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END SEMESTER REGULAR EXAMINATION
(NEP 2020), November/December, 2025

Semester : 3rd

Branch : Mechanical Engineering

Course Code : MEPC-303 (NEP)

**Course Name : MATERIAL SCIENCE AND
ENGINEERING**

Full Marks – 60

Pass Marks – 24

Time – Three hours

The figures in the margin indicate full marks
for the questions.

Instructions :

(i) Question Nos. 1, 2 and 3 are compulsory.

(ii) Answer any *five* from the rest.

1. Choose the correct answers from the following :

1×5=5

(a) Atomic packing factor for FCC structure is

(i) 0.68

(ii) 0.52

(iii) 0.74

(iv) 0.62

[Turn over

- (c) The percentage of carbon at the eutectic point in iron carbon diagram is _____.
- (d) The property of a material which allows it to be drawn into a thin wires is called _____.
- (e) _____ iron is virtually pure iron.

3. Write True or False :

1×5=5

- (a) The number of atom per unit cell for a face-centred cubic (FCC) crystal is 3.
- (b) Alloys have higher melting point than metals.
- (c) Bell metal is an alloy of tin and copper.
- (d) Rubber is highly elastic than steel.
- (e) Laminated plastic cannot be machined.

4. Define the following mechanical properties :

1½×6=9

- (a) Fatigue
- (b) Machinability
- (c) Hardness
- (d) Ductility
- (e) Resilience
- (f) Plasticity.

5. (a) Define unit cell. 1
- (b) What is an atomic radius ? Calculate Atomic radius for BCC structure. $1+3=4$
- (c) What is Atomic packing factor ? Find APF for Simple cubic structure. $2+2=4$
6. Explain the corrosion mechanism. What are the different methods of preventing corrosion ? $4+5=9$
7. Sketch the iron-carbon equilibrium diagram and mark the salient points. 9
8. Define heat treatment. What are the purpose of heat treatment ? $2+7=9$
9. What is plastic ? What are the raw materials for plastic ? What are the different types of thermo-setting plastic ? $2+2+5=9$
10. Describe the manufacturing process of pig iron with neat sketch. 9
11. Write short notes on any *three* : $3 \times 3 = 9$
- (a) Cupola furnace
- (b) High speed steel

- (c) Gun metal
- (d) Body centre cubic structure
- (e) Normalizing process.

Branch: MECHANICAL ENGINEERING

Subject code: MEPC-303

**Subject Title: MATERIAL SCIENCE AND
ENGINEERING**

CO (Course Outcome) are not for students

Questions no.	CO
1	
1.a	1
1.B	2
1.c	3
1.d	2
1.e	2
2	
2.a	1
2.b	2
2.c	3

Questions no.	CO
2.d	3
2.e	2
3	
3.a	1
3.b	2
3.c	2
3.d	5
3.e	5
4	3
5.a	1
5.b	1
5.c	1
6	3
7	4
8	4
9	5
10	2
11	2, 1