

FE sem - II | Boqanches - A11 | Nov - 2025 | 2.P code - 98332

Time: 1.5 Hours

date - 11.12.25 Marks:45

1/1

N.B.:

1. Questions number 1 is compulsory.
2. Attempt any two questions from Q.2 to Q.5.
3. Figures to right indicate full marks.
4. Draw neat labelled diagrams wherever necessary.

 $[^1\text{H}_1, ^6\text{C}_{12}, ^9\text{F}_{18.9}, ^{29}\text{Cu}_{63.54}, ^{30}\text{Zn}_{65.39}, ^{50}\text{Sn}_{118.7}, ^{82}\text{Pb}_{207.2}, ^{28}\text{Ni}_{58.69}, ^{47}\text{Ag}_{107.86}, ^{13}\text{Al}_{29.98}]$
Density (ρ): Al=2.70 g/cm³, Cu=8.92 g/cm³, Zn=7.14 g/cm³, Sn=7.26 g/cm³, Pb=11.34 g/cm³, Ni=8.9 g/cm³.

- Q.1 Attempt any five questions from the following: 15
- a. An Alloy contains Cu 80% and Zn 20%. Find atomic percentage and Density of the Alloy. 3
 - b. Define Abrasive. List any two natural & artificial abrasives with an example 3
 - c. What are Bio-composites? Give two Applications bio-composites. 3
 - d. What is natural rubber? List any four drawbacks of natural rubber 3
 - e. The polymer sample with cross sectional area 10 m². It withstands a maximum tensile force of 800 N, before breaking. Calculate the tensile strength of the polymers. 3
 - f. Define Biopolymers. Give their types. 3
 - g. Illustrate the term Nanomaterial. Give two uses of Nanomaterial's 3
- Q.2 a. Illustrate the term optical fibre. Discuss function of core, clad, coating. Give two advantages of optical fibre 6
- b. What are carbon nanotubes? Write properties & uses of SWCNTs 5
 - c. Write short note on intelligent (smart) polymers 4
- Q.3 a. Give preparation properties and uses of PMMA. 6
- b. Explain laminar composite with neat labelled diagram and give at least two applications. 5
 - c. Give properties composition and uses of Borosilicate glass. 4
- Q.4 a. What are Alloy steels? Explain the effect of alloying elements such as Ni, Cr, Mo, W, and Co on alloys. 6
- b. What are Graphene? Discuss structure and properties of Graphene. 5
 - c. A Polymer has molecular mass of 120000 g/mole. If the molecular formula of its monomer units is C₂F₄. Determine the polymerization degree. 4
- Q.5 a. Discuss fibre reinforced composites with neat labelled diagrams. Give at least two applications 6
- b. Tinman's metal weighs 2100 g. Calculate weight of each constituent and give its two uses. 5
 - c. Define Conducting polymers. Discuss working of P-doping and N-doping conducting polymers. 4
