

Total No. of Questions : 4]

SEAT No. :

**PE589**

[Total No. of Pages : 1

[6578]-62

**S.E. (Automobile & Mechanical/Mechanical Sandwich/Automation  
& Robotics) (Insem)**

**ENGINEERING MATERIALS AND METALLURGY  
(2019 Pattern) (Semester - III) (202044 )**

*Time : 1Hour]*

*[Max. Marks : 30*

*Instructions to the candidates:*

- 1) Answer Q1 or Q2, Q3 or Q4.
- 2) Neat diagrams must be drawn wherever necessary.
- 3) Figures to the right indicate full marks.
- 4) Assume Suitable data if necessary.
- 5) Use of electronic pocket calculator is allowed.

- Q1)** a) What is dislocation? Compare between edge and screw dislocation. [6]  
b) What are Bravais Lattices? Draw the following planes in cubic crystal system [9]  
(101), (222), (011), (001)

OR

- Q2)** a) What is work hardening? Explain it on the basis of dislocation theory. [7]  
b) What is fatigue failure? Enlist the factors necessary to cause fatigue failure. Explain fatigue testing process in detail. [8]

- Q3)** a) Compare between Brinell, Vicker's and Rockwell hardness testing methods. [6]  
b) What do you mean by non-destructive testing? Enlist the NDT methods. Explain ultrasonic method of testing. [9]

OR

- Q4)** a) Compare between Optical and scanning electron microscopy on the basis of following points: block diagram, working principle, 'imaging' process, magnification, use & disadvantages. [7]  
b) What is difference between Microscopy and Macroscopy? With the help of neat sketch explain the difference in flow lines observed in forged components and cast components. [8]

