AGA KHAN UNIVERSITY EXAMINATION BOARD

HIGHER SECONDARY SCHOOL CERTIFICATE

CLASS XII

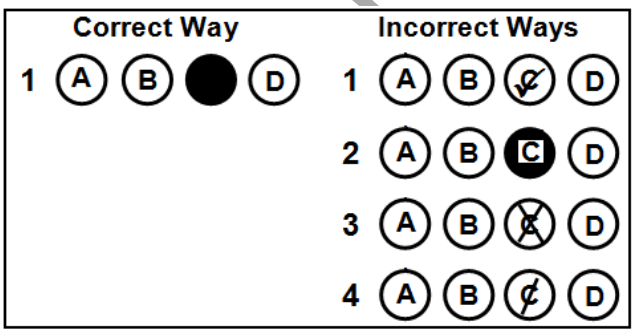
MODEL EXAMINATION PAPER 2020

Chemistry Paper I

Time: 50 minutes Marks: 35

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 35 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.



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.

1. $1s^2, 2s^2, 2p^6, 3s^2, 3p^6, 4s^2, 3d^{10}, 4p^6, 5s^2, 4d^{10}, 5p^6, 6s^2, 4f^{14}, 5d^{10}, 6p^2$

   The given electronic configuration indicates that the element belongs to group

   A. IIA.
   B. IVA.
   C. VA.
   D. VIA.

2. In group VIIA of the periodic table, the melting point of elements from top to bottom

   A. increase with the increase in atomic size.
   B. decrease with the increase in atomic number.
   C. decrease with the increase in shielding effect.
   D. increase with the increase in electronegativity.

3. Ethylenediamine is a ligand that comprises of **X** donor atom(s) having **Y** electrons for bonding. The CORRECT interpretation of **X** and **Y** for the given ligand is

	X	**Y**
A	1	2
B	2	2
C	2	4
D	4	6

4. Consider the given reaction of potassium permanganate ($KMnO_4$) with iron sulphate ($FeSO_4$).

   $$2KMnO_4 + 10FeSO_4 + 8H_2SO_4 \rightarrow K_2SO_4 + 2MnSO_4 + 5Fe_2(SO_4)_3 + 8H_2O$$

   The element which is reduced in the given reaction is

   A. iron (Fe).
   B. sulphur (S).
   C. potassium (K).
   D. manganese (Mn).

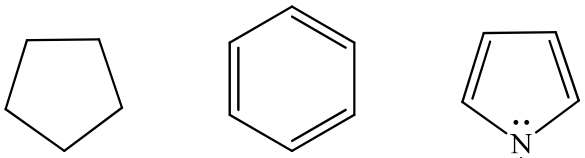
5. The functional group present in H_3CCONH_2 is

   A. $>CO$
   B. $-NH_2$
   C. $-CONH_2$
   D. $-COCH_3$

6. Chiral centre is absent in

A. $(C_6H_5)CH(OH)_2$
B. $H_3CCH(OH)C_2H_5$
C. $(C_6H_5)CH(OH)CHO$
D. $(C_6H_5)CH(OH)COCH_3$

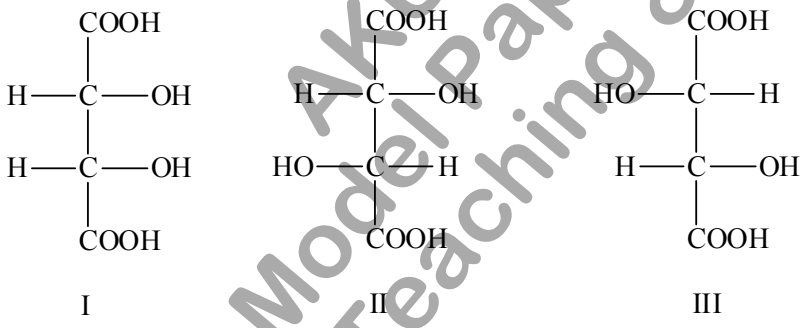
7. The compound(s) with carbocyclic nature is/ are



I II III

A. I only.
B. III only.
C. I and II.
D. II and III.

8. Which of the given molecule(s) is/ are optically inactive?



I II III

A. I only
B. II only
C. I and III
D. II and III

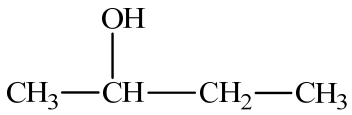
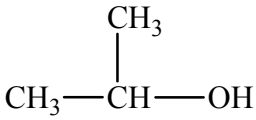
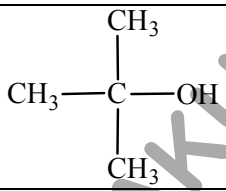
9. The MOST acidic among the given substituted phenols is

A. p-nitrophenol.
B. p-aminophenol.
C. p-chlorophenol.
D. p-methoxyphenol.

10. Which of the following statements is TRUE about Lucas test?

A. The test distinguishes among primary, secondary and tertiary amines.
B. The test result confirms that 1° carbocations are more stable than 2° and 3°.
C. The test reagent is a saturated solution of anhydrous $ZnCl_2$ in concentrated HCl.
D. The test uses an aqueous solution of sodium hydroxide and benzenesulfonyl chloride.

