

<b>Seat No.</b>	
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**S.E. Production (2012 / 2015 course)**

**MATERIAL SCIENCE**

**Semester – II 2016-17**

**Time: Two Hours**

**Maximum Marks: 50**

- N.B.** (i) Attempt Q1 or Q2, Q3 or Q4, Q5 or Q6 and Q7 or Q8.  
(ii) Neat diagrams must be drawn wherever necessary.  
(iii) Figures to the right indicate full marks.  
(iv) Assume suitable data, if necessary.  
(v) Use of electronic pocket calculator and logarithmic tables is allowed.
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- Q1.** (a) Draw the following planes and directions in a cubic unit cell:  
 $(1\ 2\ 2)$ ,  $(1\ 2\ \bar{1})$ ,  $(1\ 0\ 1)$ ,  $[4\ 2\ 4]$ ,  $[1\ 2\ 2]$ ,  $[1\ 1\ 1]$  (6)  
(b) Discuss procedure, advantages and limitations of Rockwell Hardness Test. (6)

**OR**

- Q2.** (a) Explain dye penetrant test with the help of a neat sketch. (6)  
(b) Define the terms: (i) Unit Cell (ii) Space lattice (iii) Work hardening  
(iv) Cold working (v) Annealing (vi) Resilience (6)
- Q3.** (a) Explain step by step procedure of drawing phase diagrams. (5)  
(b) Explain with the help of neat sketches the Disappearing Filament pyrometer and Thermocouple. (8)

**OR**

- Q4.** (a) What do you mean by Eutectic, Eutectoid, Peritectic and Peritectoid reactions? (8)
- (b) How does grain size refinement affect the strength of material? Describe with the help of Hall – Petch equation. (5)

- Q5.** (a) How are physical and chemical vapor deposition techniques used for corrosion prevention? Explain. (6)
- (b) Explain various metallic coatings used for corrosion prevention. (6)

**OR**

- Q6.** (a) Discuss how corrosion can be reduced by modification in design and fabrication methods. (6)
- (b) Discuss how corrosion can be reduced by modification of corrosive environment. (6)

- Q7.** (a) State advantages and limitations of powder metallurgy. (6)
- (b) Explain mechanical and physical processes of powder manufacturing in detail. (7)

**OR**

- Q8.** (a) Enlist properties of powder which need evaluation and explain sieve method for determination of size and distribution of powder. (6)
- (b) Write notes on manufacturing of
- (i) Cermets and (ii) Self lubricated bearing. (7)
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