

Time: 3hrs

Maximum marks: 75

**PART-A**  
(Marks 5 X 2 = 10)

[Note: i) Answer any 5 questions ii) All questions carry equal marks]

- 1) Define convection.
- 2) Define specific heat capacity of solids.
- 3) Define first law of thermodynamics.
- 4) Define critical volume.
- 5) Define active remote sensing.
- 6) Give two uses of laser.
- 7) State ohm's law.
- 8) Define doping.

**PART-B**  
(Marks 5 X 3 = 15)

[Note: i) Answer any 5 questions ii) All questions carry equal marks]

- 9) What are good and poor conductors? Give example.
- 10) State Joule Thompson effect.
- 11) State laws of refraction.
- 12) Give any three characteristics of laser.
- 13) Define Joule's law of heating.
- 14) Define Flemming's left hand rule.
- 15) Explain NAND gate.
- 16) What are the advantages of CE configuration?

**PART - C**  
(Marks 5 X 10 = 50)

[Note: i) Answer all questions, choosing any two divisions from each question  
ii) All questions carry equal marks]

- 17)
  - a) State the postulates of kinetic theory of gases.
  - b) Derive the expression for pressure of a gas on the basis of kinetic theory of gases.
  - c) The ratio of two specific heats of gas is 1.36 and universal gas constant is  $8314 \text{ JK}^{-1}\text{per kg mol}$ . Find the specific heats of gas at constant pressure and at constant volume.
- 18)
  - a) Explain concept of Carnot's reversible engine.
  - b) Explain the liquefaction of air by Linde's process.
  - c) The ratio of specific heat capacities of a gas is 1.5. a gas is of 1 atmospheric pressure is compressed to half of its original volume. Calculate the final pressure, if the compression is i) isothermal and ii) adiabatic.
- 19)
  - a) Derive the expression for refractive index.
  - b) Explain the working with block diagram of RADAR.
  - c) Calculate the refractive index of the material of an equilateral prism if the angle of minimum deviation is  $40^\circ$ .
- 20)
  - a) Describe an experiment to determine the specific heat capacity of liquid using Joule's calorimeter.
  - b) Explain how a galvanometer is converted into an ammeter and a voltmeter.
  - c) Find the resultant capacitance of three capacitors of capacitance  $5\mu\text{F}$ ,  $10\mu\text{F}$ ,  $20\mu\text{F}$  when they are connected (i) in series and (ii) parallel.
- 21)
  - a) Explain forward bias and reverse bias.
  - b) Explain the working of transistor amplifier in common emitter configuration.
  - c) Write a note on Integrated circuit.