11. In Lucas test, the alcohol which forms an oily layer on heating is

A	
B	
C	
D	

12. The test that can distinguish phenols from alcohols is the

A. Biuret test.
B. Litmus test.
C. Tollen's test.
D. Baeyer's test.

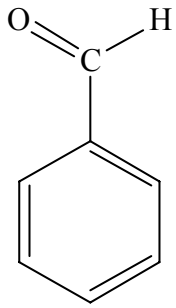
13. The alcohol which can undergo oxidative cleavage to form two carbonyl compounds is

A. 1,3-diol.
B. 1,4-diol.
C. vicinal diol.
D. geminal diol.

14. In the nitration of benzene, the first step involves the reaction of sulphuric acid with nitric acid. This reaction generates

A. NO
B. SO_3
C. NO_2^-
D. NO_2^+

15. The name of the given aromatic compound is

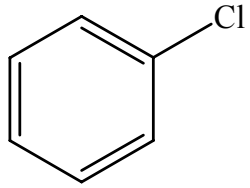
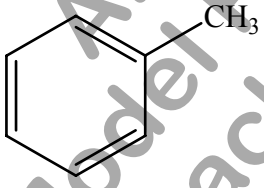
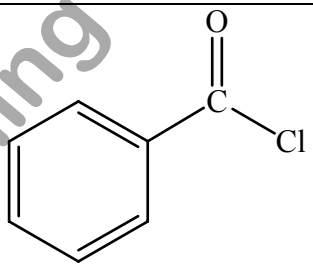
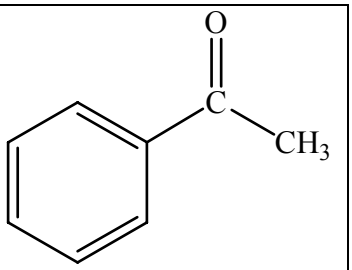


A. benzoic acid.
B. benzaldehyde.
C. 1-phenylethan-1-one.
D. 2-phenylacetaldehyde.

16. 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.

17. When benzene reacts with acetyl chloride (CH_3COCl) in the presence of aluminium chloride ($AlCl_3$), it gives

			
A	B	C	D

18. Formalin should always be used with adequate ventilation preferably under a fume hood because it has a tendency to

A. coagulate easily.
B. decolourise readily.
C. cause allergic reactions.
D. corrode reaction vessels.

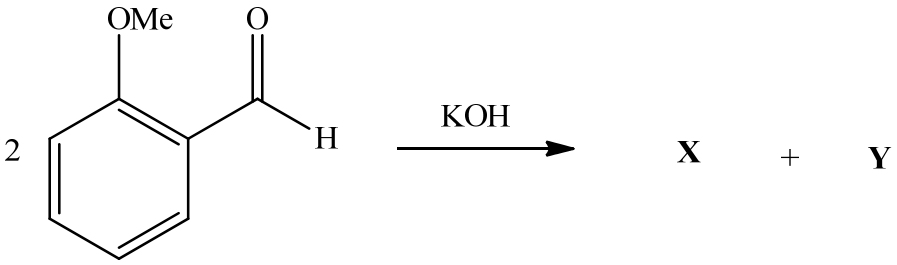
19. Which of the following statement(s) is/ are TRUE for a molecule of glucose?

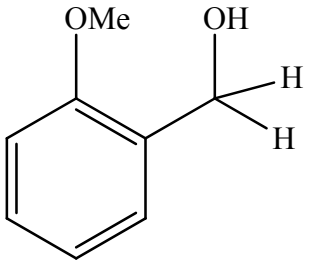
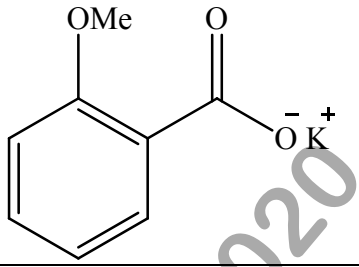
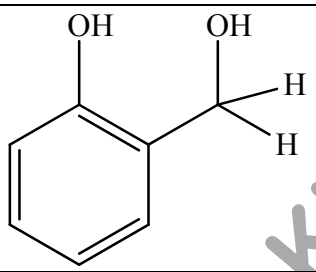
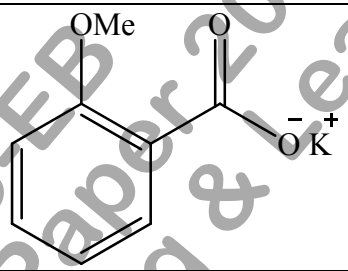
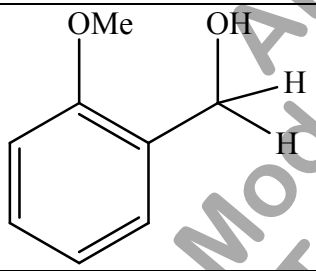
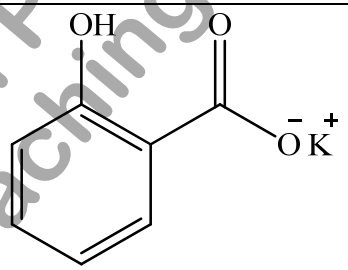
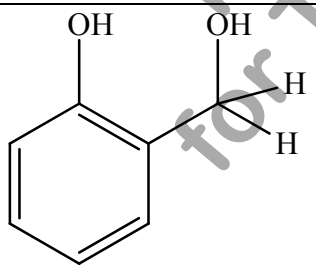
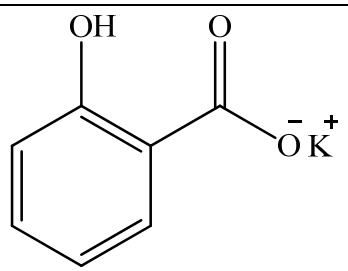
I. It is an aldohexose that can easily be oxidised.
II. It consists of ketone and hydroxyl functional groups.
III. It forms brick red precipitate with Benedict's solution.

