hence obtain the Hamiltonian density of the field.

Or

(b) Explain anticommutation relations.

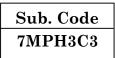
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Part C $(3 \times 10 = 30)$

Answer any **three** questions.

- 16. Discuss the first order time dependent perturbation theory.
- 17. Explain the method of partial waves to calculate the phase shifts and scattering amplitude.
- 18. What are Einstein's A and B coefficients? State the relation between the two.
- 19. Solve the Dirac's equation for a particle in central field force and calculate spin orbit coupling energy.
- 20. Derive classical Lagrangian equation.

3



M.Sc. DEGREE EXAMINATION, APRIL 2023.

Third Semester

Physics

ADVANCED ELECTRONICS

(CBCS – 2017 onwards)

Time : 3 Hours

Maximum : 75 Marks

Part A $(10 \times 2 = 20)$

- 1. Write any two applications of LASER Diode.
- 2. Compare BJT and JEET.
- 3. What is CMMR?
- 4. Mention the concept of virtual ground?
- 5. What is the function of flip flop in an logic circuit?
- 6. How does EPROM retain memory?
- 7. What is the principle of crystal oscillator?
- 8. What is the need of Analog to digital and Digital to analog conversion?
- 9. What is single side band technique?
- 10. Compare Gunn and Tunnel diode.

Answer **all** questions, choosing either (a) or (b).

11. (a) Explain V-I characteristics of varactor diode.

Or

- (b) Describe the action of bipolar junction transistor.
- 12. (a) Give the characteristics of ideal OP-Amp.

Or

- (b) Explain band pass and band reflection fillers.
- 13. (a) Explain the operations of DTL and TTL.

Or

- (b) Write a note on charged coupled devices.
- 14. (a) Give the applications of IC 555 Timer and draw its schematic diagram.

Or

- (b) With suitable diagram explain convention in R-2R Ladder DAC.
- 15. (a) Discuss mathematical representation of frequency modulation.

Or

(b) Write note on magnetron and klystron.

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Part C (3 × 10 = 30)

Answer any **three** questions.

- 16. Explain V-I characteristics of SCR and TRIAC.
- 17. Describe OP-Amp perform as log and Antilog amplifier.
- 18. Describe the operation of RS and JK flip flops.
- 19. With suitable diagram explain the action of dual slope ADC.
- 20. Explain the theory of amplitude modulation and also derive voltage equation of amplitude modulated waves.

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Sub. Code	
7MPHE3A	

M.Sc. DEGREE EXAMINATION, APRIL 2023.

Fourth Semester

Physics

Elective - NANO SCIENCE

(CBCS – 2017 onwards)

Time : 3 Hours

Maximum : 75 Marks

Part A $(10 \times 2 = 20)$

- 1. Define crystal lattice.
- 2. What is the use of the de Broglie wavelength in nanotechnology?
- 3. What do you mean by nanomaterials?
- 4. What are natural nanoparticles?
- 5. Name the different forms of carbons.
- 6. Give any two uses of nanotubes.
- 7. What do you mean by photons?
- 8. What are photonic crystals?
- 9. What are quantum computers?
- 10. What is nanoelectronics?

Answer **all** the questions, choosing either (a) or (b).

11. (a) Discuss the scientific revolutions of nanotechnology.

Or

- (b) Write an account of molecules and phases.
- 12. (a) Describe the working of ball milling technique.

Or

- (b) Discuss the construction and working of electrodeposition.
- 13. (a) List the properties of carbon nanotubes.

Or

- (b) Write five applications of nanotubes.
- 14. (a) Discuss briefly the challenges of nanotechnology.

Or

(b) List out the applications of photonic crystals.

15. (a) Write notes on

- (i) Nanoelectronics.
- (ii) Quantum electronic devices.

Or

(b) Describe micro and nano fabrication technology.

 $\mathbf{2}$

$(3 \times 10 = 30)$

Answer any **three** questions.

- 16. Write short notes on
 - (a) Types of nanotechnology.
 - (b) Surface and dimensional spaces.
- 17. Explain the principle and synthesis of nano particles by sol-gel technique.
- 18. Describe the self-assembled monolayers.
- 19. Explain the two dimensional photonic crystal and the photonic band gap of photonic crystals.
- 20. Discuss about the experimental implementation of quantum computers.

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Sub. Code 7MPHE3B

M.Sc. DEGREE EXAMINATION, APRIL 2023.

