S–4027	Sub. Code
	23MPH1C1

M.Sc. DEGREE EXAMINATION, NOVEMBER 2024

First Semester

Physics

MATHEMATICAL PHYSICS

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

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

Answer **all** questions.

1. What is meant by Notation?
2. Define vector space.
3. Give any two types of complex variables.
4. Define differentiability.
5. Write the rank of matrix.
6. Define Unitary Matrices.
7. What do you mean by Laplace transform?
8. Find the Laplace transform of e^{at}.
9. What do you mean by degree of differential equation?
10. Write a general function equation of legendre polynomials.

Section B (5 × 5 = 25)

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

11. (a) Explain briefly linear vector space.

Or

(b) Derive and explain the direct sum and invariant subspace.

12. (a) Explain and derive the de-Moivre's theorem.

Or

(b) Derive and explain Cauchy's-Riemann condition.

13. (a) Show that $A\begin{bmatrix} \frac{1}{\sqrt{2}} & \frac{i}{\sqrt{2}} \\ \frac{-i}{\sqrt{2}} & \frac{-1}{\sqrt{2}} \end{bmatrix}$ is a unitary matrix.

Or

(b) Find characteristic equation of the matrix $A = \begin{bmatrix} 2 & -1 & -1 \\ -1 & 2 & -1 \\ 1 & -1 & 2 \end{bmatrix}$.

14. (a) Find the Fourier transform of $f(x) = \begin{cases} x; & |x| \le a \\ 0; & |x| > a \end{cases}$.

Or

(b) Define Laplace transform. If $\{f(t)\} = f(s)$, then prove that $L\{F'(t)\} = Sf(s) - F(0)$.

15. (a) Explain in detail Reciprocity theorem.

Or

(b) Prove that $P_n'(1) = \frac{1}{2} n(n+1)$.

Section C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Explain in detail orthogonal transformation and notation.

17. Explain Residue theorem and its applications.

18. Determine the eigen values and eigen vectors of the matrix $A = \begin{bmatrix} 5 & 4 \\ 1 & 2 \end{bmatrix}$.

19. Explain briefly Sturm-Liouville's theorem.

20. Define Fourier transform. Find the function of sine and cosine transforms of $f(x)$ where, $f(x) = \begin{cases} 1 & 0 \le x < 1 \\ 0 & x > 1 \end{cases}$.

S–4028

Sub. Code
23MPH1C2

M.Sc. DEGREE EXAMINATION, NOVEMBER 2024

First Semester

Physics

CLASSICAL MECHANICS AND RELATIVITY

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. What are constraints?

2. What are the generalized coordinates?

3. State the principle of virtual work.

4. What do you understand by conservative system?

5. What is phase space?

6. State Hamilton's principle.

7. Define normal modes of frequency.

8. When is a system said to be under stable equilibrium?

9. Compare inertial and non–intertial frames.

10. What is meant by time dilation?

Part B (5 × 5 = 25)

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

11. (a) Explain in detail the transformation equations.

Or

(b) Discuss briefly conservation laws for a system of particles.

12. (a) Using Lagrangian equation of motion solve the problem of simple pendulum.

Or

(b) Obtain the equation of motion of an Atwoods machines.

13. (a) Obtain Hamilton's equations from the Hamiltonian function.

Or

(b) Apply Hamiltonian equation of motion to solve the problem of one dimensional harmonic oscillator.

14. (a) Obtain the equation of motion of the parallel pendulum.

Or

(b) Explain in detail general theory of small oscillations.

15. (a) Derive Einstein mass–energy relation.

Or

(b) Write a short note on Four vector system.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. What is meant by configuration space? How is this concept used to describe the motion of a system of particles?

17. Derive Lagrange's equations of motion from D'Alembert's principle.

18. Formulate the problem of simple pendulum and hence derive equation of motion of a simple pendulum by applying Hamilton equation of motion.

19. Obtain normal frequencies and normal modes of linear Triatomic molecules.

20. Derive Lorentz Transformation equations.

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S–4029

Sub. Code
23MPH1E1

M.Sc. DEGREE EXAMINATION, NOVEMBER 2024.

