1B3N16140 (Pages :2) Reg. No:.....

Name: .....

FAROOK COLLEGE (AUTONOMOUS), KOZHIKODE

Third Semester B.Sc Degree Examination, November 2016

CHE3C03 - Organic Chemistry

(2015 Admission onwards)

Max. Time: 3 hours Max. Marks: 64

Section A (One word)

Answer all questions. Each question carries 1 mark

1. Draw the structural formula of TNT.
2. In the Luca's test for alcohols the turbidity is due to the formation of ----------
3. Draw the structural formula of the monomer of natural rubber.
4. Mention any one use of sandal wood oil.
5. The electrophile in the sulphonation of benzene is ----------
6. Draw the most stable conformation of methyl cyclohexane.
7. The IUPAC name of *tert*-pentyl alcohol is ----------
8. The optical isomers which are mirror images are called ---------
9. Draw the structure of pyrrole.
10. The number of metameres possible for $C_4H_{10}O$ are ----------

Section B (Short answer)

Answer any seven questions. Each question carries 2 marks

11. What is rectified spirit? How is it prepared from Wash?
12. Differentiate between homolysis and heterolysis.
13. What is/are the product/s obtained when benzene is first brominated and then sulphonated? Justify.
14. What is functional isomerism? Give examples.
15. Differentiate between recemisation and resolution.
16. What is Huckel's rule? Explain it taking tropylium cation as an example.
17. Draw the structure of menthol and mention its uses.
18. Briefly discuss inversion of cane sugar.
19. What is meant by vulcanization? What are its advantages?
20. Draw and compare the stabilities of staggered and eclipsed conformations of ethane.

Section C (Paragraph)

Answer any four questions. Each question carries 5 marks

21. Discuss the optical isomerism in tartaric acid.
22. Discuss the mechanism of halogenation and nitration of benzene.
23. Discuss the mechanism of S_N^1 reaction in alkyl halides with special reference to stereochemistry.
24. Define Saponification number and iodine number. What are their applications?
25. (a) How is picric acid prepared from phenol in good yield? Justify your answer.
    (b) Discuss haloform reaction?
26. Discuss the primary, secondary and tertiary structure of proteins.

Section D (Essay)

Answer any two questions. Each question carries 10 marks

27. Discuss the preparation and synthetic applications of benzene diazonium chloride.
28. (a) What is mesomeric effect? Discuss its application in the orientation effect of aromatic electrophilic substitution reactions?
    (b) Discuss (i) HVZ reaction (ii) Hofmann's carbylamine reaction.
29. Discuss in detail the double-helical structure of DNA.
30. (a) Discuss the substituent effects on the acidity of phenol taking suitable examples.
    (b) Discuss the molecular orbital description in the structure of benzene.

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FAROOK COLLEGE (AUTONOMOUS), KOZHIKODE

Third Semester B.Sc Degree Examination, November 2016

CHE3B03 - Physical Chemistry I

(2015 Admission onwards)

Max. Time: 3 hours Max. Marks: 80

Section A (One word) Answer all questions. Each carry 1 mark.

1. With increase in temperature the most probable velocity of a gas.....
2. The temperature at which the second virial coefficient B is zero for a gas is called its.....temperature.
3. Temperature is an .....property of a system.
4. When work is done on the system, its internal energy become.....
5. The third law of thermodynamics helps in the calculation of.....
6. For an exothermic reaction, the enthalpy change is.....
7. Liquids with high molecular masses have.....viscosity.
8. The SI unit of surface tension is.....
9. If half of HI in a vessel decomposes at a certain temperature, K_c = ...
10. The melting point of ice .....with increase of pressure

Section B (Short answer) Answer any ten questions. Each carry 2 mark.

11. Calculate the temperature at which RMS velocity of nitrogen equals that of CO_2 at 300K.
12. Define most probable velocity of a gas.
13. What are Fermions and Bosons ?
14. What is the relationship between q_p and q_v ?
15. What does free energy change in a process signify?
16. What is meant by residual entropy ?
17. State the law of mass action.
18. What is meant by optical exaltation ? Illustrate giving an example.
19. Molar refraction is a additive and constitutive property. Explain.
20. Why chemical equilibrium is termed as dynamic ?
21. Define the term collision diameter.
22. 500 J heat was supplied to a system at constant volume. It resulted in the increase of temperature of the system from 293K to 298K. What is the change in the internal energy of the system ?

Section C (paragraph) Answer any five questions. Each carry 6 mark.

23. State Le Chatelier principle and apply it to an equilibrium which is industrially important.
24. P_c , V_c, and T_c of chlorine are 76 atm ,0.125 dm^3 mol^{-1} and 417 K respectively. Calculate its a and b.
25. K_p for a reaction at 801K and 952K are 98 and 10.5 respectively. Assuming ΔH to be a constant in the above temperature range, calculate ΔH.
26. Calculate the entropy change accompanying the heating of 1 mole of an ideal gas from 300K to 900K (a) at constant volume (b) at constant pressure. Assume that $C_v = (3/2)R$.
27. Explain how viscosity measurements are useful in the determination of molecular mass of polymers ?
28. Derive an expression for the relation between entropy and probability ?
29. Explain Linde's process for the liquefaction of gases?
30. Derive Gibb's Duhem equation.

Section D (Essay) Answer any two questions. Each carry 10 mark.

31. Derive the van der Waals equation for a real gas.
32. What is meant by parachor ? Discuss how parachor measurements have been useful in the structure determination of compounds ?
33. Derive the van't Hoff's equation showing the temperature dependence of equilibrium constant and arrive at its integrated form.
34. Describe the Carnot's cycle and derive an expression for the efficiency of a heat engine.