

Total No. of Questions : 9]

PE898

SEAT No. :

[Total No. of Pages : 3

[6581]-1904

F.E.

ENGINEERING CHEMISTRY

(2019 Pattern) (Credit System) (Semester - I/II) (107009)

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) Question No.1 is compulsory. Solve Q.No.2 or Q.No.3, Q.No.4 or Q.No.5, Q.No.6 or Q.No.7, Q.No.8 or Q.No.9.
- 2) Neat diagrams must be drawn wherever necessary.
- 3) Figures to the right indicate full marks.
- 4) Use of logarithmic tables, slide rules, Mollier charts, Use of scientific calculator is allowed.
- 5) Assume suitable data, if necessary.

Q1) Multiple Choice Questions.

- i) All the carbon atoms in Graphene are _____ hybridized. [1]
 - a) SP
 - b) SP²
 - c) SP³
 - d) None of these
- ii) PHBV a copolymer is an example of _____ polymer. [1]
 - a) Biodegradable
 - b) Composite
 - c) Engg. Thermoplastic
 - d) Liquid Crystal
- iii) Reinforcing agent used in a polymer matrix _____. [1]
 - a) Carbon fibre
 - b) Glass fibre
 - c) Aramid fibre
 - d) All of these
- iv) Characteristics of a good fuel _____. [1]
 - a) High calorific value
 - b) Moderate ignition temp
 - c) Low Moisture content
 - d) All of the above
- v) Boy's calorimeter can be used to determine calorific value of _____. [1]
 - a) Solid fuel
 - b) Volatile liq fuel
 - c) Gaseous fuel
 - d) Both B & C
- vi) Fundamental modes of vibration in C₆H₆ are _____. [1]
 - a) 9
 - b) 6
 - c) 3
 - d) 30

P.T.O.

- Q5)** a) Explain the production of hydrogen by steam reforming of methane and coke with reaction conditions and removal of CO_2 . [6]
b) What is Biodiesel? Give preparation reaction of biodiesel with reaction conditions give advantages and limitations of biodiesel. [5]
c) 2.00g of coal sample was heated for one hour at 110°C , the weight of the residue was 1.80g. The residue was then covered with a vented lid and heated for exactly 7 minutes at 950°C . The residue weighed 1.00g. The crucible was then heated without lid till a constant weight of the residue of 0.15g was obtained. Calculate % of the various constituents of coal. [4]

- Q6)** a) Explain block diagram of single beam of UV-vis spectrophotometer. Explain its four components and give their function. [6]
b) What are the conditions of IR radiations by the molecule? Calculate the fundamental modes of vibrations in the following molecules [5]
i) H_2O
ii) NO
c) Define the following: [4]
i) Beers law
ii) Chromophore
iii) Auxochrome
iv) Bathochromic shift

OR

- Q7)** a) Give principle of IR spectroscopy. Explain modes of vibrations with stretching and bending vibrations. [6]
b) Explain the possible electronic transitions with diagram which occur on absorption of UV. vis radiations by an org. molecule. [5]
c) Explain any four applications of IR spectroscopy. [4]

- Q8)** a) Define corrosion. State the conditions under which wet corrosion occurs. Explain hydrogen evolution mechanism of wet corrosion. [6]
b) What is the principle of cathodic protection? Explain any one method. [5]
c) Explain any four factors affecting the rate of corrosion related to metal. [4]

OR

- Q9)** a) Define Electroplating. Explain the process with diagram and reactions. Give any two applications of electroplating. [6]
b) What is PBR? Explain diff-types of films with related to nature of metal [5]
i) Mg
ii) Cu
iii) Ag
iv) Mo
c) Distinguish between Galvanisation and Tinning. [4]

* * *