



# JEE (Main)

PAPER-1 (B.E./B. TECH.)

# 2023

## COMPUTER BASED TEST (CBT) Memory Based Questions & Solutions

Date: 25 January, 2023 (SHIFT-2) | TIME : (3.00 p.m. to 6.00 p.m)

Duration: 3 Hours | Max. Marks: 300

**SUBJECT: CHEMISTRY**

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### PART : CHEMISTRY

1. Select the correct metallic character order for the following :

(1)  $K > Mg > Be > Si$  (2)  $Mg > K > Be > Si$  (3)  $Si > K > Mg > Be$  (4)  $K > Be > Mg > Si$

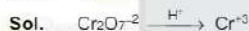
Ans. (1)

Sol. According to electropositive character

Si is having non-metallic character

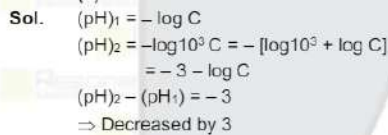
2. In acidic medium  $K_2Cr_2O_7$  acts as strong oxidising agent in it oxidation state of Cr changes from :  
 (1) + 6 to + 2 (2) + 6 to + 3 (3) + 7 to + 2 (4) + 7 to + 4

Ans. (2)



3. If  $[H^+]$  ion concentration is increased by factor of 1000, then pH is :  
 (1) Decreased by 3 (2) Increased by 3 (3) No. Change in pH (4) Decreased by 1

Ans. (1)



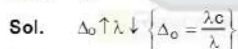
4. Match the following column :

	Column - I (Complex)		Column - II (Absorbed wave length in nm)
A	$[Co(CN)_6]^{3-}$	P	535 nm
B	$[Co(NH_3)_6]^{3+}$	Q	375 nm
C	$[Co(NH_3)_5Cl]^{2+}$	R	600 nm
D	$[Co(NH_3)_4Cl_2]^+$	S	450 nm

Select the correct option :

- |     |   |   |   |   |     |   |   |   |   |
|-----|---|---|---|---|-----|---|---|---|---|
|     | A | B | C | D | A   | B | C | D |   |
| (1) | Q | S | P | R | (2) | R | Q | P | S |
| (3) | P | Q | R | S | (4) | S | R | P | Q |

Ans. (1)



5. **Statement – I** : Carbon form two oxides CO and  $CO_2$  where CO is neutral while  $CO_2$  is acidic.  
**Statement – II** :  $CO_2$  will combine with water to give carbonic acid while CO is water insoluble gas.]  
 (1) Both **statement I** and **II** are correct.  
 (2) **Statement I** is correct while **statement II** is incorrect.  
 (3) **Statement I** is incorrect while **statement II** is correct.  
 (4) Both **statement I** and **statement II** are incorrect.

Ans. (1)

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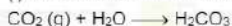
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- Sol. (i)  $CO_2$  is acidic as it form carbonic acid.



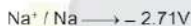
(ii) CO is almost insoluble in water.

6. Which among, the following is weakest reducing agent ?

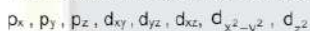
- (1) Li (2) Na (3) K (4) Cs

Ans. (2)

Sol. According to electrochemical series

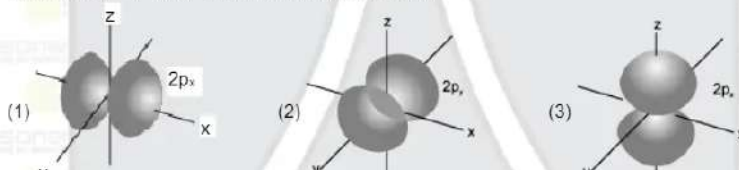


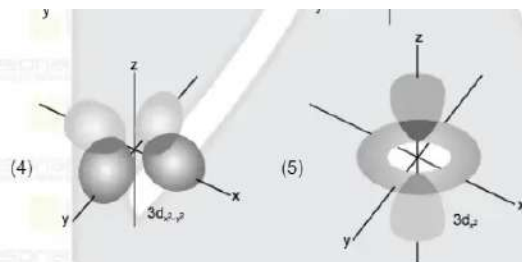
7. How many of the following orbitals is considered axial orbital (s)



Ans. (5)

Sol.  $p_x, p_y, p_z, d_{x^2-y^2}$  &  $d_{z^2}$  orbital (eg) are axial orbitals





8. **Assertion** : Alkali metals and their salts impart characteristic colour in oxidizing flame.  
**Reason** : Alkali metals can be identified using flame test.  
 (1) If both assertion and reason are true and reason is the correct explanation of assertion.  
 (2) If both assertion and reason are true but reason is not the correct explanation of assertion.  
 (3) If Assertion is true but reason is false.  
 (4) If both assertion and reason are false.

