

**AGA KHAN UNIVERSITY EXAMINATION BOARD**

**HIGHER SECONDARY SCHOOL CERTIFICATE**

**CLASS XII EXAMINATION**

**MAY 2012**

**Chemistry Paper I**

**Time allowed: 40 minutes    Marks 30**

**INSTRUCTIONS**

1. Read each question carefully.
2. Answer the questions on the separate answer sheet provided. DO NOT write your answers on the question paper.
3. There are 100 answer numbers on the answer sheet. Use answer numbers 1 to 30 only.
4. In each question there are four choices A, B, C, D. Choose ONE. On the answer grid black out the circle for your choice with a pencil as shown below.

Correct Way	Incorrect Ways
1 (A) (B) ● (D)	1 (A) (B) (C) (D)
	2 (A) (B) ● (C) (D)
	3 (A) (B) (C) (D)
	4 (A) (B) (C) (D)

Candidate's Signature

5. If you want to change your answer, ERASE the first answer completely with a rubber, before blacking out a new circle.
6. DO NOT write anything in the answer grid. The computer only records what is in the circles.
7. You may use a scientific calculator if you wish.

- Which of the following alkaline earth metals form an amphoteric oxide?
  - Beryllium
  - Magnesium
  - Calcium
  - Strontium
- Silicon dioxide differs from carbon dioxide on the basis of
  - smaller size of silicon atoms.
  - weaker silicon-oxygen bonding.
  - single bonding at tetrahedral angles.
  - overall ratio of silicon-oxygen atoms i.e. 1:2.
- The acidity in hydrogen halides increases down the group because of increased
  - ionization.
  - dipole moment.
  - hydrogen bonding.
  - electronegativity.
- $[\text{CO}(\text{NH}_3)_6]^{3+}$  having  $\text{sp}^3\text{d}^2$  hybridization exhibits
  - tetrahedral geometry.
  - octahedral geometry.
  - square planar geometry.
  - trigonal bipyramidal geometry.
- $[\text{Ar}] 3\text{d}^9$  is the electronic configuration of
  - ${}_{27}\text{Co}^{+2}$
  - ${}_{28}\text{Ni}^{+2}$
  - ${}_{29}\text{Cu}^{+2}$
  - ${}_{30}\text{Zn}^{+2}$
- Which of the following conditions is required for the destructive distillation of coal?
  - Low temperature
  - Absence of air
  - Ammoniacal liquor
  - Mixture of silica and alumina
- The organic compounds give slow rate of reaction because of their
  - variable melting point.
  - solubility in non-polar solvents.
  - strong covalent bonding.
  - high concentration of carbon.

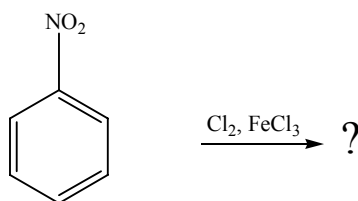
8. Terminal alkynes are acidic in nature because of the overlapping of

- A.  $sp - s$  orbitals.
- B.  $sp - sp$  orbitals.
- C.  $sp^2 - sp^2$  orbitals.
- D.  $sp^3 - sp^3$  orbitals.

9. Ethylene glycol is formed by the reaction of ethylene with

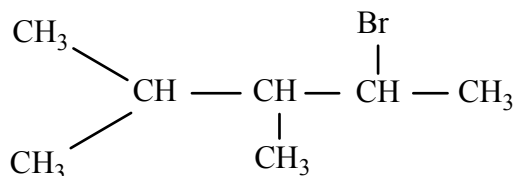
- A. oxygen.
- B. hypohalous acid.
- C. potassium dichromate.
- D. potassium permanganate.

10. Which of the following is the major organic product in the given reaction?



<p>A.</p>	<p>B.</p>	<p>C.</p>	<p>D.</p>
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11. Which of the following is the IUPAC name of the given compound?



