

17210

15116

2 Hours / 50 Marks

Seat No.

| | | | | | | | |
|--|--|--|--|--|--|--|--|
| | | | | | | | |
|--|--|--|--|--|--|--|--|

- Instructions* – (1) All Questions are *Compulsory*.
(2) Illustrate your answers with neat sketches wherever necessary.
(3) Figures to the right indicate full marks.
(4) Assume suitable data, if necessary.
(5) Use of Non-programmable Electronic Pocket Calculator is permissible.
(6) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

- 1. Attempt any NINE of the following:** **18**
- Define electric current. State its SI unit.
 - State the principle of Wheatstone's network.
 - Draw a neat circuit diagram of potentiometer.
 - The plates of condensers are given charge of $5\mu\text{C}$. If the potential difference across the plate is 100 volt. Calculate the capacitance.
 - Define:
 - Conductor
 - Semiconductor
 - Distinguish between intrinsic and extrinsic semiconductor on the basis of flow of electrons.
 - Define:
 - Threshold frequency
 - Work function

P.T.O.

- h) State the principle of production of X-rays.
- i) Define:
 - (i) Pumping
 - (ii) Life time
- j) Define:
 - (i) Spontaneous emission
 - (ii) Stimulated emission
- k) What is nanotechnology? Define nanoparticles.
- l) State two methods of synthesis of nanoparticles.

2. Attempt any FOUR of the following:

16

- a) Write the four factors affecting the resistance of a conductor.
- b) In a potentiometer arrangement, a cell of emf 1.25 volt gives a balance point of 35 cm length of wire. If a cell is replaced by another cell and the balance shifts to 63 cm, what is the emf of the second cell.
- c) Draw the circuit diagram and symbols of:
 - (i) condensers are in parallel
 - (ii) condensers are in series
- d) Two condensers of capacitances $0.5 \mu\text{F}$ and $1.5 \mu\text{F}$ are connected in series. A potential difference of 12V is applied across them. Calculate the resultant capacitance and charge on each condenser.
- e) Define:
 - (i) conduction band
 - (ii) forbidden band
 - (iii) valence band
 - (iv) dopping
- f) Draw the structure of P-type and N-type material.

3. Attempt any FOUR of the following:**16**

- a) Define:
 - (i) P-N junction diode
 - (ii) Depletion layer
 - (iii) Forward bias
 - (iv) Reverse bias of P-N junction diode
 - b) Give four applications of photoelectric cell.
 - c) Define photo resistor. State its symbol and its two applications.
 - d) Differentiate between spontaneous and stimulated emission of light with diagram.
 - e) (i) State any two properties of X-rays.
(ii) State any two engineering applications of X-rays.
 - f) Explain - nanotechnology is used in space and defence.
-