B.Sc. (Part–I) Semester–I Examination

1S : PETROCHEMICAL SCIENCE

Time : Three Hours] [Maximum Marks : 80

Note :— (1) Question No. **1** is compulsory and carries **8** marks.
(2) Remaining **six** questions carry **12** marks each.
(3) Credit will be given to chemical equations and neat sketches, wherever necessary.
(4) Scientific calculator is permitted.
(5) Use of cell phone is strictly prohibited in examination hall.
(6) Use only Blue or Black refill or ball pen only.

1. (A) Complete the following sentences :
(i) pH of a solution is the negative logarithm of its _____ concentration.
(ii) Oil and Natural Gas Commission was formed in _____ year.
(iii) API gravity is used to magnify the value of ____ of petroleum.
(iv) Pure liquid, when heated will boil or vaporise, at certain single temperature, known as _____. 2

(B) Choose correct answer :
(i) Petroleum occurs in the earth _____ in all possible state.
(a) Crust (b) Mantle
(c) Core (d) Surface
(ii) Molecular weight of compound is the sum of the _____.
(a) Atomic weight (b) Equivalent weight
(c) Molecular weight (d) None of these
(iii) Sound travels through air and shock travels through _____.
(a) Air (b) Water
(c) Ground (d) Both (a) and (b)
(iv) _____ solution has pH more than 7.
(a) Acidic (b) Basic
(c) Neutral (d) Mixed 2

(C) Answer the following questions in **one** sentence :
(i) What is base of solution ?
(ii) Place where the first exploratory crude well was drilled in India ?
(iii) What is solar panel ?
(iv) What is blending ? 4

2. (A) What is calorific value ? Explain in detail with examples. 6

(B) Define and explain the term pH in detail with pH scale. 6

OR

3. (P) Calculate the molecular weight of following compounds :
(i) Fe_2O_3
(ii) $KClO_4$
(iii) $(NH_4)_2SO_4$ 6

(Q) Calculate the volume of water required to prepare 0.1 M H_2SO_4 from 200 ml of 0.5 M solution. 2

(R) Calculate the normality of 20 ml of NaOH, which exactly neutralises the 50 ml of 0.02N H_2SO_4 solutions. 2

(S) 300 ml of water is added to 200 ml of 0.5M HCl solution. Calculate the molarity of dilute solution. 2

4. Describe following gases with their composition :

(i) Dry natural gas. 3

(ii) Wet natural gas. 3

(iii) Lean natural gas. 3

(iv) Associated natural gas. 3

OR

5. (P) Why non-conventional energy resources are important ? State their advantages also. 6

(Q) "Petroleum is a source of Petrochemical." Explain in detail. 6

6. (A) Why drilling mud is used in drilling operation ? What are the advantages of drilling mud ? 6

(B) Which observation of J. D. Haun for accepting the organic theories for formation of petroleum ? 6

OR

7. (P) What is drilling ? Explain cable tool drilling in detail. 6

(Q) Describe seismic method for exploration of petroleum. 6

8. (A) Describe elemental composition of crude oil. 6

(B) Discuss the classification of petroleum crude on the basis of key fraction method. 6

OR

9. (P) State the non-hydrocarbon impurities present in crude oil. Describe any two of them. 6

(Q) Define paraffin. Explain with examples and their properties. 6

10. (A) Define distillation. Explain with example. 8

(B) Why desalting and dehydration operation are necessary for crude petroleum processing ? State the methods used for both these operations. 4

OR

11. (P) Why reduced crude from the bottom of A.D.U. is further distilled in V.D.U. ? Explain with operating conditions. 8

(Q) Define reflux. Describe pump back reflux in detail. 4

12. Define and explain the following :

(i) API gravity. 4

(ii) Viscosity. 4

(iii) Carbon residue. 4

OR

13. (P) Diesel Index is a measure of ignition quality of fuel. Explain with their formula. 6

(Q) Define smoke point. Explain, how this property is important in petroleum fuels. 6