Total No. of Questions : 10]

SEAT No. :

PF-12333

[Total No. of Pages : 2

[6625]-339

S.E. (Machanical/Machanical S.W.)

PCC-203-MEC : ENGINEERING MATERIALS & METALLURGY

(2024 Pattern) (Semester - III)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) ***Answer Q1 or Q2, Q3 or Q4, Q5 or Q6, Q7 or Q8, Q9 or Q10.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right side indicate full marks.***
4) ***Assume Suitable data if necessary.***

Q1) a) Draw the following planes in cubic crystal system. **[7]**

i) (101)

ii) (100)

iii) (111)

b) What is mean by Atomic Packing Factor? Calculate the Atomic Packing Factor for the BCC and FCC unit cell. **[7]**

OR

Q2) a) Define formability. Draw Erichsen Cupping test diagram. What do you mean by 'Radial' and 'Circumferential' cracks observed after testing. **[7]**

b) What do you mean by non-destructive testing? Enlist the NDT methods. Explain ultrasonic method of testing. **[7]**

Q3) a) With neat labels draw Iron-Iron Carbide equilibrium diagram. **[7]**

b) Discuss nucleation & crystal growth in solidification of pure metals? **[7]**

OR

P.T.O.

SPPUQuestionPapers.com
CEGP019671
103.157.122.163 11/06/2026 09:39:10 in-pnq-static-163-122-157-103

Q4) a) Define Solid Solution and explain its types. **[7]**

b) State Gibbs Phase rule? List application and Limitation of Gibbs Phase rule? **[7]**

Q5) a) Draw isothermal time temperature transformation diagram. **[7]**

b) Define annealing and explain types of annealing. **[7]**

OR

Q6) a) What is tempering process? Why tempering is carried out after hardening? List classification and application of tempering process? **[7]**

b) With the help of neat sketch explain flame hardening process. Also state its application. **[7]**

Q7) a) Mention the names of alloying elements used and the amount in present of alloy used in the following steels **[7]**

i) C40 ii) AISI 1040

iii) Fe 410 K iv) St 42

v) FeE 270 vi) 80 T 11

vii) 25 C 5

b) What is stainless steel? Classify it with application? Explain sensitization of stainless steel? **[7]**

OR

Q8) a) Write a short note on Grey Cast Iron and Nodular Cast Iron. **[7]**

b) Discuss effect of alloying elements on steel. **[7]**

Q9) a) Differentiate between brass and bronze? (Compositions, application, Uses). **[7]**

b) Write short note on Age Hardening? What are advantage and disadvantage of age hardening? **[7]**

OR

Q10) a) Give typical composition, important properties and applications of Cartridge brass? **[7]**

b) Explain Nickel with characteristics, Properties and application of Nickel alloys. **[7]**

⌘⌘⌘

SPPUQuestionPapers.com CEGP019671 103.157.122.163 11/06/2026 09:39:10 in-pnq-static-163-122-157-103