A. I only
B. II only
C. I and III
D. II and III

PLEASE TURN OVER THE PAGE

20. The products **X** and **Y** in the given reaction are



	X	Y
A		
B		
C		
D		

21. When carboxylic acids are decomposed into carbonates and bicarbonates, the gas that evolves is

A. oxygen.
B. ammonia.
C. carbon dioxide.
D. carbon monoxide.

22. The compound that yields ethanoic acid when hydrolysed with hydrochloric acid is

A. CH_3MgBr
B. $CH_3C \equiv N$
C. CH_3CH_2OH
D. $CH_3CH = CHCH_3$

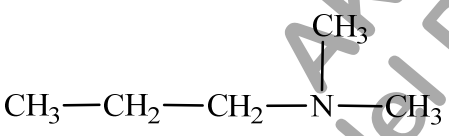
23. Which of the following compounds is LEAST soluble in water?

A. CH_3COOH
B. CH_3CH_2COOH
C. $CH_3(CH_2)_2COOH$
D. $CH_3(CH_2)_4COOH$

24. When tertiary butyl iodide is forced to undergo dehydrohalogenation, the major resulting product is

A. 1-butene.
B. 2-butene.
C. 2-methyl propene.
D. 1,1-dimethyl ethene.

25. The IUPAC (International Union of Pure and Applied Chemistry) name of the given amine is



A. methyl amino butane.
B. dimethyl amino propane.
C. 2-methyl-2-amino butane.
D. 2-methyl propyl amino ethane.

26. The MOST stable diazonium salt is

A. $C_6H_5 - N_2^+$
B. $CH_3 - CH_2 - N_2^+$
C. $C_6H_5 - CH_2 - N_2^+$
D. $CH_3 - CH_2 - CH_2 - N_2^+$

27. On hydrolysis, a molecule of sucrose yields

A. two molecules of glucose.
B. two molecules of fructose.
C. one molecule each of glucose and fructose.
D. one molecule each of glucose and galactose.

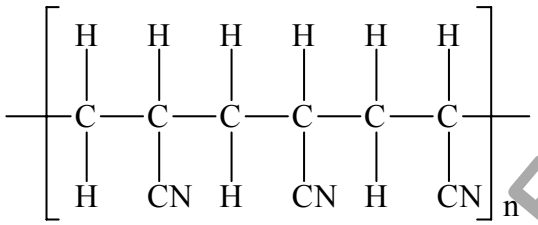
28. At isoelectric point of approximately 4.6, the casein protein will have

A. minimum solubility.
B. maximum solubility.
C. a net positive charge.
D. a net negative charge.

29. The process of breaking higher hydrocarbons (large molecules) into a variety of lower hydrocarbons (small molecules) is known as

A. cracking.
B. catenation.
C. fractional distillation.
D. destructive distillation.

30. The given structure shows a part of a polyacrylonitrile molecule.



The structure of the monomer forming the given polymer is

A. $HC \equiv C - CN$
B. $H_2C = CH - CN$
C. $H_3C - CH_2 - CN$
D. $H_3C - CH = CH - CN$

31. Which of the following is FALSE about fractional distillation?

A. The fractionating column provides large surface area for condensation.
B. Heavy fractions are runny with lower boiling points than light fractions.
C. Fractions of short chain hydrocarbons are collected at the top of the column.
D. Fractions of long chain hydrocarbons are collected at the bottom of the column.

32. The causative agent of reducing smog is

A. ultraviolet radiations.
B. nitrogen oxides.
C. sulphur dioxide.
D. ozone.

33. Coagulation during water purification helps to remove

A. volatile organic compounds.
B. foul-smelling dissolved gases.
C. disease causing microorganisms.
D. large amounts of suspended solids.

34. The BEST description of atomic absorption spectrum is that it

A. occurs when light is passed through a hot solid.
B. contains bright lines against a dark background.
C. contains dark lines against a bright background.
D. occurs when a gas is subjected to high pressure.

35. In mass spectroscopy, the electron which is the most easily removed from a target atom/ molecule is

A. non-bonded.
B. sigma bonded.
C. isolated π bonded.
D. delocalised π bonded.

END OF PAPER

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