



# CANDIDATE ANSWER BOOKLET

## JEE

### CANDIDATE DETAILS

**NAME OF STUDENT**

**DATE OF EXAMINATION**  /  /

**CLASS**

**BOARD**

**TIME DURATION**  :  To  :

#### READ THE INSTRUCTIONS CAREFULLY

- Please read these instructions carefully. A candidate who breaches any of the Examination Regulations will be liable to disciplinary action
- Examinations will be conducted during the allocated times shown in the examination timetable.
- Do NOT turn over the question paper until instructed at the time of commencement of the examination.
- Any unauthorised materials or devices found in your possession after the start of the examination will be confiscated, and you will be liable to disciplinary action.
- Handphones brought into the examination hall must be switched off at ALL times. If your handphone is found to be switched on in the examination hall, the handphone will be confiscated and retained for investigation of possible violation of regulations.
- Please check that you have the correct question paper and read the instructions printed on your examination question paper carefully.
- You are not allowed to communicate by word of mouth or otherwise with other candidates (this includes the time when answer scripts are being collected).
- Please raise your hand if you wish to communicate with an invigilator.
- Unless granted permission by an invigilator, you are not allowed to leave your seat.
- Once you have entered the examination hall, you will not be allowed to leave the hall until one hour after the examination has commenced.

#### QUESTION PAPER FORMAT

- Each question carries 4 marks.
- For correct answer, +4 marks. For wrong answer, -1 marks. For no attempt, 0 marks.
- All questions are compulsory.
- The question paper contains 25 objective type questions.
- Total time duration of the examination is 60 minutes.

#### SCORE CARD

+4

0

-1

**Total Score**

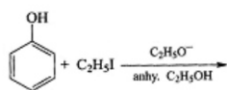
**Pass Score**

**Result**

**Pass/Fail**

## CHAPTER: ALKYL HALIDES

1. The product of following reaction is



- (a)  $\text{C}_6\text{H}_5\text{OC}_2\text{H}_5$
- (b)  $\text{C}_2\text{H}_5\text{OC}_2\text{H}_5$
- (c)  $\text{C}_6\text{H}_5\text{OC}_6\text{H}_5$
- (d)  $\text{C}_6\text{H}_5\text{I}$

2. The compound that will react most readily with NaOH to form methanol is

- (a)  $(\text{CH}_3)_4\text{N}^+\text{I}^-$
- (b)  $\text{CH}_3\text{OCH}_3$
- (c)  $(\text{CH}_3)_3\text{S}^+\text{I}^-$
- (d)  $(\text{CH}_3)_3\text{Cl}$

3. An  $\text{S}_{\text{N}}2$  reaction at an asymmetric carbon of a compound always gives

- (a) An enantiomer of the substrate
- (b) A product with opposite optical rotation
- (c) A mixture of diastereomers
- (d) A single stereoisomer

4. The order of reactivities of the following alkyl halides for a  $\text{S}_{\text{N}}2$  reaction is

- (a)  $\text{RF} > \text{RCl} > \text{RBr} > \text{RI}$
- (b)  $\text{RF} > \text{RBr} > \text{RCl} > \text{RI}$
- (c)  $\text{RCl} > \text{RBr} > \text{RF} > \text{RI}$
- (d)  $\text{RI} > \text{RBr} > \text{RCl} > \text{RF}$

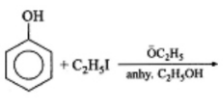
5. Which of the following has the highest nucleophilicity?

- (a)  $\text{F}^-$
- (b)  $\text{OH}^-$
- (c)  $\text{CH}_3^-$
- (d)  $\text{NH}_2^-$

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## CHAPTER: PHENOLS

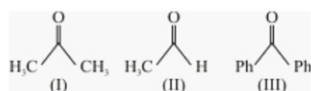
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6. When phenol is treated with excess of bromine water, it gives
- m*-bromophenol
  - o*- and *p*-bromophenol
  - 2,4-dibromophenol
  - 2,4,6-tribromophenol
7. In the reaction of *p*-chlorotoluene with  $\text{KNH}_2$  in liq.  $\text{NH}_3$ , the major product is
- o*-toluidine
  - m*-toluidine
  - p*-toluidine
  - p*-chloroaniline
8. 
- $\text{C}_6\text{H}_5\text{OC}_2\text{H}_5$
  - $\text{C}_2\text{H}_5\text{OC}_2\text{H}_5$
  - $\text{C}_6\text{H}_5\text{OC}_6\text{H}_5$
  - $\text{C}_6\text{H}_5\text{I}$
9. Phenol is heated with a solution of mixture of  $\text{KBr}$  and  $\text{KBrO}_3$ . The major product obtained in the above reaction is
- 2-bromophenol
  - 3-bromophenol
  - 4-bromophenol
  - 2, 4, 6-tribromophenol
10. The correct order of acid strength of the following compound is
- I. Phenol II. *p*-cresol  
 III. *m*-nitrophenol IV. *p*-nitrophenol
- III > II > I > IV
  - IV > III > I > II
  - II > IV > I > III
  - I > II > IV > III