**Ans.** (2)

**Sol.** The alkali metals and their salts impart characteristic colour to an oxidizing flame. This is because the heat from the flame excites the outermost orbital electron to a higher energy level. When the excited electron comes back to the ground state, there is emission of radiation in the visible region. Alkali metals can therefore, be detected by the respective flame tests and can be determined by flame photometry or atomic absorption spectroscopy.

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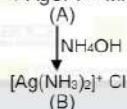
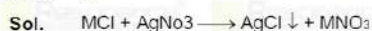
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9. Chloride salt of M is treated with excess of  $\text{AgNO}_3$ . It forms curdy white precipitate 'A'. When 'A' is treated with  $\text{NH}_4\text{OH}$ , it forms a soluble salt 'B'. Then 'A' and 'B' respectively are :  
 (1)  $\text{AgCl}$ ,  $[\text{Ag}(\text{NH}_3)_2]^+$  (2)  $\text{AgBr}$ ,  $[\text{Ag}(\text{OH})_2]^-$  (3)  $\text{AgCl}$ ,  $[\text{Ag}(\text{OH})_4]^{2-}$  (4)  $\text{AgBr}$ ,  $[\text{Ag}(\text{OH})_4]^{2-}$

**Ans.** (1)



10. Which of the following option contains the options the correct match.

List I	List II
(a) Adiabatic	(1) $\Delta T = 0$
(b) Isothermal	(2) Heat exchange = 0
(c) Isochoric	(3) $\Delta P = 0$
(d) Isobaric	(4) Work done = 0

- (1) a-2, b-1, c-4, d-3 (2) a-1, b-2, c-3, d-4 (3) a-4, b-3, c-2, d-1 (4) a-1, b-3, c-4, d-2

**Ans.** (1)

**Sol.** Theory Based

11. A hydrocarbon is having molar mass  $84 \text{ gmol}^{-1}$  and 85.8% C by mass. Calculate the number of H-atom in one molecule?

- (1) 8 (2) 10 (3) 12 (4) 14

**Ans.** (3)

**Sol.**  $\text{C} = \frac{85.8}{12} \text{H} = \frac{14.2}{1}$



$n \times \text{EF}_{\text{mass}} = \text{MF}_{\text{mass}}$

$14 \times n = 84$

$n = 6$



12. Find out mass ratio of ethylene glycol (62 g) required to make 500 ml, 0.25 M and 250 ml, 0.25 M

(1) 1 : 2      (2) 1 : 1      (3) 4 : 1      (4) 2 : 1

Ans. (4)

Sol.  $\frac{\text{Millimole of Ist case}}{\text{Millimole of IInd case}} = \frac{500 \times 0.25}{250 \times 0.25} = \frac{2}{1}$

2 : 1

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13. For reaction  $A \rightarrow B$

$$K = 2 \times 10^{-3} \text{ s}^{-1}$$

Consider the following statement for the above reaction

Statement 1: The reaction is complete in 1000 sec.

Statement 2: Half life of the reaction is 500 sec.

Statement 3: Units of rate constant is same as that of rate

Statement 4: Degree of dissociation is  $(1 - e^{-kt})$

Statement 5: It is zero order reaction.

How many statements are correct ?

Ans. 1

Sol. Statement 4 is correct

$$C_t = C_0 e^{-kt}$$

$$C_0 \rightarrow C_0 - C_t$$

$$1 \rightarrow \frac{C_0 - C_t}{C_0}$$

14. Consider a mixture of  $\text{CH}_4$  and  $\text{C}_2\text{H}_4$  having volume 16.8 L at 273 K and 1 atm. It undergoes combustion to form  $\text{CO}_2$  with total volume 28 L at the same temperature and pressure.

If the enthalpy of combustion of  $\text{CH}_4$  is  $-900 \text{ KJ/mol}$  and enthalpy of combustion of  $\text{C}_2\text{H}_4$  is  $-1400 \text{ KJ/mole}$  then find the magnitude of heat released on combustion of given mixture in KJ.

Ans. 925 KJ



$$x \qquad \qquad \qquad x$$



$$16.8 - x \qquad \qquad 2(16.8 - x)$$

$$x + 2(16.8 - x) = 28$$

$$\text{CH}_4 = x = 5.6 \text{ L}$$

$$\text{C}_2\text{H}_4 = 16.8 - 5.6 = 11.2 \text{ L}$$

$$n_{\text{CH}_4} = \frac{5.6}{22.4} = \frac{1}{4}$$

$$n_{\text{C}_2\text{H}_4} = \frac{11.2}{22.4} = \frac{1}{2}$$

$$\therefore \text{Heat released} = \frac{1}{4} \times 900 + \frac{1}{2} \times 1400 \\ = 225 + 700 = 925 \text{ KJ}$$

15. Which of the given has two chiral center.

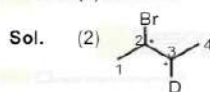
(1) 1-Bromo-2-duterobutane

(2) 2-Bromo-3-duterobutane

(3) 1-Bromo-4-duterobutane

(4) 1-Bromo-3-duterobutane

Ans. (2)



