Total No. of Questions : 6]

SEAT No. :

P558

[Total No. of Pages : 2

[4456]-2
F.E. (Engineering) (Semester - I)
APPLIED SCIENCE - I (Chemistry)
(2008 Course)

Time : 2 Hours] *[Max. Marks : 50*

Instructions to the candidates:

1) ***Answer only three questions (Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6).***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***
4) ***Use of logarithmic table or electronic pocket calculator is allowed.***
5) ***Assume suitable data, if necessary.***

Q1) a) What are the types of symmetries for crystals? Explain them for a cubic crystal. **[7]**

b) Draw following planes in a cubic system. **[6]**

i) (112)

ii) (110)

iii) (111)

c) At what glancing angle would the first order diffraction from (110) plane of KCl can be observed using X - rays of wavelength 150 pm. **[4]**

OR

Q2) a) What are CNTs? Explain the structure, properties and applications of Carbon Nano Tubes. **[7]**

b) Define Radius ratio. Show that Radius ratio for ionic crystal with co - ordination number 3 is 0.155. **[6]**

c) Compare : Miller's and Weiss indices. **[4]**

Q3) a) Explain the titration curve and calculation of pH at various stages during strong acid and strong base. **[7]**

b) Explain the titration of metal ions with EDTA. **[6]**

c) 25 ml of sodium chloride solution when titrated with N/20 $AgNO_3$ requires 15.5 ml in Mohr's method for brick red end point. Calculate amount of chloride ions present per litre of NaCl solution. **[4]**

OR

P.T.O.

Q4) a) Explain Ostwald's theory of Acid - base indicators. **[7]**

b) Calculate the equivalent weight of $KMnO_4$ in acidic, alkaline and neutral medium. **[6]**

c) Explain Mohr's method for determination of Cl^- ions. **[4]**

Q5) a) What are plastics? Explain the compounding of plastics with purposes of compounding of each constituent. **[6]**

b) Compare between : **[6]**

i) LDPE and HDPE.

ii) Natural rubber and vulcanized rubber.

c) Explain average molecular weight of polymers and any one method to determine it. **[4]**

OR

Q6) a) Explain free radical polymerization mechanism with suitable example. **[6]**

b) Give synthesis, properties and applications of Polypropylene (PP) and Acrylonitrile Butadiene Styrene (ABS). **[6]**

c) Write a note on conducting polymer. **[4]**

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