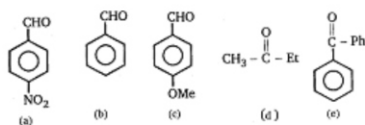
## CHAPTER: ALDEHYDES AND KETONES

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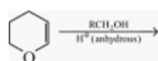
11. Trans esterification is the process of
- Conversion of an aliphatic acid to ester
  - Conversion of an aromatic acid to ester
  - Conversion of one ester to another ester
  - Conversion of an ester into its components namely acid and alcohol
12. The order of reactivity of phenyl magnesium bromide with the following compound is



- (II) > (III) > (I)
  - (I) > (III) > (II)
  - (II) > (I) > (III)
  - All react with the same rate
13. The correct order of rate of reaction towards nucleophilic addition reaction



- $a > b > c > d > e$
  - $a > b > d > c > e$
  - $a > d > e > b > c$
  - $a > b > e > d > c$
14. M-chlorobenzaldehyde on reaction with conc. KOH at room temperature gives
- potassium *m*-chlorobenzoate and *m*-chlorobenzyl alcohol
  - m*-hydroxy benzaldehyde and *m*-chlorobenzyl alcohol
  - m*-chlorobenzyl alcohol and *m*-hydroxy benzyl alcohol
  - potassium *m*-chlorobenzoate and *m*-hydroxy benzaldehyde
15. The major product of the following reaction is



- A hemiacetal
- An acetal
- An ether
- An ester

## CHAPTER: ELECTROCHEMISTRY

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16. Electrolysis of dilute aqueous NaCl solution was carried out by passing 10 mA current. The time required to liberate 0.01 mole of H<sub>2</sub> gas at the cathode is ( $1F = 96500\text{Cmol}^{-1}$ )
- (a)  $9.65 \times 10^4$   
(b)  $19.3 \times 10^4$   
(c)  $28.95 \times 10^4$  s  
(d)  $38.6 \times 10^4$  s
17.  $\text{Zn} | \text{Zn}^{2+} (a = 0.1 \text{ M}) || \text{Fe}^{2+} (a = 0.01 \text{ M}) | \text{Fe}$ . The emf of the above cell is 0.2905 V. Equilibrium constant for the cell reaction is
- (a)  $10^{0.32/0.059}$   
(b)  $10^{0.32/0.0295}$   
(c)  $10^{0.26/0.0295}$   
(d)  $10^{0.32/0.295}$
18. In the electrolytic cell, flow of electrons is from
- (a) Cathode to anode in solution  
(b) Cathode to anode through external supply  
(c) Cathode to anode through internal supply  
(d) Anode to cathode through internal supply
19. The correct order of equivalent conductance at infinite dilution of LiCl, NaCl and KCl is
- (a)  $\text{LiCl} > \text{NaCl} > \text{KCl}$   
(b)  $\text{KCl} > \text{NaCl} > \text{LiCl}$   
(c)  $\text{NaCl} > \text{KCl} > \text{LiCl}$   
(d)  $\text{LiCl} > \text{KCl} > \text{NaCl}$
20. The standard reduction potential values of three metallic cations, X, Y, Z are 0.52, -3.03 and -1.18 V respectively. The order of reducing power of the corresponding metals is
- (a)  $Y > Z > X$   
(b)  $X > Y > Z$   
(c)  $Z > Y > X$   
(d)  $Z > X > Y$

