

SPECTRA SAMPLE PAPER
SPECTRA CLASSES
CLASS 11TH
SUBJECT- CHEMISTRY

TIME-3HR.

MM:70

General Instructions:

- a) All the questions are compulsory.
- b) There are 26 questions in total.
- c) Questions 1 to 5 are very short answer type questions and carry one mark each.
- d) Questions 6 to 10 carry two marks each.
- e) Questions 11 to 22 carry three marks each.
- f) Questions 23 is value-based question carrying four marks.
- g) Questions 24 to 26 carry five marks each.
- h) There is no overall choice. However, an internal choice has been provided in one question of two marks, one question of three marks and all three questions in five marks each. You have to attempt only one of the choices in such questions.
- i) Use of calculators is not permitted. However, you may use log tables if necessary.

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1. Why BeH_2 molecule has zero dipole moment although the Be-H bonds are polar?
 2. Give two examples of state functions.
 3. Draw the resonance structure of Ozone molecule.
 4. Write the electronic configuration of Cu^{2+} ?
 5. Two litres of an ideal gas at a pressure of 10 atm expands isothermally into a vacuum until its total volume is 10 litres. How much heat is absorbed and how much work is done in the expansion?
 6. Write the Hybridisation of C in a) CO_2 b) C_2H_2 ?
 7. Explain a) Isoelectronic species b) Anomalous behaviour ?
 8. Give reason:
 - (a) F has lower electron gain enthalpy than Cl.
 - (b) Ionization enthalpy of N is higher than O.

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9. Arrange benzene, hexane and ethyne in decreasing order of acidic behaviour by giving reasons.
10. (a) Give reasons: "Extra-ordinary stability of benzene though it contains three double bonds".
(b) Explain Common Ion Effect.
11. Give reasons: Why NH_3 has higher dipole moment than NF_3 ?
12. Describe in detail the limitations of octet rule with suitable examples

OR

Explain Chain isomerization in hexane with examples.

13. Write the mechanism of Markovnikov addition of HBr to Propene.
14. Calculate the amount of ammonia formed when 50 kg of N_2 (g) and 10.0 kg H_2 (g) of are mixed to produce NH_3 (g). Identify the limiting reagent.
15. Predict the geometry of following molecules: a) CO_2 b) NH_3 c) H_2O
16. Explain Three acid base concepts.
17. Give the Lewis representation of:
(i) Nitric acid (ii) Ammonia (iii) Ozone molecule
18. In the reaction: $2\text{SO}_2 + \text{O}_2 \rightleftharpoons 2\text{SO}_3 + \text{heat}$
(i) Indicate the direction in which the equilibrium will shift when:
(ii) Concentration of SO_2 is increased.
(iii) Concentration of SO_3 is increased.
(iv) Temperature is increased.
19. Calculate the wavelength in nm, of visible light having a frequency of 4.37×10^{14} /s.
20. Convert the following :
a) Hexane to Benzene

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b) Benzene to acetophenone

21. (i) List two differences between Orbit and Orbital
(ii) If an electron is moving with a velocity 600 m/s which is accurate up to 0.005% then calculate the uncertainty in its position. [$h = 6.626 \times 10^{-34}$ J s and mass of electron = 9.11×10^{-31} kg]
22. Calculate the enthalpy change when 2.38g of CO vaporizes at its normal boiling point, if the enthalpy of vaporization of CO is 6.04 kJ/mol.
23. John was arrested by the custom officials as he was smuggling drugs and caught by x-ray machines. According to Roentgen when electrons strike a material in the cathode ray tube, it produces a ray which can cause fluorescence in the fluorescent material placed outside the cathode ray tubes. These rays were called x-rays. These were not deflected by electric and magnetic field. It was used as diagnostic tool in the treatment of diseases and bone fractures.
- (a) What is the approx. wavelength of x-rays?
(b) Why x-rays are used to screen luggage's in airports?
(c) How would you prevent smuggling
24. (i) Explain : a) Inductive Effect b) Hyper conjugation c) Resonance
(ii) Write : a) Wurtz Reaction b) Friedel craft alkylation
25. Balance the Equation: $MnO_4^- + I^- \rightarrow Mn^{2+} + I_2$ (acidic medium)
- OR
- Write the types of redox reactions with examples.
26. (a) In which C-C bond of $CH_3CH_2CH_2Br$, the inductive effect is expected to be least?
(b) Which of the following compound shows geometrical isomerism?
(i) Pent-1-ene

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(ii) Pent-2-ene

(iii) 2-Methylbut-2-ene

(c) What type of isomerism is present in the following pairs?

(i) $\text{CH}_3 - \text{CH}_2 - \text{CH}_2 - \text{OH}$ and $\text{CH}_3 - \text{CH}(\text{OH}) - \text{CH}_3$

(ii) $\text{CH}_3 - \text{CH}_2 - \text{CO} - \text{CH}_2 - \text{CH}_3$ and $\text{CH}_3 - \text{CO} - \text{CH}_2 - \text{CH}_2 - \text{CH}_3$

(iii) $\text{CH}_3 - \text{CH}_2 - \text{OH}$ and $\text{CH}_3 - \text{O} - \text{CH}_3$

OR

(a) How will you convert ethanoic acid into benzene?

(b) "Branched chain hydrocarbons have lower boiling point than straight chain hydrocarbon". Why?