First Semester

Physics

Elective – LINEAR AND DIGITAL IC'S AND APPLICATIONS

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

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

Answer **all** questions.

1. Define integrated circuits.

2. Draw the diagram of IC 741.

3. Write the types of multivibrator.

4. What is log amplifier?

5. Define detector.

6. What is meant by band pass filter?

7. What do you mean by regulator?

8. Define convertors.

9. Draw the diagram of basic transistors?

10. Give truth table and draw the diagram of NOR gate.

Part B (5 × 5 = 25)

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

11. (a) Draw the circuit diagram and explain the Non inverting Op-AMP.

Or

(b) Explain summing amplifier with its circuit?

12. (a) Draw the diagram and explain instrumentation amplifier.

Or

(b) Write short notes on a stable multivibrators with neat diagram.

13. (a) Define filter and explain butter worth filters.

Or

(b) Describe the voltage controlled oscillator.

14. (a) Describe the IC voltage regulator.

Or

(b) Explain the weighted resistor DAC with neat circuit.

15. (a) Explain and draw MOs transistors.

Or

(b) Describe the working of AND-OR invert gate.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Explain in detail about the working of integrated circuits.

17. What is OP-AMP? and explain any two applications of it.

18. Explain the monolithic PLL and it's applications.

19. Explain following

    (a) R-2R ladder

    (b) Inverted R-2R and D to A convertor

20. Draw the diagram of NAND and NOR gate. Discuss NAND and NOR as universal gate with true table.

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S–4030

Sub. Code
23MPH1E2

M.Sc. DEGREE EXAMINATION, NOVEMBER 2024

First Semester

Physics

Elective – ENERGY PHYSICS

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. What are the main types of ocean energy?
2. Can ocean energy by used for electricity generation?
3. Define Nuclear energy?
4. What is meant by chemical energy?
5. What are the advantages of wind energy?
6. Can wind energy be stored for laser use?
7. What is meant by solar distillation?
8. Write down solar cell parameters.
9. Define online seminar?
10. What is meant by bio–gas?

Part B (5 × 5 = 25)

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

11. (a) What are renewable energy sources, and how do they differ from fossil fuels?

Or

(b) What are the environmental impacts associated different energy sources.

12. (a) Explain the concept of ocean thermal energy conversion.

Or

(b) Explain briefly tidal power energy?

13. (a) Write a short notes on wind turbines.

Or

(b) Write down the application of wind energy.

14. (a) Discuss mechanism involved solar energy harnessing.

Or

(b) Discuss environmental benefits of solar energy.

15. (a) Explain bio–gas generation.

Or

(b) Write down application of fuel cell?

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Explain briefly conventional energy sources.

17. Write a short notes on

    (a) Thermal energy

    (b) Tidal power

    (c) Energy utilisation.

18. Write down advantages and disadvantages of wind energy?

19. Write down properties biogas.

20. Write down application of solar pond and its applications.

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S–4031	Sub. Code
	23MPH2C1

M.Sc. DEGREE EXAMINATION, NOVEMBER 2024.

Second Semester

Physics

STATISTICAL MECHANICS

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

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

Answer **all** questions.

1. What is meant by phase Equilibrium?

2. State-Third law of Thermodynamics.

3. Give any three Fundamental postulates of statistical mechanics.

4. What is the system?

5. Give any three examples of statistical quantities.

6. Write a note on partition function.

7. Define – Degeneracy.

8. How are distinguish classical and quantum statistics?

9. State – virial co-efficient.

10. Write the exact solutions in one dimension?

Part B (5 × 5 = 25)

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

11. (a) Prove – Gibb's phase rule.

Or

(b) What is Landau's theory? Give its importance.

12. (a) Write down phase-space.

Or

(b) What do you understand by specification of state of a system?

13. (a) Explain the Grand canonical ensemble.

Or

(b) State and explain partition function.

14. (a) Discuss about comparison of three distribution laws.

Or

(b) How to compare Ideal Fermi gas and Ideal Bose gas.

15. (a) What is the significant of dissipation theorem?

Or

(b) Mention any four features of Brownion motion.