**CHAPTER: CHEMICAL KINETICS**

21. In a first order reaction the concentration of reactant decreases from  $800 \text{ mol/dm}^3$  to  $50 \text{ mol/dm}^3$  in  $2 \times 10^4 \text{ s}$ . The rate constant of reaction in  $\text{s}^{-1}$  is
- (a)  $2 \times 10^4$
  - (b)  $3.45 \times 10^{-5}$
  - (c)  $1.386 \times 10^{-4}$
  - (d)  $2 \times 10^{-4}$
22. Consider a reaction  $a\text{G} + b\text{H} \rightarrow \text{products}$ . When a concentration of both the reactants G and H is doubled, the rate increases by eight times. However, when concentration of G is doubled keeping the concentration of H fixed, the rate is doubled. The overall order of the reaction is
- (a) 0
  - (b) 1
  - (c) 2
  - (d) 3
23. The half-life period of a radioactive element is 140 days. After 650 days, one gram of the element will reduce to
- (a)  $\frac{1}{2^8} \text{ g}$
  - (b)  $\frac{1}{4^8} \text{ g}$
  - (c)  $\frac{1}{8^8} \text{ g}$
  - (d)  $\frac{1}{16^8} \text{ g}$
24. The rate constant for the reaction,  $2\text{N}_2\text{O}_5 \rightarrow 4\text{NO}_2 + \text{O}_2$  is  $3.0 \times 10^{-4} \text{ s}^{-1}$ . If the rate is  $2.40 \times 10^{-4} \text{ mol L}^{-1} \text{ s}^{-1}$ , then the concentration of  $\text{N}_2\text{O}_5$  (in  $\text{mol L}^{-1}$ ) is
- (a) 1.4
  - (b) 1.2
  - (c) 0.04
  - (d) 0.8
25. (A) follows first order reaction,  $(\text{A}) \rightarrow \text{product}$ . Concentration of A, changes from 0.1 M to 0.025 M in 40 min. Find the rate of reaction of A when concentration of A is 0.01 M.
- (a)  $3.74 \times 10^{-4} \text{ M min}^{-1}$
  - (b)  $3.47 \times 10^{-4} \text{ M min}^{-1}$
  - (c)  $1.73 \times 10^{-4} \text{ M min}^{-1}$
  - (d)  $1.73 \times 10^{-3} \text{ M min}^{-1}$

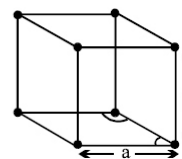
## CHAPTER: SOLUTIONS

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26. How many moles of oxalic acid are oxidized by one mole of  $\text{KMnO}_4$  in acidic medium?
- (a) 5  
(b) 2.5  
(c) 2  
(d) 4
27. Ratio of moles of Fe(II) oxidized by equal volumes of equimolar  $\text{KMnO}_4$  and  $\text{K}_2\text{Cr}_2\text{O}_7$  solutions in acidic medium will be
- (a) 5 : 3  
(b) 1 : 1  
(c) 1 : 2  
(d) 5 : 6
28. 0.66 g of  $\text{H}_3\text{PO}_2$  will require x mL of 0.1 M NaOH for complete neutralization, x is:
- (a) 100 mL  
(b) 200 mL  
(c) 300 mL  
(d) None of these
29. 10 g sample of  $\text{H}_2\text{O}_2$  just decolorized 100 mL of 0.1 M  $\text{KMnO}_4$  in acidic medium. % by mass of  $\text{H}_2\text{O}_2$  in the sample is:
- (a) 3.40  
(b) 8.5  
(c) 17.0  
(d) 1.70
30. If x g is the mass of  $\text{NaHC}_2\text{O}_4$  required to neutralize 100 mL of 0.2 M NaOH and y g that required to reduce 100 mL of 0.02 M  $\text{KMnO}_4$  in acidic medium. then
- (a)  $x = y$   
(b)  $2x = y$   
(c)  $x = 4y$   
(d)  $4x = y$

**INTEGER TYPE QUESTIONS** All answers are integers from 1 to 9

1. Ice crystallizes in a hexagonal lattice. At the low temperature at which the structure was determined, the lattice constants were  $a = 4.53 \text{ \AA}$ , and  $b = 7.60 \text{ \AA}$  (see figure). How many molecules are contained in a given unit cell? [density (ice) =  $0.92 \text{ gm/cm}^3$ ]



Answer:

2. The two ions  $A^+$  and  $B^-$  have radii 88 and 200 pm respectively. In the closed packed crystal of compound AB, predict the co-ordination number of  $A^+$ .

Answer:

3. For a reaction  $A \longrightarrow B \longrightarrow C$   $t_{1/2}$  for A & B are 4 and 2 minutes respectively. How much time would be required for the B to reach maximum concentration.

Answer:

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**OMR**

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