Fourth Semester

Physics

Elective - ANALYTICAL INSTRUMENTION

(CBCS – 2017 onwards)

Time : 3 Hours

Maximum : 75 Marks

Part A $(10 \times 2 = 20)$

- 1. State the frequency range of UV-V is spectra.
- 2. Mention use of filters in UV absorption photometry.
- 3. What do you understand by photographic detection?
- 4. Mention the features of FT- Interferometer.
- 5. Expand: ESCA.
- 6. Write the role of SEM.
- 7. What is laser?
- 8. Give example for Laser source.
- 9. What is FES?
- 10. Give any two comparison of FEs and AAs

Answer **all** questions, choosing either (a) or (b).

11. (a) Describe the absorption spectrophotometry.

Or

- (b) Outline the instruments used for absorption photometry.
- 12. (a) Discuss the atomic emission spectrometer.

Or

- (b) Elucidate the features of FT-interferometer.
- 13. (a) Enumerate the X-ray fluorescence Spectrometer.

Or

- (b) Write a short note on sample handling.
- 14. (a) Discuss the principles of NMR.

Or

- (b) Describe the working of SEM.
- 15. (a) Discuss the flame emission spectrometry.

Or

(b) Give brief account on AFS.

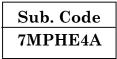
Part C

 $(3 \times 10 = 30)$

Answer any **three** questions.

- 16. Explain the working principle of IR spectrophotometer.
- 17. Describe the photographic and photoelectric detection.
- 18. Discuss the Laser Raman spectrometer.
- 19. Explain the working of continuous wave NMR spectrometer.
- 20. Discuss the atomic absorption spectrometry.

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M.Sc. DEGREE EXAMINATION, APRIL 2023.

Fourth Semester

Physics

Elective – THERMODYNAMICS AND STATISTICAL PHYSICS

(CBCS - 2017 onwards)

Time : 3 Hours

Maximum : 75 Marks

Part A $(10 \times 2 = 20)$

- 1. Define Entropy.
- 2. State second law of thermodynamics.
- 3. What is Transport Phenomena?
- 4. Give the relation between mean free path and absolute temperature.
- 5. Define statistical equilibrium.
- 6. Differentiate micro and macro states.
- 7. Write the expression of Sacker–Tetrode equation.
- 8. What are symmetric and antisymetric wave functions?
- 9. What is meant by Photons?
- 10. Write the special properties of liquid Helium.

Answer **all** questions, choosing either (a) or (b).

11. (a) Derive Vander Waals equation of state.

Or

- (b) Calculate changes the entropy in reversible processes.
- 12. (a) Derive Boltzmann transport equation.

Or

- (b) Write note on Brownian motion.
- 13. (a) State and prove Liouville's theorem.

Or

- (b) Discuss about canonical and grand canonical ensembles.
- 14. (a) Discuss the postulates of Quantum statistical mechanics

Or

- (b) Derive Fermi-Dirac distribution law of statistics.
- 15. (a) Give the properties of ideal fermigas.

Or

(b) State and explain Debye's theory.

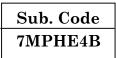
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Part C $(3 \times 10 = 30)$

Answer any **three** questions.

- 16. Derive the relation between Gibbs and Helmholtz functions.
- 17. Define mean free path and show the relation between mean free path and temperature of gas.
- 18. Derive the expression for speeds of molecules from maxwell's distribution law.
- 19. Derive the expression for Bose-Einstein distribution law.
- 20. Discuss about pauli's theory of paramagnetism.

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M.Sc. DEGREE EXAMINATION, APRIL 2023.

Fourth Semester

Physics

Elective - COMMUNICATION ELECTRONICS

(CBCS – 2017 onwards)

Time : 3 Hours

Maximum : 75 Marks

Part A $(10 \times 2 = 20)$

- 1. What is the bandwidth required for an amplitude modulated signal?
- 2. What is radiation resistance?
- 3. Why is ASK called as ON-OFF keying?
- 4. How does data modulation differ from PCM?
- 5. Make a clear distinction between velocity modulation and current modulation.
- 6. What are Gunn domains? How are they found?
- 7. What are the types of linear scattering losses?
- 8. What is meant by dispersion in optical fiber?
- 9. What are the conditions required for an orbit to be Geostationary?
- 10. State the basic constituents of a cellular system.

Answer **all** questions, choosing either (a) or (b).

11. (a) Explain the difference between driven and parasitic elements in an antenna array.

Or

- (b) Write a note on non-resonant antenna.
- 12. (a) Describe the operation frequency shift keying modulation.

Or

- (b) Describe with neat diagram, the operation of a QPSK modulator.
- 13. (a) Describe the reflex klystron oscillator with the aid of a suitable schematic diagram.

