S–7537

Sub. Code
22MPH1C3

M.Sc. DEGREE EXAMINATION, APRIL 2025

First Semester

Physics

ELECTRONICS AND COMMUNICATION

(CBCS – 2022 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. What is Zener Breakdown?

2. What are holding current and Holding Voltage?

3. Write the important parameters of Op-Amp.

4. What is Strain Gauge?

5. Define Resolution and Accuracy in A/D Converter

6. Give the Principle of Capacitive Transducer.

7. Define Amplitude modulation.

8. Define Quantization.

9. What is an optical detector?

10. Write the Components of Satellite System.

Part B

$(5 \times 5 = 25)$

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

11. (a) Explain the construction and working of a TRIAC.

Or

(b) Explain Monolithic Fabrication Process.

12. (a) Draw the Circuit of an Op-Amp used in the integrator. Explain its working.

Or

(b) Briefly Explain frequency doubling.

13. (a) Define and describe pulse position modulation and draw the waveform.

Or

(b) Briefly explain Frequency shift keying.

14. (a) Explain the construction and Operation Principle of Inductive Transducer.

Or

(b) Describe Photo Voltaic Transducer.

15. (a) Describe the function of telemetry.

Or

(b) Explain about CDMA with a neat block diagram.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Explain the working Principle of UJT with Characteristics.

17. Explain with circuit the working of a 4 Bit R-2R ladder D/A Converter. Give the necessary theory.

18. Explain construction and working of Thermistor.

19. Explain Phase shift keying.

20. Explain optical fiber communication system with Block Diagram.

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S–7539

Sub. Code
22 MPH 2C2

M.Sc. DEGREE EXAMINATION, APRIL 2025

Second Semester

Physics

QUANTUM MECHANICS - I

(CBCS – 2022 onwards)

Time : Three Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. State principle of super position.

2. Define-wave function.

3. What is linear vector space?

4. State Schwantz inequaity.

5. What is delta function?

6. Define-square well potential.

7. Define-spherical symmetric potential.

8. What is free particle?

9. What is Pauli principle?

10. What is meant by spin function?

Part B (5 × 5 = 25)

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

11. (a) Discuss about wave nature of particle.

Or

(b) Write short note on wave packet.

12. (a) Explain about linear operator.

Or

(b) Discuss about General uncertainty relation.

13. (a) Discuss about alpha emission.

Or

(b) Explain about Blockwaves in Periodic Potential.

14. (a) Discuss about Hydrogen orbitals.

Or

(b) Write short note on unitary transformation.

15. (a) Discuss about Pauli spin matrix.

Or

(b) Explain about Central Field Approximations.

Part C (3 × 10 = 30)

Answer any **three** questions.

16. Explain about Expectation Value and Eirentest's theorem.

17. Derive an Equation of motion of Schrodinger representation.

18. Discuss about Kronig-Penny Square well periodic potentials.

19. Explain about three dimensional square well potential.

20. Derive Hastree Fock equation.

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S–7541

Sub. Code
22 MPH 2E1

M.Sc. DEGREE EXAMINATION, APRIL 2025

Second Semester

Physics

Elective : MICROPROCESSOR AND MICRO CONTROLLER

(CBCS – 2022 onwards)

Time : Three Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. What is the role of ALU in 8085 Microprocessor?

2. Write an example of an ADD Instruction.

3. Define Memory interfacing.

4. What is the function of stepper motor interface?

5. How much program memory does the 8051 micro - Controller have?

6. Define micro controller.

7. List out some compare instruction of 8051.

8. Define addressing modes of 8051.

9. What is a PIC Micro Controller?

10. List the types of Embedder Operating System.

Part B (5 × 5 = 25)

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

11. (a) Draw and Explain the Pin diagram of the 8085.

Or

(b) Write an assembly language program to add and subtract two 8 bit numbers in the 8085.

12. (a) Explain the modes of operation in 8255.

Or

(b) Differentiate between memory mapped I/O and I/O mapped I/O scheme.

