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**4th Sem / Automobile, Mechanical, Mech ( Tool & Die)**

**Subject : Materials and Metallurgy**

Time : 3 Hrs.

M.M. : 60

**SECTION-A**

**Note:** Multiple choice questions. All questions are compulsory (6x1=6)

Q.1 In H.C.P. structure, the number of atoms in a unit cell are

- a) 1                                      b) 2
- c) 4                                      d) 6

Q.2 The property which resist penetration of other metals is called.

- a) Ductility                              b) hardness
- c) toughness                              d) malleability

Q.3 Which of the following is an alloy.

- a) cast iron                              b) steel
- c) brass                                      d) all of above

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Q.4 Plastic deformation may take place due to.

- a) slip only                              b) twinning only
- c) slip or twinning                      d) none of them

Q.5 Pearlite or entectoid steel has carbon content.

- a) 0.8%                                      b) 1.8%
- c) 2%                                        d) 6.67%

Q.6 Which plastic is used in electrical conduit pipes.

- a) P.V.C                                      b) Polystyrene
- c) Polyethylene                              d) Acrylic Resin

**SECTION-B**

**Note:** Objective/ Completion type questions. All questions are compulsory. (6x1=6)

Q.7 Define non-ferrous metals.

Q.8 Define fatigue.

Q.9 Define atomic radius.

Q.10 Name types of solid solution alloy.

Q.11 Name any four iron ores.

Q.12 Name any two types of annealing.

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### SECTION-C

**Note:** Short answer type questions. Attempt any eight questions out of ten questions. (8x4=32)

- Q.13 Explain different types of composite material.
- Q.14 Derive an expression for the atomic radius of body centered cubic structure.
- Q.15 Explain the difference between slip and twinning.
- Q.16 Explain the manufacturing of steel by open hearth processes.
- Q.17 Explain the different allotropic forms of iron? Explain.
- Q.18 Differentiate between ferrous and non ferrous metals.
- Q.19 Write the purpose of heat treatment.
- Q.20 Explain nuclear energy material.
- Q.21 Explain nitriding with advantage and disadvantage.
- Q.22 Explain the properties of copper.

### SECTION-D

**Note:** Long answer type questions. Attempt any two questions out of three questions. (2x8=16)

- Q.23 What is pyrometer? What are its different types? Explain.

- Q.24 Explain the effects of following elements on steel.

- a) Nickel
- b) Silicon
- c) vanadium

- Q.25 Explain briefly the effect of crystal defect on material.