- A. 3-bromo-1,1,2-trimethylbutane
- B. 2-bromo-3,4-dimethylpentane
- C. 4-bromo-2,3-dimethylpentane
- D. 1,1,2-trimethyl-3-bromobutane

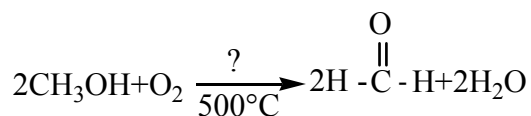
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12. Which of the following reactions of Grignard's reagent yields a tertiary alcohol?
- A.  $\text{RMgX} + \text{CO}_2$
  - B.  $\text{RMgX} + \text{HCHO}$
  - C.  $\text{RMgX} + \text{R}'\text{R}''\text{CO}$
  - D.  $\text{RMgX} + \text{R}'\text{CHO}$
13. Which of the following compounds of nitrogen has the most basic nature?
- A.  $\text{NH}_3$
  - B.  $\text{NH}_2\text{C}_2\text{H}_5$
  - C.  $\text{NH}(\text{C}_2\text{H}_5)_2$
  - D.  $\text{NH}_2\text{C}_6\text{H}_5$
14. Which of the following products is produced, when sodium alkoxide reacts with an alkyl halide?
- A. An ester
  - B. An ether
  - C. An aldehyde
  - D. An acid
15. Which of the following formulae indicates ether?
- A.  $\text{C}_3\text{H}_6\text{O}_2$
  - B.  $\text{C}_3\text{H}_6\text{O}$
  - C.  $\text{C}_3\text{H}_7\text{OH}$
  - D.  $\text{C}_3\text{H}_8\text{O}$
16. Which of the following is NOT a characteristic of phenol?
- A. It is partially soluble in water.
  - B. It is less acidic than alcohol.
  - C. It is a deliquescent solid.
  - D. It is less reactive to nucleophiles.
17. Which of the following tests is used to distinguish among the primary, secondary and tertiary alcohols?
- A. Lucas test
  - B. Biuret test
  - C. Hinsberg test
  - D. Silver mirror test

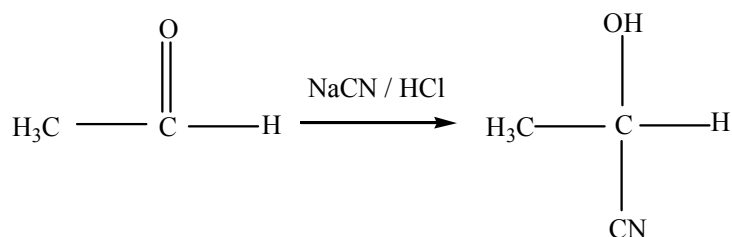
18. Which of the following reactions yields the indicated compound as a major product?

- A.  $\text{CH}_3 - \overset{\text{O}}{\parallel} \text{C} - \text{CH}_3 + \text{H}_2 \xrightarrow{\text{Pd, Pt or Ni}} \text{CH}_3 - \text{CH}_2 \text{OH}$
- B.  $\text{CH}_3 - \overset{\text{O}}{\parallel} \text{C} - \text{CH}_3 + \text{H}_2 \xrightarrow{\text{Pd, Pt or Ni}} \text{CH}_3 - \overset{\text{OH}}{\text{CH}} - \text{CH}_3$
- C.  $\text{CH}_3 - \overset{\text{O}}{\parallel} \text{C} - \text{H} + \text{H}_2 \xrightarrow{\text{Pd, Pt or Ni}} \text{CH}_3 \text{OH}$
- D.  $\text{CH}_3 - \overset{\text{O}}{\parallel} \text{C} - \text{H} + \text{H}_2 \xrightarrow{\text{Pd, Pt or Ni}} \text{CH}_3 \text{COOH}$

19. Which of the following catalysts is used in the industrial preparation of formalin?



- A. Platinised asbestos  
 B. Palladium chloride  
 C. Acidified sodium dichromate  
 D. Iron oxide - molybdenum oxide
20. Which of the following will react with carbonyl carbon to form the given product?

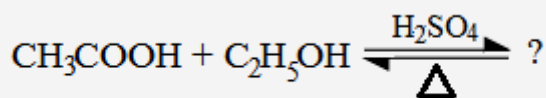


- A.  $\text{OH}^-$   
 B.  $\text{CN}^-$   
 C.  $\text{HCN}$   
 D.  $\text{NaCN}$
21. Which of the following compounds would be more soluble in water?