 \mathbf{Or}

- (b) Explain the working principle of IMPATT diode.
- 14. (a) Explain the acceptance angle and numerical aperture of an optical fiber and derive expressions for both.

Or

- (b) Explain with neat diagram the elements of an optical fiber transmission link.
- 15. (a) Discuss about frequency allocations for satellite services.

Or

(b) Explain about the handoff and power control.

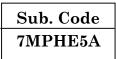
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Part C (3 × 10 = 30)

Answer any **three** questions.

- 16. Discuss the various types on internal noise and external noise in communication system.
- 17. Explain the operation of frequency and time division multiplexing system.
- 18. Draw a functional block diagram of a pulsed radar set, and describe the function of each block.
- 19. What are the losses on signal attenuation mechanisms in a fiber? Explain.
- 20. Elucidate the three basic multiple access methods currently use in cellular systems.

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M.Sc. DEGREE EXAMINATION, APRIL 2023.

Fourth Semester

Physics

Elective – ENERGY AND ENVIRONMENTAL PHYSICS

(CBCS – 2017 onwards)

Time : 3 Hours

Maximum : 75 Marks

Part A $(10 \times 2 = 20)$

- 1. How does pressure vary with height?
- 2. Differentiate weather from climate.
- 3. Name the two instruments used for solar radiation measurement.
- 4. How flat plate solar collectors are divided?
- 5. When does gasification occur?
- 6. Why Biogas is called as Gobar gas?
- 7. How storage of Hydrogen is easier compared to that of gasoline?
- 8. Why Hydrogen is called as a secondary source?
- 9. Name four hazardous air pollutants.
- 10. When land breeze will occur?

Answer **all** questions, choosing either (a) or (b).

11. (a) Brief temperature and density variations with height.

Or

- (b) Explain hydrostatic equilibrium.
- 12. (a) Estimate the daily global radiation on a horizontal surface at Baroda (22°13'N, 73°13'E) during March. If a = 0.28 and b = 0.48 and the average sunshine hours for the day are 9.5.

Or

- (b) Brief the three types of thermal losses in a flat plate collector.
- 13. (a) List the factors affecting biodigestion.

Or

- (b) Describe the advantages and disadvantages of fixed dome plant.
- 14. (a) Mention the various safety factors relevant to use hydrogen as a fuel.

 \mathbf{Or}

- (b) How Hydrogen is used to produce electricity?
- 15. (a) Explain the quality standards of air.

Or

(b) Brief puffs and plumes.

 $\mathbf{2}$

Part C (3 × 10 = 30)

Answer any **three** questions.

- 16. (a) Brief Raynold transport theorem.
 - (b) Explain Green house effect.
- 17. Describe the thermal analysis of a flat plate collector.
- 18. Give an account on photosynthesis.
- 19. Write a note on Hybrid batteries.
- 20. Brief purification and control devices of air pollution.

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Sub. Code	
7MPHE5B	

M.Sc. DEGREE EXAMINATION, APRIL 2023.

Fourth Semester

Physics

Elective - MEDICAL PHYSICS

(CBCS – 2017 onwards)

Time : 3 Hours

Maximum : 75 Marks

Part A $(10 \times 2 = 20)$

- 1. What is an Alveoli?
- 2. Expand ERG and EOG.
- 3. What is meant by percussion effect?
- 4. What is meant by deafness? Why does it occur?
- 5. What is ultraviolet light?
- 6. Why vision is colour? Name the elements corresponding to that.
- 7. What is the use of fluoroscopy?
- 8. Define Red and gray.
- 9. What is meant by heart sounds?
- 10. Where defibrillators are useful?

Part B

 $(5 \times 5 = 25)$

Answer **all** the questions, choosing either (a) or (b).

11. (a) Brief the physics of some common lung diseases.

Or

- (b) Explain the electric signals from heart.
- 12. (a) List the general properties of sound.

Or

(b) Describe sensitivity of the ears.

13. (a) How infrared light is useful in medicine?

Or

- (b) Brief the role of retina in vision.
- 14. (a) How the live X-ray in ages are produced?

Or

- (b) Brief the principles of radiation therapy.
- 15. (a) Write a note on cardiovascular diseases.

Or

(b) Describe Bernoulli's principle.

Part C

 $(3 \times 10 = 30)$

Answer any three questions.

16. Write a note on

- (a) Magneto cardiogram.
- (b) Magneto Encephalogram.

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- 17. Brief
 - (a) Stethoscope.
 - (b) Hearing aids.
- 18. Explain the role of LASER in medicine and list the applications of microscopes in medicine.

19. Describe

- (a) X-ray production.
- (b) Absorption of X-rays.
- 20. Explain the measurement of blood pressure.

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