

Duration: 2:30 Hrs.

N.B: (1) All questions are compulsory.

(2) Figures to the right indicate maximum marks.

(3) Use of non-programmable calculators is permitted.

(4) Symbols used have their usual meaning

- Q1. A) Attempt any ONE (08)
- (A) In a box of switches it is known 10% of the switches are faulty. A technician is wiring 30 circuits, each of which needs one switch. What is the probability that
 - All thirty works,
 - at most 2 of the circuits do not work?
 - (B) Find the mean and standard deviation of each of the following sets of numbers
 - 10, 11, 12, 13, 14
 - 5, 6, 12, 18, 19
 - What is Error? Classify and explain Errors with examples.
- B) Attempt any ONE (04)
- Why is the Normal distribution useful?
 - Births in a hospital occur randomly at an average rate of 1.8 births per hour. What is the probability of observing 4 births in a given hour at the hospital?
- Q2. A) Attempt any ONE (08)
- Explain an Ultra High Vacuum System with the help of diagram.
 - What are basic materials used in vacuum; describe any two in detail.
- B) Attempt any ONE (04)
- State the impingement rate and Monolayer time in vacuum.
 - What is the Pressure ranges used at the time of working on a vacuum of different types?
- Q3. A) Attempt any ONE (08)
- Explain the Principle, Construction and Working of Cyclotron Accelerator with the help of diagram.
 - Discuss the Construction and Working of Sloan and Lawrence Linear Accelerator (diagram is not needed).
- B) Attempt any ONE (04)
- Write a list of advantages and disadvantages of Crockroft Walton generator.
 - What are advantages and disadvantages of NaI detector?

- Q4. A) Attempt any ONE (08)**
1. Explain working, principle of Scanning Electron Microscopy.
 2. Discuss and explain the working principle of Transmission Electron Microscopy.

- B) Attempt any ONE (04)**
1. Write a note on FTIR spectroscopy.
 2. Write down the advantages and disadvantages of SEM.

- Q5. Attempt any FOUR (12)**
1. Distinguish between the Sample statistic and Population parameter.
 2. What is Normal distribution in statistics?
 3. Draw the neat labeled diagram of Diffusion Pump Systems.
 4. Explain what vacuum is?
 5. Write an application of Synchrotron Accelerator.
 6. Write a short note on advantages and disadvantages of Proton Linear Accelerator.
 7. Write down the application of UV Visible Spectroscopy.
 8. Explain in short Electron Gun of Scanning Electron Microscope.
