2024
M.Sc.
Fourth Semester
CORE – 12
PHYSICS
Course Code: MPHC 4.21
(Experimental Methods)

Total Mark: 70   *Pass Mark: 28*
Time: 3 hours

Answer <u>five</u> *questions, taking* <u>one</u> *from each unit.*

UNIT–I

1. (a) Discuss the various types of errors in instrumental observation.   6
   (b) Write a short note on Gaussian distribution.   4
   (c) Distinguish between significant figures and uncertainty analysis.   4

2. (a) What are signals and systems? Discuss the transfer of function and frequency response for first order system.   2+3+3=8
   (b) Explain fluctuation and inherent fluctuation.   3+3=6

UNIT–II

3. (a) Describe the various types of safety grounding.   6
   (b) Write a short note on electromagnetic interference.   4
   (c) Distinguish between thermal and mechanical system.   2+2=4

4. (a) Explain static and dynamic characteristics of measurement system.   6
   (b) Write short note on generalized performance system.   4
   (c) Distinguish between linear and calibration system.   2+2=4

UNIT–III

5. (a) With proper diagram, discuss the working principle of RTD.   6
   (b) Write short notes on the following: 3×2=6
      (i) AD590   (ii) LM35
   (c) What is piezoelectric?   2

6. (a) Draw a block diagram of scintillation detector and explain its
       working principle. 6
   (b) Write a short note on LVDT. 4
   (c) Distinguish between transducer and sensors. 4

UNIT–IV

7. (a) Draw a block diagram of CRO and explain the working operation. 6
   (b) Write a short note on digital multimeter. 4
   (c) Distinguish between accuracy and resolution of measurement. 4

8. (a) With a proper electrical circuit explain Q-meter and the working
       operation. 6
   (b) Write a short note on digital LCR bridge. 4
   (c) Distinguish between impedance and inductances. 4

UNIT–V

9. (a) Draw a block diagram of diffusion pump and explain the working
       principle. 6
   (b) Write a short note on Pirani pressure gauge. 4
   (c) State and explain the Charles and Boyle's law of gases. 2+2=4

10. (a) Draw a block diagram of turbo modular pump and explain the
        working operation. 6
    (b) Write a short note on ionization pressure gauge. 4
    (c) Explain pumping speed of a vacuum system. 4

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