TEST RIDER

Comprehensive Simulator Test Series for JEE Main & Advanced

JEE MAIN

(PAPER TWO SCALE UP)

HALF TEST 2

(XII SYLLABUS)

WITH ANSWER KEY

Mock Questions from Class XIIth syllabus to enhance Your Problem Solving Skills

INSTRUCTIONS

- This test consists of 30 questions and each question is allotted 4 marks for correct response.
- Candidates will be awarded marks as stated above for correct response of each question. 1/4 marks will be deducted for indicating incorrect response of each question. No deduction from the total score will be made if no response is indicated for an item in the answer sheet.
- There is only one correct response for each question. Filling up more than one response in any question will be treated as wrong response and marks for wrong response will be deducted according as per instructions.

1. An element crystallises in two forms (x) and (y); (x) form has fcc structure with $a = 3.80$ Å and (y) has bcc structure with $a = 3.0$ Å.

The ratio of densities of (x) to that of (y) is

(a) 1 : 1 (b) 1 : 2

(c) 2 : 1 (d) 2 : 3

2. CN^- and N_2 are isoelectronic but as compared to CN^- ion, N_2 is inert due to

(a) low bond dissociation energy

(b) unsymmetrical electronic distribution of electrons

(c) presence of more electrons in bonding orbitals

(d) absence of polarity

3. Methyl cyanide when treated with methyl magnesium chloride followed by hydrolysis gives

(a) propanal (b) propanol

(c) propanone (d) ethanol

4. 100 g of ethylene glycol dissolved in 400 g of water at the temperature of – 9.3°C. The amount of water separates out as ice will be (Molar mass of ethylene glycol = 62 and K_f for water 1.86 K kg mol^{-1}).

(a) 322.5 g (b) 77.4 g

(c) 38.7 g (d) 200.0 g

5. Which of the following statement about NO_2 and N_2O_4 is correct?

(a) NO_2 is diamagnetic while N_2O_4 is paramagnetic

(b) NO_2 is paramagnetic while N_2O_4 is diamagnetic

(c) Both are diamagnetic

(d) Both are paramagnetic

6. Identify the incorrect statement.

(a) PCl_5 exist but NCl_5 does not

(b) Nitrogen form oxides in all (+ 1 to + 5) oxidation states

(c) All S—O bonds in SO_3^{2-} are not of equal length

(d) None of the above

7. 100 mL of 1 M solution of $CuCl_2$ is electrolysed with the current of 1.0 A for 1 h. The normality of the remaining solution will be

(a) 1 N (b) 1.63 N

(c) 2.00 N (d) 2.20 N

8. An unknown gas (Z) is used to produce Holme's signal. The gas when burns in air give a pentoxide with white smoke (vortex rings). The gas is highly poisonous and reactive.

The gas (Z) is

(a) PCl_3 (b) N_2O

(c) PH_3 (d) NCl_3

9. The gas evolved on anode during electrolysis of $K_2SO_4(aq)$ solution using platinum electrodes will be

(a) H_2 (b) SO_2

(c) SO_3 (d) O_2

10. Which of the following on reaction will give cyclohexane?

(a) Cyclohexene and HBr followed by treatment with KOH (alcoholic)

(b) Cyclohexanol and Mg followed by treatment with CO_2

(c) Bromocyclohexane and Mg in dry ether followed by H_2O

(d) Isopropyl bromide and Na in presence of dry ether

11. Which of the following compound can show tautomerism?

(a) $C_6H_5NO_2$ (b) $(CH_3)_3C \cdot NO_2$

(c) $C_2H_5 \cdot NO_2$ (d) $(C_6H_5)_3C \cdot NO_2$

12. Which of the following statement is correct?

(a) Most common oxidation state for lanthanoids is + 2 and for actinoids is + 2 and + 4

(b) The electronic configuration of actinoids cannot be assigned with accuracy because of small energy difference in 5*f* and 6*d*-energy levels

(c) Basic strength of hydroxides of lanthanoids increases from $La(OH)_3$ to $Lu(OH)_3$

(d) Lu^{3+}, Yb^{3+} and Cu^{4+} are paramagnetic in nature

13. For a reaction,

$A + B \longrightarrow$ Products.

