FE/ All BRANCHES / NEP 2020 / DEC-25
Q.P. code: 98332
11/12/202

Time: 1.5 Hours   Marks:45

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.

[$^1H_1$ $^6C_{12,}$ $^9F_{18.9,}$ $^{29}Cu_{63.54,}$ $^{30}Zn_{65.39,}$ $^{50}Sn_{118.7,}$ $^{82}Pb_{207.2,}$ $^{28}Ni_{58.69,}$ $^{47}Ag_{107.86,}$ $^{13}Al_{29.98}$]

Density (ρ): Al=2.70 g/cm^3, Cu=8.92 g/cm^3, Zn=7.14 g/cm^3, Sn=7.26 g/cm^3, Pb=11.34 g/cm^3, Ni=8.9 g/cm^3.

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 m^2. 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 C$_2$F$_4$. Determine the polymerization degree.	4

Q.5 a. Discuss fibre reinforced composites with neat labelled diagrams. Give at least two applications	6
	5
b. Tinman's metal weighs 2100 g. Calculate weight of each constituent and give its two uses.	4
c. Define Conducting polymers. Discuss working of P-doping and N-doping conducting polymers.	

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