Part C (3 × 10 = 30)

Answer any **three** questions.

16. What are thermodynamic potentials? Deduce from them there maxwell's thermodynamic relations.

17. Discuss the entropy of an ideal gas using the micro canonical ensemble.

18. Explain and distinguish between the following terms. Canonical and grand canonical ensembles.

19. Derive expression for Fermi – Dirac statistics.

20. Explain – the Fokker – Plank equations.

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S–4032	Sub. Code
	23MPH2C2

M.Sc. DEGREE EXAMINATION, NOVEMBER 2024.

Second Semester

Physics

QUANTUM MECHANICS – I

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

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

Answer **all** questions.

1. Give the Eigen functions and Eigen values?

2. Define – Ehrenfest's theorem.

3. Mention the significant properties of unitary transformation?

4. Condition for square well potential barrier?

5. Find the value of maximum probability density of a harmonic oscillator in the ground state?

6. What is zero point energy of the harmonic oscillator?

7. What do you understand by parity?

8. What are continues symmetries and discrete symmetries?

9. Fine clebsch Gorden coefficients?

10. What are ladder operators? Why are they called so?

Part B (5 × 5 = 25)

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

11. (a) Obtain time independent schrodinger wave equation.

Or

(b) Postulates of Quantum mechanics write it self.

12. (a) Explain Bloch wave in a periodic potential.

Or

(b) Prove that kronig-penny square well periodic potential.

13. (a) Discuss the schrodinger picture.

Or

(b) Explain unitary transformation.

14. (a) Briefly note on stark effect in hydrogen atom.

Or

(b) Application of simple harmonic oscillator. Explain.

15. (a) Explain Eigen value spectrum of general angular momentum.

Or

(b) Explain spin angular momentum.

Part C (3 × 10 = 30)

Answer any **three** questions.

16. State and prove that Ehrenfest's theorem.

17. Explain

(a) Square well potential with rigid walls

(b) Square well potential with finite walls.

18. Obtain the equation of WKB approximation and WKB quantization.

19. Explain symmetry transformations and briefly discuss how it accounts for conservation laws.

20. Obtain the clebsh–Gorden coefficients for a system having $j_i = 1/2$ and $j_2 = 1$.

S–4034	Sub. Code
	23MPH2E2

M.Sc. DEGREE EXAMINATION, NOVEMBER 2024.

Second Semester

Physics

Elective – ADVANCED OPTICS

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

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

Answer **all** questions.

1. What do you understand by the term polarisation of light?

2. State Brewster's law.

3. What is population inversion?

4. Give the applications of LASER.

5. What is meant by total internal reflection?

6. Define single mode in Fiber optics.

7. What is meant by parametric oscillation?

8. What is meant by self – focussing of light?

9. Define pockels electro optic effect.

10. What is meant by voigt effect?

Part B (5 × 5 = 25)

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

11. (a) State and explain Malus law.

Or

(b) Give the construction and the theory of quarter wave plate and half wave plate.

12. (a) Explain with neat diagram absorption, spontaneous emission and stimulated emission of radiation.

Or

(b) Describe the working of solid state Ruby laser.

13. (a) Write detailed note on multimode in optical fiber.

Or

(b) What is dispersion in optical fiber? Explain its types.

14. (a) Give the basic principles of Harmonic generation.

Or

(b) Distinguish between second and third harmonic generations.

15. (a) State and explain cotton – mouton effect.

Or

(b) Give the theory of zeeman effect and Inverse zeeman effect.

Part C (3 × 10 = 30)

Answer any **three** questions.

16. Describe in brief the phenomenon of birefringence and Huygens's theory of double refraction.

17. Explain the principle and working of a He-Ne laser.

18. Explain the principle and working of fiber optic sensors.

19. Derive third Harmonic generation in non-linear optics.

20. What is Fara day effect? Describe with a suitable neat diagram, an experiment to demonstrate it.

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S–4035	Sub. Code
	23MPH2E3

M.Sc. DEGREE EXAMINATION, NOVEMBER 2024

Second Semester

Physics

Elective — MICROPROCESSOR 8085 AND MICROCONTROLLER 8051

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. Draw Pin diagram of PPI.
2. Define - instruction.
3. What is D/A converter?
4. What are the need for interfacing?
5. Show how the parts and the circuits can be initialized using the control register.
6. What is the function of port 3 in 8051 microcontroller?
7. Write data exchange instruction.
8. What do you understand by nested subroutines?
9. Define - Nested interrupts.
10. Give any three applications of A/D converter.