Initial concentration ($mol\,L^{-1}$)			Initial rate ($mol\,L^{-1}\,s^{-1}$)
S.No.	$[A]_0$	$[B]_0$	
1.	0.2	0.2	0.1
2.	0.4	0.2	0.2
3.	0.2	0.4	0.1

The rate equation for the above reaction is

(a) $r = k[A][B]$

(b) $r = k[A]$

(c) $r = k[B]$

(d) $r = k[A][B]^2$

14. Consider the following statements.

I. White phosphorus is a translucent, white waxy, poisonous and insoluble in water.

II. White phosphorus is a translucent, white waxy, non-poisonous and insoluble in water.

III. White phosphorus is a translucent, white waxy, poisonous and soluble in water.

IV. White phosphorus is a non-translucent, white waxy, poisonous and soluble in water.

Choose the incorrect statement(s) given above.

(a) Only II

(b) Both I and II

(c) II, III and IV

(d) Both III and IV

15. A 6% solution of sucrose (molar mass = 342 g mol^{-1}) is isotonic with 4 per cent solution of an unknown non-volatile substance. At same temperatures, the molecular mass of unknown substance will be

(a) 513 (b) 70 (c) 684 (d) 228

16. Which of the following solution act as disinfectant?

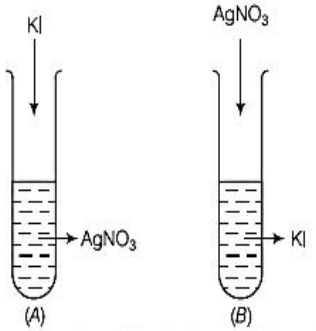
(a) 2 – 3% solution of iodine in alcohol and water

(b) Mixture of chloroxylenol (also known as parachlorometa xylenol) and terpineol

(c) 1% solution of phenol

(d) Both (a) and (b)

17. A sol of AgI is prepared by mixing $AgNO_3$ and KI as follows:



The charge on the colloidal particles of (*A*) and (*B*) are respectively.

(a) positive on both (*A*) and (*B*)

(b) negative on both (*A*) and (*B*)

(c) positive on (*A*) and negative on (*B*)

(d) negative on (*A*) and positive on (*B*)

18. The correct increasing order of basic strength of $C_6H_5NH_2$, $(C_2H_5)_2NH$ and $C_2H_5NH_2$ is

(a) $C_2H_5NH_2 < (C_2H_5)_2NH < C_6H_5NH_2$

(b) $C_6H_5NH_2 < (C_2H_5)_2NH < C_2H_5NH_2$

(c) $C_6H_5NH_2 < C_2H_5NH_2 < (C_2H_5)_2NH$

(d) $(C_2H_5)_2NH < C_2H_5NH_2 < C_6H_5NH_2$

19. A compound (*A*) with molecular formula, $C_4H_{10}O$ is soluble in conc. $H_2SO_4 \cdot (A)$ on heating with excess of HI gives a single alkyl halide as product. (*A*) is

(a) C_4H_9OH (b) $C_2H_5—\underset{\displaystyle OH}{\underset{|}{CH}}—CH_3$

(c) $CH_3CH_2OCH_2CH_3$ (d) $CH_3—O—C_3H_7$

20. For a reaction,

$$\underset{\text{[Reactant]}}{X} \longrightarrow \underset{\text{[Product]}}{Y}$$

If, E_a for forward reaction = 20 kJ mol^{-1}

E_a for backward reaction = 10 kJ mol^{-1}

and potential energy of (*X*) = 11 kJ mol^{-1}.

The heat of reaction (ΔH) and value of threshold energy of the reaction will be, respectively

(a) 9 kJ mol^{-1} and 30 kJ mol^{-1}

(b) 9 kJ mol^{-1} and 31 kJ mol^{-1}

(c) 10 kJ mol^{-1} and 30 kJ mol^{-1}

(d) 10 kJ mol^{-1} and 31 kJ mol^{-1}

21. Consider the following observations and identify the compounds *A* and *B*.

(i) Compound *A* is prepared by oxidation of compound *B* using alkaline $KMnO_4$.

(ii) *A* on reduction with $LiAlH_4$ gives *B*.

(iii) *A* and *B* react together in presence of H_2SO_4 to give a fruity smell.