2-Bromo-3-duterobutane

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16. Select the correct match.
- (1) 2-Pentene & 1-Pentene – Metamers  
 (2) Hexan-2-one & Hexanal – Functional isomer  
 (3) Pentanoic acid & Hexanoic acid – Functional isomer  
 (4) Pentan-3-one & Pentan-2-one – Functional isomer

Ans. (2)

Sol. (2) Hexan-2-one & Hexanal – Functional isomer

17. Match the following :

	Column-I		Column-II
(i)	LDP	(a)	Paint
(ii)	Acrolein	(b)	Synthetic wool
(iii)	Glyptal	(c)	Toys and Flexible pipes
(iv)	Neoprene	(d)	Gaskets, Conveyor belts

	(i)	(ii)	(iii)	(iv)		(i)	(ii)	(iii)	(iv)
(1)	(a)	(b)	(d)	(c)	(2)	(b)	(d)	(c)	(a)
(3)	(c)	(b)	(d)	(a)	(4)	(c)	(b)	(a)	(d)

Ans. (4)

Sol. Fact

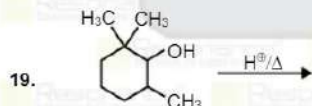
18. Match List-I with List II.

	List-I		List-II
	<b>Amine</b>		<b>pK<sub>b</sub> (aqueous medium)</b>
(a)	Ethanamine	(i)	3.0
(b)	Aniline	(ii)	3.25
(c)	N-N-diethylethanamine	(iii)	9.0
(d)	N-ethylethanamine	(iv)	3.29

	(a)	(b)	(c)	(d)		(a)	(b)	(c)	(d)
(1)	(ii)	(iii)	(iv)	(i)	(2)	(iii)	(iv)	(i)	(ii)
(3)	(iv)	(iii)	(ii)	(i)	(4)	(iv)	(iii)	(i)	(ii)

Ans. (3)

Sol. Greater the basic strength, smaller the pK<sub>b</sub> value.



Major product of the reaction is



Ans. (3)

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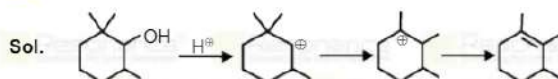
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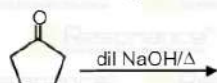
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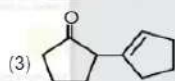
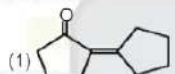
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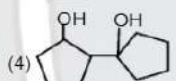
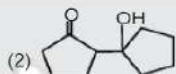


20. Product of the given reaction is





Ans. (1)



Sol. Cyclopentanone with dilute NaOH &  $\Delta$  undergoes aldol condensation to give

21. Which of the following compound give positive CAN and Iodoform test.

(1) 2-Pentanone

(2) 3-Pentanol

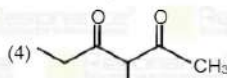
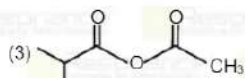
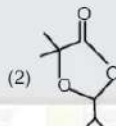
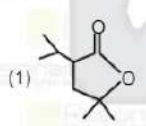
(3) 3-Pentanone

(4) 2-Pentanol

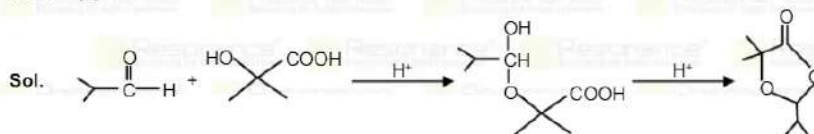
Ans. (4)

Sol. 2-Pentanol gives both the test of alcohol as well as Iodoform test.

22. Consider the following reaction. find the product, P



Ans. (2)



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23. Assertion : BHA is added to butter to increase shelf life.

Reason : BHA reacts with oxygen more than butter.

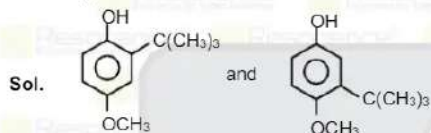
(1) Both Assertion and Reason are correct.

(2) Assertion is correct but Reason is incorrect.

(3) Assertion is incorrect but Reason is correct.

(4) Both Assertion & Reason are incorrect.

Ans. (1)





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CLASS STARTS 10<sup>th</sup> & 24<sup>th</sup> April

SCHOLARSHIP ON THE BASIS OF JEE (MAIN) 2023 %ILE / AIR

Resonance Eduventures Limited  
REGISTERED & CORPORATE OFFICE: CG Tower, A-46 & 52, IPIA, Near City Mall, Jhalawar Road, Kota (Rajasthan) - 324005  
Tel. No.: 0744-2777777, 2777700 | CIN: U80302RJ2007PLC024029

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