Marks

VI (a) Discuss polar satellites and their uses. 3

(b) Find the orbital velocity of an artificial satellite moving close to the surface of the Earth (First cosmic velocity). Also calculate the period. (R = 6400 km and g = 9.8 ms^{-2}) 6

(c) Find out the height at which the acceleration due to gravity becomes half its value on the surface of the Earth. (R = 6400 km) 6

Unit — III

VII (a) State Ohm's law and laws of combination of resistances. 3

(b) A long resistance wire admits a current of 5 A when a potential difference of 10 V is applied across it. If the wire is cut into two pieces of equal length and connected to the same voltage source as a parallel combination, then calculate the effective resistance. 6

(c) Three resistances R1 = 4Ω, R2 = 6Ω and R3=10Ω are connected as shown in figure. Calculate the effective resistance of the combination as measured across the open terminals.
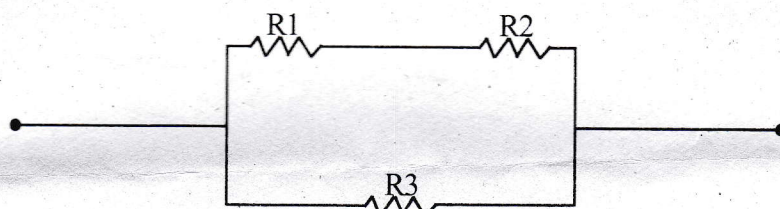
6

Or

VIII (a) With the help of a circuit diagram explain how Ohm's law can be verified ? 3

(b) State Biot-Savart's law and use it to derive the expression for the magnetic field produces at the centre of a current carrying circular coil. 6

(c) Given three resistances 6 Ω each. Draw the diagrams explaining how these resistances can be combined to give 18 Ω, 9 Ω and 2 Ω. 6

Unit — IV

IX (a) The photo electric work function of copper is 7.2 × 10^{-19}. Calculate the threshold wavelength. [Speed of light (c) = 3 × 10^8 ms^{-1}, Planck's constant (h) = 6.63 × 10^{-34} Js] 3

(b) Explain clearly the concepts of photon, photoelectric work function and threshold wavelength. 6

(c) State and explain Einstein's mass — energy relation. Use it to explain energy production in the case of nuclear fission and fusion. 6

Or

X (a) Explain the advantages of solid state lasers. 3

(b) With the help of a neat figure explain the working of He-Ne laser. 6

(c) Explain the characteristic properties of laser light. 6