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Seat No.	
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[5057]-2015

**S.E. (Mechanical/Automobile Engg.) (First Semester)**

**EXAMINATION, 2016**

**MATERIAL SCIENCE**

**(2015 PATTERN)**

**Time : Two Hours**

**Maximum Marks : 50**

**N.B. :—** (i) Answer Q. No. 1 or Q. No. 2, Q. No. 3 or Q. No. 4,  
Q. No. 5 or Q. No. 6, Q. No. 7 or Q. No. 8.

(ii) Neat diagrams must be drawn wherever necessary.

(iii) Figures to the right indicate full marks.

(iv) Use of calculator is allowed.

(v) Assume suitable data, if necessary.

1. (a) Show the following planes on a cubic cell (222), (110). [4]

(b) Define the following : [4]

(i) Co-ordination number

(ii) Hot working.

(c) Materials like Al shows more plastic deformation by the slip mechanism than twinning. Explain in detail. [4]

*Or*

2. (a) No. of atoms per unit cell in FCC metal is 4 explain with mathematical proof. [3]

P.T.O.

- (b) What is Polymer and how its molecular structure is different than metals ? Explain. [3]
- (c) What do you understand by crystal imperfection ? Explain the Edge dislocation with a neat diagram. [6]
3. (a) Compare and contrast between : [6]
- (i) Dye penetrant test and Ultrasonic test
  - (ii) Brinell hardness tester and Rockwell hardness tester.
- (b) One Assembly is made with nuts and bolts used for joining them. Where the probability of corrosion is more ? Which type of corrosion is probable in this type ? Explain can it be avoided. [7]

*Or*

4. (a) Draw the self-explanatory diagram for the following : [4]
- (i) Stress-strain diagram for Cast Iron
  - (ii) S-N diagram for Cu.
- (b) For checking internal defects in brass component which NDT methods are used, justify your answer. [3]

- (c) Pitting corrosion is most dangerous amongst all types of corrosion do you agree with this statement ? Justify your answer. [4]
- (d) In Anodic and Cathodic Inhibitors which is more protective, explain. [2]
5. (a) Explain with neat diagram physical vapor deposition. State its advantages, disadvantages and applications over other processes. [6]
- (b) What are different characteristics of surface improvements ? Explain in brief. [6]

Or

6. Write short notes on (any *three*) [12]
- (a) Anodising
- (b) Electroplating
- (c) Ion implantation
- (d) CVD.
7. (a) What is the best suitable process for manufacturing of oil impregnated bearings ? Explain its advantages over other manufacturing processes. [7]
- (b) Explain importance of sintering with its different stages to get required strength to green compact. [6]

*Or*

8. (a) Define the following : [4]
- (i) Green Spring
  - (ii) Tap density.
- (b) Write flow-chart of production of Tungsten cemented carbide tool. [3]
- (c) What are the different techniques used for compaction ? Explain Isostatic compaction in detail. [6]