Part B (5 × 5 = 25)

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

11. (a) Classify the instructions of 8085 microprocessor.

Or

(b) Explain - control word.

12. (a) Distinguish between measurement of electrical and physical quantities.

Or

(b) Write a program to convert a BCD number to its 7-segment code for a common display.

13. (a) Design an OUTPUT port of 8051 microcontroller.

Or

(b) Discuss internal RAM structure of microcontroller.

14. (a) Explain - Instruction cycle.

Or

(b) Explain POP and PUSH instructions, with its examples.

15. (a) Write a program to illustrate the LED interfaces display for binary data.

Or

(b) Explain any one A/D converter.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Explain the different operating modes of 8255.

17. Write an assembly language program to interface stepper motor with 8085.

18. Draw that internal block diagram of 8051 and explain it's features.

19. Discuss the addressing modes in 8051 and give two examples for each mode.

20. Explain the difference between hardware interrupt and software interrupt.

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S–4037

Sub. Code
23MPH2S1

M.Sc. DEGREE EXAMINATION, NOVEMBER 2024

Second Semester

Physics

SOLAR ENERGY UTILIZATION

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. Define conduction.
2. Define solar constant.
3. What is solar collector?
4. General characteristics of solar collectors.
5. Write some notes on solar ponds.
6. Some discuss on solar cooling systems?
7. What is principle of photo voltaic?
8. Define diffusion.
9. What is nanomaterials?
10. Define electrolytes.

Part B (5 × 5 = 25)

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

11. (a) Explain solar radiation at the earth surface.

Or

(b) Determination of solar time.

12. (a) Explain physical principles of conversion of solar radiation into that flat collectors.

Or

(b) Briefly note on focussing collector systems.

13. (a) Explain type of solar water heater.

Or

(b) Explain types of collectors and storage tanks.

14. (a) Explain types of solar cells.

Or

(b) Briefly note on texturization .

15. (a) Some note on high and low temperature fuel cells.

Or

(b) Uses of nanostructures and nanomaterial in fuel cell technology.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Explanation of how to working solar energy measuring instruments.

17. Explain

    (a) General characteristics of solar collector.

    (b) Thermal performance evaluation of optical loss.

18. Explain solar cooling systems.

19. Explain

    (a) Crystalline silicon/amorphous silicon and

    (b) Thermo electric conversion.

20. Application of Nanomaterials in fuel cell.

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S–4038

Sub. Code
23MPH3C1

M.Sc DEGREE EXAMINATION, NOVEMBER 2024

Third Semester

Physics

QUANTUM MECHANICS-II

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

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

Answer **all** questions

1. Define Scattering cross section.
2. Write the validity of Born approximation.
3. Define transition probability.
4. Write down the selection rule for dipole transition.
5. Define D'Alembertian operator.
6. What is the relativistic energy of a free particle?
7. Why are four vectors needed in the Dirac equation?
8. Define Bilinear covariant in quantum field.
9. What do you understand by classical field?
10. Write a short note on annihilation operation of photons.

Part B (5 × 5 = 25)

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

11. (a) Discuss the scattering of a particle +Ze by a screened coulomb potential.

Or

(b) Explain in detail about the scattering length and effective range theory for S wave.

12. (a) Discuss the adiabatic approximation in perturbation.

Or

(b) Derive Fermi's Golden rule for first order transition probability.

13. (a) Give a Simple derivation of Klein-Gorden equation.

Or

(b) Discuss the various interpretation of Negative energy states.

14. (a) Obtain an expression for Dirac equation in covariant form.

Or

(b) Explain about the Traces of Gamma matrices.

15. (a) Discuss the Hamiltonian formulation of classical field.