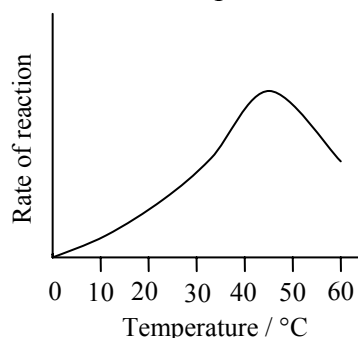
- A.  $\text{CH}_3 - \text{CH}_2 - \text{CH}_2 - \text{COOH}$   
 B.  $\text{CH}_3 - \text{CH}_2 - \text{CH}_2 - \text{CH}_2 - \text{COOH}$   
 C.  $\text{CH}_3 - \text{CH}_2 - \text{CH}_2 - \text{CH}_2 - \text{CH}_2 - \text{COOH}$   
 D.  $\text{CH}_3 - \text{CH}_2 - \text{CH}_2 - \text{CH}_2 - \text{CH}_2 - \text{CH}_2 - \text{COOH}$

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22. Which of the following products are formed when the given reactants react with each other?



- A. Amine + Water  
 B. Amide + Water  
 C. Ether + Water  
 D. Ester + Water
23. Which of the following sugars are the major constituents of a nucleoside?
- A. Glucose and maltose  
 B. Fructose and ribose  
 C. Ribose and deoxyribose  
 D. Deoxyribose and glucose
24. The graph below shows the action of lactase enzyme on lactose at different temperatures. The reaction rate falls after 45°C because the
- A. entire enzyme has been consumed.  
 B. reaction has attained equilibrium.  
 C. enzyme has lost its active sites.  
 D. activation energy has decreased.



25. Which of the following controls hyperglycemia?

- A. Insulin  
 B. Adrenaline  
 C. Thyroxin  
 D. Thrombin

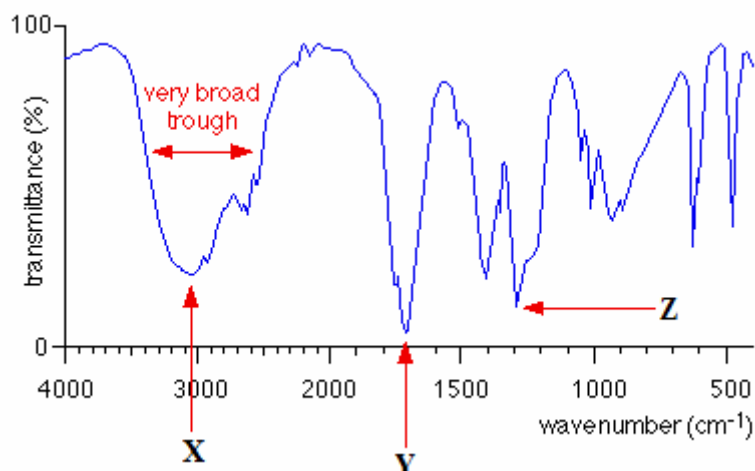
26. Nylon is used extensively in rope making because it is

- A. rigid.  
 B. heat resistant.  
 C. easy to launder.  
 D. strong and elastic.

27. Which of the following monomers is used in the formation of polyvinyl chloride?

- A.  $\text{ClCH} = \text{CHCl}$   
 B.  $\text{ClCH}_2 - \text{CH}_2\text{Cl}$   
 C.  $\text{CH}_2 = \text{CHCl}$   
 D.  $\text{CH}_3 - \text{CH}_2\text{Cl}$

28. The infrared spectrum shown below is of a compound K.



Bond	Range / $\text{cm}^{-1}$
O – H (alcohols)	3230 – 3550
O – H (acids)	2500 – 3000
C = C	1620 – 1680
C = O	1680 – 1750
C – O	1000 – 1300
C – H	2850 – 3300

On the basis of absorptions marked as X, Y and Z, the structure of the compound is  
(Hint: Table of infrared absorption data is given for your reference)

- A.  $\text{C}_6\text{H}_5$ .  
 B.  $\text{CH}_3\text{COCH}_3$ .  
 C.  $\text{CH}_3\text{CH}_2\text{OH}$ .  
 D.  $\text{CH}_3\text{COOH}$ .
29. Which of the following reacts with ozone and breaks it apart?
- A.  $[\text{O}]$   
 B.  $\text{Cl}_2$   
 C.  $\text{Cl}^\bullet$   
 D.  $\text{ClO}^\bullet$
30. Which of the following is TRUE about atomic absorption spectroscopy?
- A. It detects vibrational and rotational transitions.  
 B. It determines the concentration of a particular analyte.  
 C. It determines the functional group in an organic compound.  
 D. It detects electronic transitions between molecular energy levels.

Please use this page for rough work