PART C — (5 × 8 = 40 marks)

Answer ALL questions choosing either (a) or (b).

16. (a) (i) Give the mechanism of MC-Lefferty rearrangement. (5)

(ii) What are the advantages of TMS as internal standard in NMR spectroscopy? (3)

Or

(b) (i) What is chemical shift? (3)

(ii) Explain the NMR spectrum of benzene radical. (5)

17. (a) Derive the rate law for first order reaction.

Or

(b) Write Arrhenius equation. Discuss the determination of 'A' and E_a from it.

18. (a) (i) State and explain Lewis concept. (5)

(ii) What is common-ion effect? (3)

Or

(b) What are acid-base indicators? Give their application in acid base titration.

19. (a) Define the following terms : (2 + 3 + 3)

(i) phase

(ii) component

(iii) degrees of freedom.

Or

(b) Explain the phase diagram of magnesium-zinc system.

20. (a) Describe the synthesis of nanoparticles by bottom-up approach.

Or

(b) Give a detailed study of applications of Nano technology.

———————

Reg. No. : .....

Code No. : 41106 E **Sub. Code : JMCH 63**

B.Sc. (CBCS) DEGREE EXAMINATION, APRIL 2019.

Sixth Semester

Chemistry — Main

PHYSICAL CHEMISTRY — IV

(For those who joined in July 2016 onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer.

1. High energy electrons are used as source in ———————— spectroscopy.

(a) Mass (b) IR

(c) Raman (d) NMR

2. ESR spectrum of methyl radical contains ———————— lines.

(a) 1 (b) 2

(c) 3 (d) 4

3. In a _____ order reaction, rate is independent of the concentration of reactants.
(a) zero (b) first
(c) second (d) third

4. Arrhenius equation is _____
(a) $A = ke^{-Ea/RT}$ (b) $A = -ke^{-Ea/RT}$
(c) $k = Ae^{-Ea/RT}$ (d) $k = -Ae^{-Ea/RT}$

5. pH + pOH = _____
(a) 0 (b) 1
(c) 7 (d) 14

6. _____ is a salt of weak acid and strong base.
(a) NaCl (b) NH_4Cl
(c) CH_3COONA (d) CH_3COONH_4

7. For one component system the phase rule is _____
(a) F = 1 – P (b) F = 2 – P
(c) F = 3 – P (d) F = P – 1

8. When the solute under goes association in one of the solvent, Nernst distribution law is modified as _____
(a) $C_1 = \sqrt{C_2}$ (b) $C_1 = \sqrt{C_2}\ K_d$
(c) $C_1 = C_2 K_d$ (d) $C_1 \times C_2 = K_d$

9. 1 nanometre = _____
(a) 1×10^{-9} m (b) 1×10^{-10} m
(c) 1×10^{-9} cm (d) 1×10^{-10} cm

10. Which of the following is a allotrope of carbon?
(a) Graphite (b) Diamond
(c) Fullerene (d) All the above

PART B — (5 × 5 = 25 marks)

Answer ALL questions choosing either (a) or (b).

11. (a) Write the differences between IR and Raman Spectroscopy.

Or

(b) Give the applications of NMR spectroscopy.

12. (a) What are the factors influencing rate of a chemical reaction?

Or

(b) Compare collision theory with ARRT.

13. (a) What are buffer solutions? Give their types with examples.

Or

(b) Explain the determination of degree of hydrolysis.

14. (a) Write the thermodynamic derivation of distribution law.

Or

(b) Explain the phase diagram of sulphur system.

15. (a) Give the properties of metal and metal oxide nanoparticles.

Or

(b) Explain the magnetic property of nano particles.