Total No. of Questions : 8]

SEAT No. :

P4399

[Total No. of Pages : 2

[5458]-104
F.E.
ENGINEERING CHEMISTRY
(2015 Pattern) (Theory) (Credit System)

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

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Use of logarithmic tables slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.***
5) ***Assume suitable data, if necessary.***

Q1) a) Explain demineralization method of water softening with reactions and neat labelled diagram. **[6]**

b) Explain conductometric titration curve in case of strong acid & strong base. **[3]**

c) Define following terms : **[3]**

i) Chromophore

ii) Auxochrome

iii) Bathochromic shift.

OR

Q2) a) Explain procedure and reaction involved in potentiometric titration of Fe^{+2} Vs Ce^{+4} along with titration curve. Write the formulae for calculating emf of the cell before and after equivalence point of titration. **[6]**

b) Write merits and demerits of greener and traditional synthesis respectively of polycarbonate. **[3]**

c) 100 ml of alkaline water sample when titrated against 0.02N HCl, phenolphthalein end point obtained at 20ml addition of acid while further 15 ml acid required to get Methyl orange end point. Identify type of alkalinity and determine its extent. **[3]**

P.T.O.

Q3) a) Define vulcanization. Explain the vulcanization process with reaction & advantages of vulcanized rubber over natural rubber. **[6]**

b) What is power alcohol? Write its advantages and limitations. **[3]**

c) A coal sample contains 72%C, 10%H, 2%S, 1%O and remaining is ash. Calculate quantity of air required for complete combustion of 1kg of coal. **[3]**

OR

Q4) a) Explain Bomb calorimeter with principle, construction, working and neat labelled diagram. State formula with corrections to calculate GCV. **[6]**

b) Distinguish between thermosoftening and thermosetting polymer with example. **[3]**

c) What is Biodegradable polymer? Draw the structure of PHBV and write its applications. **[3]**

Q5) a) Give the isotopes of hydrogen with their applications and write the properties of hydrogen which makes it more difficult to state and transport. **[6]**

b) Explain structure of Graphite with its properties and applications. **[4]**

c) Write three isotopes of carbon with their applications. **[3]**

OR

Q6) a) Explain structure, properties and applications of fullerene. **[6]**

b) Explain production of Hydrogen by water splitting using solar energy. **[4]**

c) Write synthesis, properties and applications of silane. **[3]**

Q7) a) Discuss electrochemical corrosion by H_2 - evolution and O_2 - absorption mechanism. **[6]**

b) What is anodic coating? Explain galvanization with neat labelled diagram. **[4]**

c) State pilling-Bedworth ratio. Give its significance with example. **[3]**

OR

Q8) a) Define corrosion and explain any five factors affecting rate of corrosion. **[6]**

b) What is principle of cathodic protection? Explain it with any one suitable method. **[4]**

c) What are the types of metal oxide formed on following metals. i) Na ii) Ag iii) Mo and write the reactions involved in it. **[3]**