(a) $A = RCH_2OH$, $B = RCHO$

(b) $A = R \cdot COOH$, $B = RCH_2OH$

(c) $A = R \cdot CH_2OH$, $B = R \cdot COOH$

(d) $A = R \cdot CHO$, $B = R \cdot COOH$

22. A complex, $[M(H_2O)_6]Cl_3$ (Z of $M = 24$) show magnetic moment of 3.83 BM then the correct distribution of 3*d*-electrons in the orbitals of M is

(a) $3d^1_{(xy)}, 3d^1_{(yz)}, 3d^1_{(zx)}$

(b) $3d^1_{(xy)}, 3d^1_{(z^2)}, 3d^1_{(x^2-y^2)}$

(c) $3d^1_{(z^2)}, 3d^1_{(xy)}, 3d^1_{(yz)}$

(d) $3d^1_{(x^2-y^2)}, 3d^1_{(xy)}, 3d^1_{(yz)}$

23. Which of the following reaction confirms presence of five —OH groups in glucose?

(a) Glucose + Br_2(aqueous)

(b) Glucose + HNO_3

(c) Glucose + Acetic anhydride

(d) Glucose + NH_2OH

24. Which of the following statement is incorrect when a mixture of NaCl and $K_2Cr_2O_7$ is gently warmed with conc. H_2SO_4?

(a) A deep red vapours is formed

(b) Vapours when passed into NaOH solution gives a yellow solution of Na_2CrO_4

(c) Chlorine gas is evolved

(d) Chromyl chloride is formed

25. For the reaction,

$$2A(g) + 3B(g) + C(g) \longrightarrow \text{Products}$$

Time (in min)	0	100	200
Partial pressure of (*A*) (mm Hg)	800	400	200

At a given temperature, order and rate constant of the said reaction are respectively

(a) zero, 6.93×10^{-3} min

(b) first, 0.693 min

(c) first, 6.93×10^{-3} min

(d) zero, 0.693 min

26. In the following reaction,

$$CH_3CHO + C_2H_5MgCl \xrightarrow{H_2O} (A) \xrightarrow[(443\ K)]{\text{Conc. } H_2SO_4} (B)$$

The major products (*A*) and (*B*) are respectively

(a) $CH_3CH_2CH_2CH_2OH$ and $CH_3CH_2OCH_2CH_3$

(b) $CH_3—\underset{\displaystyle OH}{\underset{|}{C}}H—C_2H_5$ and $CH_3—CH=CH—CH_3$

(c) $CH_3CH_2CH_2CH_2OH$ and $CH_3—OCH_2—CH_2—CH_3$

(d) $CH_3CH_2CH_2CH_2OH$ and $CH_2=CH—CH_2—CH_3$

27. An organic compound (*A*) with molecular formula C_6H_6O, on treatment with NaOH and CO_2 at 400 K under pressure gives (*B*). (*A*) gives a characteristic colour with aqueous $FeCl_3$. (*A*) and (*B*) are respectively

(a) phenol and salicylic acid

(b) hexanol and haxanoic acid

(c) toluene and phenol

(d) phenol and benzyl alcohol

28. Poling is the process used to remove

(a) Al_2O_3 from Al

(b) Cu_2O from Cu

(c) Fe_2O_3 from Fe

(d) ZnO from Zn

29. The correct statement for the use of NaCN is

I. as depressant in froth floating process to separate ZnS and PbS.

II. in leaching of silver and gold during extraction.

III. to remove Zn in extraction of silver and gold.

(a) Only I

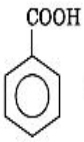
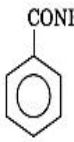
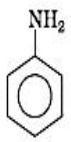
(b) Only III

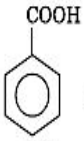
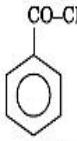
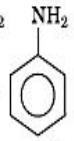
(c) I and II

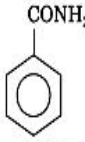
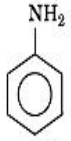
(d) I and III

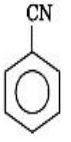
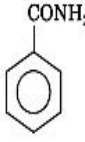
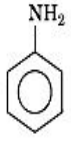
30. An aromatic compound (*A*) on heating with aqueous ammonia gives (*B*). (*B*) on heating with Br_2 and KOH form a compound (*C*) having molecular formula C_6H_7N.

(*A*), (*B*) and (*C*) are, respectively

(a) (*A*) =  ; (*B*) =  ; (*C*) = 

(b) (*A*) =  ; (*B*) =  ; (*C*) = 

(c) (*A*) =  ; (*B*) =  ; (*C*) = 

(d) (*A*) =  ; (*B*) =  ; (*C*) = 

Answers

1. (a)	2. (d)	3. (c)	4. (b)	5. (b)
6. (c)	7. (b)	8. (c)	9. (d)	10. (c)
11. (b)	12. (b)	13. (b)	14. (c)	15. (d)
16. (c)	17. (c)	18. (c)	19. (c)	20. (d)
21. (b)	22. (a)	23. (c)	24. (c)	25. (c)
26. (b)	27. (a)	28. (b)	29. (c)	30. (a)