13. (a) Explain the internal and External memory structure of the 8051 micro controller.

Or

(b) How does the serial communication work in the 8051 micro controller.

14. (a) Explain any Five Data transfer instruction with an example.

Or

(b) Explain addressing modes of 8051 micro controller.

15. (a) Explain the flash program memory in PIC micro controller.

Or

(b) List the features of PIC Micro controller.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Explain the architecture of the 8085 micro processor, highlighting the Function of block.

17. Explain the operation of 8251 USART in asynchronous mode with neat sketch.

18. Explain the Memory Organization of 8051 micro controller.

19. Write an assembly language program in 8051 to find biggest number in an array.

20. Discuss the role of embedded systems in real time applications.

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S–7543

Sub. Code
22MPH3C3

M.Sc. DEGREE EXAMINATION, APRIL 2025

Third Semester

Physics

ELECTROMAGNETIC THEORY

(CBCS – 2022 onwards)

Time : 3 Hours Maximum : 75 Marks

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

Answer **all** questions.

1. Define polarization.

2. Write Poissons equation in cylindrical coordinates.

3. State Biot-Savart Law.

4. Give the physical significance of Divergence.

5. Define poynting vector.

6. Define Lenz's law.

7. What is lossy dielectric medium?

8. Write down the wave equation for E and H in free space.

9. Define the excitation of cavities.

10. What is Thomson's scattering?

Part B (5 × 5 = 25)

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

11. (a) List out the properties of dielectric materials.

Or

(b) Derive the expression for energy of a continuous charge distribution.

12. (a) Differentiate Magnetic vector potential and magnetic scalar potential.

Or

(b) Derive the expression for magnetic flux density due to the solenoid.

13. (a) Write a short notes on Faradays law of electromagnetic induction.

Or

(b) Explain poynting theorem.

14. (a) Write a note on polarization of EM waves.

Or

(b) Differentiate normal and oblique incidence.

15. (a) Write a note on cavity resonator.

Or

(b) Write a note on Rayleigh scattering.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Explain the method of electrical images with an illustration.

17. State and explain Ampere's circuital law.

18. Derive Maxwell's equations in differential and Integral forms.

19. Explain the propagation of EM waves in free space.

20. Discuss about the dispersion phenomenon in gases giving appropriate examples.

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S–7544

Sub. Code
22MPH4C1

M.Sc. DEGREE EXAMINATION, APRIL 2025

Fourth Semester

Physics

THERMODYNAMICS AND STATISTICAL PHYSICS

(CBCS – 2022 onwards)

Time : 3 Hours Maximum : 75 Marks

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

Answer **all** questions.

1. State Zeroth law of thermodynamics.

2. What is reversible process?

3. What is mean free path in kinetic theory.

4. How does diffusion occur in gases?

5. How does the number of microstates relate to the entropy of a system?

6. What is micro canonical ensemble?

7. Define Bose-Einstein condensation.

8. What is ideal gas?

9. What is liquifaction of gases?

10. What is degrees of freedom?

Part B (5 × 5 = 25)

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

11. (a) Explain Clausius Clayperon equation.

Or

(b) Write the expression for Helmholtz and Gibbs free energy and explain.

12. (a) Explain the Boltzmann Transport equation and discuss its validity.

Or

(b) Explain the concept of transport phenomena and discuss the main types of transport in fluids.

13. (a) Explain the concepts of microstate and macrostate.

Or

(b) State and explain the principle of equipartition of energy.

14. (a) Derive the Bose Einstein statistics.

Or

(b) Brief account of Sackur-Tetrode equation.

15. (a) Explain the liquifaction of gases - Alir Linde's process.

Or

(b) Explain Landau's diamagnetism.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Explain the phase transitions of I and II orders.

17. Explain Maxwell Boltzmann distribution of velocities.

18. Compare micro canonical, canonical and grand canonical ensembles.

19. Discuss the Bose Einstein statistics.

20. Explain Einstein theory of specific heat of solids.

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