Or

(b) State and Prove Noether's theorem.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Using Born approximation obtain an expression for differential cross section for a screened Coulomb's field.

17. Establish the relation between the various Einstein coefficients following semiclassical treatment.

18. Write down Dirac equation and obtain an expression for plane wave solution.

19. Discuss the relativistic invariance of Dirac equation.

20. Derive an expression for Euler-Lagrangian equation for classical field.

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S–4039

Sub. Code
23MPH3C2

M.Sc. DEGREE EXAMINATION, NOVEMBER 2024

Third Semester

Physics

NUMERICAL METHODS AND COMPUTER PROGRAMMING

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

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

Answer **all** questions.

1. What is the rate of convergent and convergent condition in Newton Raphson method?

2. Give an example of transcendental and algebraic equation.

3. Explain the term pivoting.

4. Write the procedure involved in Gauss Jordan method.

5. What is meant by interpolation?

6. What is the assumption we make when Lagrange's formula is used?

7. Define Numerical differentiation.

8. What are the distinguishable properties of Runge-Kutta Method?

9. Define Built in Function in C.

10. What is subroutine in C with suitable example?

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

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

11. (a) Find the number of real and complex roots of the polynomial $P_4(x) = x^4 - 4x^3 + 3x^2 + 4x - 4$.

Or

(b) If $x^2 - e^{-x} = 0$, find the real root by Newton-Raphson method.

12. (a) Show that the matrix $\begin{bmatrix} 12 & 4 & -1 \\ 4 & 7 & 1 \\ -1 & 1 & 6 \end{bmatrix}$ is positive definite.

Or

(b) Find the inverse of the matrix $A = \begin{bmatrix} 1 & 1 \\ 1 & 2 \end{bmatrix}$.

13. (a) Explain Interpolation with suitable example.

Or

(b) Find the Polynomial using Newton's forward interpolation formula and also find $y(4)$ given that

x:	0	1	2	3
y:	1	2	1	10

14. (a) Find the approximate value of $I = \int_0^1 \frac{dx}{1+x}$ using (i) Trapezoidal rule and (ii) Simpson's rule.

Or

(b) Evaluate $\int_0^\infty (3x^3 - 5x + 1)e^{-x} dx$, using the Gauss-Leguerre two-point formula.

15. (a) Discuss about programming outline and flowchart in C-Programming.

Or

(b) Write a C program for Trapezoidal rule to find numerical integration.

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

Answer any **three** questions.

16. Perform three iteration of the Newton-Raphson method to solve the system of equations $x^2 + xy + y^2 = 7$, $x^3 + y^3 = 9$.

17. Examine the inverse of the Matrix $\begin{bmatrix} 1 & 2 & -1 \\ 4 & 1 & 0 \\ 2 & -1 & 3 \end{bmatrix}$ using Gauss Jordan Method.

18. Given $f(x) = 4$, $f(2.5) = 5.5$. Find the linear interpolating polynomial using (a) Lagrange interpolation and (b) Newton's divide difference interpolation. Hence find an approximate value of $f(2.2)$.

19. Evaluate the integral $I = \int_{1}^{2} \frac{2xdx}{1+x^4}$ using the Gauss-Legendre 1-point, 2-point and 3-point quadrature rules. Compare with exact solution $I = \tan^{-1}(4) - \left(\frac{\pi}{a}\right)$.

20. Write a program to implement Bisection method for finding real roots of nonlinear equation.

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S–4040

Sub. Code
23MPH3C3

M.Sc. DEGREE EXAMINATION, NOVEMBER 2024

Third Semester

Physics

ELECTROMAGNETIC THEORY

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** the questions

1. What is an electrostatic energy?
2. Define Brewster's law.
3. Define magnetostatics. Give an example of magnetostatic boundary conditions.
4. State the ampere's circuit law.
5. State the faraday's law of induction.
6. What is coulomb gauge?
7. What do you mean by circular polarization.
8. Define wave-guide. Mention the characteristics and its type.
9. Define pinch effect.
10. Write about the plasma oscillation.

Part B (5 × 5 = 25)

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

11. (a) Write an example of solutions for boundary value problem.

