



Name _____

1- ہر سوال کے سامنے چار دائرے دیئے گئے ہیں، صرف صحیح جواب والا دائرہ بھریں۔

2- دائروں کو شیڈ (بھرنے) کے لئے نیچے یا کالے رنگ کا مارکر استعمال کریں۔

3- جواب میں ایک سے زائد دائرے بھرنے سے جواب غلط تصور ہوگا۔

Roll No _____

Time Allowed: 20 Minutes

SECTION – A

Marks : 18

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|----|--|--|---|--|--|
| 1 | The pH at which enzyme shows maximum activity is called: | ☐ maximum pH | ☐ minimum pH | ☒ optimum pH | ☐ moderate pH |
| 2 | High insulating capacity is shown by: | ☒ Fats | ☐ Oils | ☐ Wax | ☐ Steroids |
| 3 | Nylon 6,10 is the example of: | ☐ Addition polymers | ☒ Condensation polymers | ☐ Ring opening polymers | ☐ Copolymers |
| 4 | The combustion of carbonaceous compounds results in the formation of: | ☒ Carbon dioxide | ☐ Carbon monoxide | ☐ Carbide | ☐ Carbonic acid |
| 5 | The iron-binding sites in haemoglobin bind carbon monoxide more tightly than oxygen: | ☐ 310 times | ☐ 320 times | ☒ 330 times | ☐ 340 times |
| 6 | In mass spectrometry, the different positively charged ions are separated on the basis of their: | ☐ Charge-to-mass ratio (z/m) | ☒ Mass-to-charge ratio (m/z) | ☐ Protons-to-electrons ratio (p/e) | ☐ Electrons-to-protons ratio (e/p) |
| 7 | Heterolysis results in the formation of: | ☐ Free radicals | ☒ ions | ☐ Only electrophile | ☐ Only nucleophile |
| 8 | S _N 2 mechanism follows: | ☐ Zero order kinetics | ☐ First order kinetics | ☒ Second order kinetics | ☐ Third order kinetics |
| 9 | The acidic nature of alcohol is due to the presence of polar: | ☐ Carbon-oxygen bond | ☐ Carbon-hydrogen bond | ☒ Oxygen-hydrogen bond | ☐ Hydrogen-carbon bond |
| 10 | An electron rich center in alcohols is: | ☐ Carbon atom | ☐ Nitrogen atom | ☐ Hydrogen atom | ☒ Oxygen atom |
| 11 | Pentan-2-one and 3-methylbutanone are chain isomers of: | ☒ Carboxylic acids | ☐ Alcohols | ☐ Aldehydes | ☐ Ketones |
| 12 | Acetic acid and methyl formate are: | ☐ Chain isomers | ☐ Position isomers | ☒ Functional group isomers | ☐ Metamers |
| 13 | The first member of Group-IA metals react with oxygen to form: | ☒ Normal oxides | ☐ Peroxides | ☐ Suboxides | ☐ Superoxides |
| 14 | The element of group-IIA which does not react with oxygen below 600°C is: | ☒ Beryllium | ☐ Magnesium | ☐ Calcium | ☐ Strontium |
| 15 | SnCl ₄ and PbCl ₄ reacts with water: | ☐ Slowly | ☒ Rapidly | ☐ Violently | ☐ Explosively |
| 16 | The colour of solution of [Ti(H ₂ O) ₆] ³⁺ is: | ☐ Yellow | ☒ Green | ☐ Red | ☐ Purple |
| 17 | A homologous series is a group of organic compounds having: | ☐ Different functional groups | ☐ Same molecular formula | ☒ Same functional group | ☐ Different general formula |
| 18 | A chiral compound: | ☐ Has a super-imposable mirror image | ☐ Contains a plane symmetry | ☒ Has a non-superimposable mirror image | ☐ Contains a mirror plane |

Note: Time allowed for Section - B and Section - C is 2 Hours and 40 minutes.

Section - B

Marks: 40

Answer any TEN parts. Each part carries FOUR marks.

- Q.1 Define melting and boiling point. Why do metal oxides and silicon dioxide have high melting and boiling points? 1+1+1+1
- Q.2 Write the complete and balanced chemical reactions of the following with water. Also mention the nature of product formed in each case. 1+1+1+1
- (i) sodium oxide (ii) aluminum chloride
- (iii) phosphorus pentoxide (iv) phosphorus trichloride
- Q.3 Explain the trend in the polarizing ability of positive ions in a group. How is a negative ion polarized by a positive ion? Support your answer with a diagram. 2+1+1
- Q.4 Write the uses of the following: 1+1+1+1
- (i) coke (ii) coal tar (iii) ammoniacal liquor (iv) coal gas
- Q.5 Give the structures of the following: 1+1+1+1
- (i) 2, 4-dimethyl-4-ethylheptane (ii) 2-methylpropane
- (iii) 2, 2, 4-trimethyloctane (iv) 3-ethyl-3, 4, 6-trimethyloctane
- Q.6 Differentiate between symmetric and asymmetric alkenes. Give one example of each and explain behaviour of symmetric and asymmetric alkenes when HBr is added to them. 2+1+1
- Q.7 What are the Grignard's reagents? Write the reaction of methylmagnesium bromide with ethyl formate and ethyl acetate. Also write the names of products formed. 1+1+1+1
- Q.8 Define the nitration of benzene. How is nitrobenzene prepared? Prepare phenol from nitrobenzene in stepwise process. Give complete and balanced equation in each case. 1+1+2
- Q.9 Prepare the following using KMnO_4 as oxidizing agent: 2+2
- (i) methanoic acid (ii) ethanoic acid
- Q.10 Define glycosidic linkage. How is it formed? Illustrate your answer by drawing the structure of sucrose. 1+1+2
- Q.11 Write the two important uses of the following: 0.5x8
- (i) fuel oil (ii) light naphtha (iii) paraffin oil (iv) diesel oil
- Q.12 Define NMR spectroscopy. What types of information does it provide? Describe the concept of chemical shift and explain why is it important in proton NMR spectroscopy. 1+1+2
- Q.13 Define spectroscopy and give three of its important applications. 1+3

Section - C

Marks: 27

Note: Attempt any THREE questions. All questions carry equal marks.

- Q.14 (a) What is reducing agent? Explain why the iodide ion is considered the strongest reducing agent among the halide ions. Give two relevant examples. 1+2+2
- (b) What is coordination number of a central metal ion? Give an example. Determine the coordination number of the central metal ion and expected geometry of the following coordination compounds: (i) $[\text{AlF}_6]^{3-}$ (ii) $[\text{CuCl}_4]^{2-}$ 1+1+1+1
- Q.15 (a) Define hydrohalogenation of alkynes. Write complete and balanced chemical equations for the following: 1+2+2
- (i) addition of bromine to symmetric alkyne
- (ii) addition of bromine to asymmetric alkyne
- (b) Define E1 mechanism. Explain E1 mechanism in the following steps: 1+1+1+1
- (i) ionization of substrate (ii) abstraction of proton (iii) order of reaction
- Q.16 (a) What is halogenations of phenol? How does phenol react with bromine in CCl_4 ? Name the products formed and explain how these products can be separated. Also mention the reaction conditions. 1+2+1+1
- (b) What is meant by PCC? How is it prepared? How is acetone prepared using PCC? 1+1+2
- Q.17 (a) Describe flame photometry in five points. 1+1+1+1+1
- (b) Describe the importance of ozone layer for living organisms with reference to ultraviolet radiation in four points. 1+1+1+1