Or

(b) Derive an expression for the relation between molecular polarizability and electric susceptibility.

12. (a) State and explain the Biot-Savart's law.

Or

(b) Discuss the solution of a boundary value problem of uniformly magnetized.

13. (a) Deduce the expression of Maxwell's displacement current by Maxwell's equation.

Or

(b) Derive an expression of Lorentz and coulomb gauges.

14. (a) Discuss the plane waves in a non-conducting media.

Or

(b) Explain the oscillating electric dipole.

15. (a) Derive an expression for plasma frequency in an electron plasma oscillation.

Or

(b) Explain the Alfven waves and magnetosonic waves.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Derive the equation of electrostatic energy in the presence of dielectric.

17. Discus the magnetic induction and magnetic field in macroscopic media.

18. Determine the equation of conservation of energy and momentum for a system of charged particle and electromagnetic fields.

19. Explain the wave guide. Discuss the transverse electric wave propagation in a rectangular wave guide.

20. What is plasma confinement? Elaborate the plasma as a conducting fluid by magneto hydrodynamics phenomenon.

S–4041

Sub. Code
23MPH3E1

M.Sc. DEGREE EXAMINATION, NOVEMBER 2024

Third Semester

Physics

Elective — PHYSICS OF NANOSCIENCE AND TECHNOLOGY

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

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

Answer **all** questions.

1. Mention some effects of size reduction of nano particles.

2. What are nanomaterials?

3. What is lattice constant?

4. Define conductivity.

5. Write the principle of electrospinning method.

6. What are the advantages of sol-gel process?

7. What are advantages of electron microscope?

8. What is luminescence?

9. State the application of nanoparticles in biology.

10. What is GMR?

Part B (5 × 5 = 25)

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

11. (a) List the difference between quantum wire and quantum well.

Or

(b) List the factors responsible for change of properties of nanoscale material from bulk material.

12. (a) Write a note on surface plasmon resonance.

Or

(b) Explain diluted magnetic semiconductor.

13. (a) Explain the ball milling technique for synthesis of nanomaterial.

Or

(b) Write a short note on nanomanipulator.

14. (a) Explain the sampling depth in XPS.

Or

(b) Write a note on field emission gun.

15. (a) Write a note on fuel cells.

Or

(b) Explain the process of air purification.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Describe about 1D, 2D and 3D nanostructured materials.

17. Explain in detail electrical and magnetic properties of nanostructured materials.

18. Describe the principle and experimental set up of electrochemical deposition method.

19. What is X-ray? Explain the principle and working of X-ray diffractometer.

20. Discuss in detail about bio-imaging using nanoparticles with neat sketch.

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S–4043

Sub. Code
23MPH3S1

M.Sc. DEGREE EXAMINATION, NOVEMBER 2024

Third Semester

Physics

SOLID WASTE MANAGEMENT

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** the questions

1. Define solid waste management.
2. What is called resource recovery?
3. Define moisture content.
4. Define compressibility of solid waste management.
5. Write the modes of operation in solid waste collection?
6. List the advantages of landfills.
7. List out the environmental effect caused due solid waste.
8. How environmental impact effects on market?
9. What is the purpose of industrial visit?
10. What are methods used for data analysis?

Part B (5 × 5 = 25)

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

11. (a) Write a note on hazardous wastes.

Or

(b) Explain the renewal act of solid waste management.

12. (a) Draw and explain hierarchy of municipal solid waste management.

Or

(b) Give the physical characteristics of solid waste.

13. (a) Write a note on problem occurs in transportation of solid waste.

Or

(b) What are the favorable conditions for composting? Explain.

14. (a) Write a note on climate change linked with solid waste.

Or

(b) Briefly explain the zonation of marine.

15. (a) Write a note on solid waste management industrial visit.

Or

(b) How do you make presentation about SWH analysis?

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Explain the functional elements in solid waste management.

17. Discuss the factors affecting generation of solid waste.

18. Explain the factors to be considered in selecting solid waste collection equipment?

19. Explain the various view and ancient agenda for environmental protection.

20. Explain the various methods and tools used for SWM data collection.

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