



JEE (Main)

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

2023

COMPUTER BASED TEST (CBT) Memory Based Questions & Solutions

Date: 30 January, 2023 (SHIFT-1) | TIME : (9.00 a.m. to 12.00 p.m)

Duration: 3 Hours | Max. Marks: 300

SUBJECT: CHEMISTRY

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PART : CHEMISTRY

1. Match the following :

	List-I (Atomic Number)		List-II (Block)
(A)	63	(P)	s-block
(B)	37	(Q)	p-block

(C)	76	(R)	d-block
(D)	54	(S)	f-block

(1) A - S ; B - P ; C - R ; D - Q

(2) A - P ; B - S ; C - Q ; D - R

(3) A - R ; B - S ; C - P ; D - Q

(4) A - Q ; B - P ; C - S ; D - R

Ans. (1)

Sol.

Atomic number	Electronic configuration	Block
(A) Z = 63	[Xe] 4f ⁷ 6s ²	f-block
(B) Z = 37	[36Kr] 5s ¹	s-block
(C) Z = 76	[54Xe] 4f ¹⁴ 6s ² 6d ⁶	d-block
(D) Z = 54	[36Kr] 4f ¹⁰ 5s ² 5p ⁶	p-block

2. Which of the following are readily soluble in water

(A) BeSO₄

(B) MgSO₄

(C) SrSO₄

(D) BaSO₄

(1) A & B only

(2) D & E only

(3) C & D only

(4) None of these

Ans. (1)

Sol. BeSO₄ and MgSO₄ are readily soluble in water. The greater hydration enthalpies of Be²⁺ and Mg²⁺ ions overcome the lattice enthalpy factor and hence sulphates of Be²⁺ & Mg²⁺ are soluble in water.

3. The compound effectively inhibit the growth of tumors is :

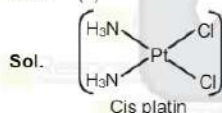
(1) Cis-platin

(2) EDTA

(3) Cobalt

(4) [(Ph₃P)₃RhCl]

Ans. (1)



used to inhibit the growth of tumors.

4. The SO₂ gas evolved during qualitative analysis of SO₃²⁻ using dilute H₂SO₄, turns K₂Cr₂O₇ solution to colour.

(1) Green

(2) Black

(3) Blue

(4) Red

Ans. (1)

Sol. $\text{Cr}_2\text{O}_7^{2-} + 14\text{H}^+ + 6\text{e}^- \rightarrow 2\text{Cr}^{3+} + 7\text{H}_2\text{O}$
(Orange Red) (Green)

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5. Match the following :

Column-I (Species)	Column-II (No. of lone pairs on central atom)
(A) IF ₇	(P) 0
(B) ICl ₄ ⁻	(Q) 1
(C) XeF ₂	(R) 2
(D) XeF ₆	(S) 3

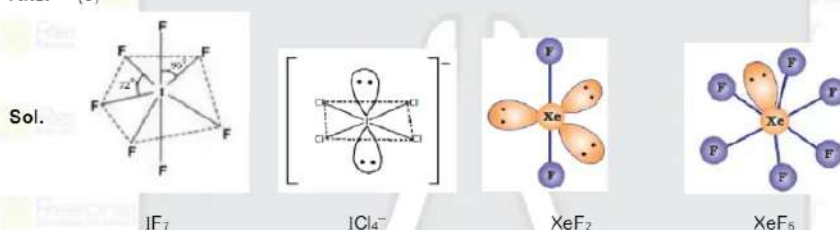
(1) A - R ; B - P ; C - S ; D - Q

(2) A - P ; B - R ; C - Q ; D - S

(3) A - P ; B - R ; C - S ; D - Q

(4) A - P ; B - S ; C - R ; D - Q

Ans. (3)



6. Volume of an ideal gas double isothermally, then change in internal energy is J.

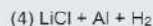
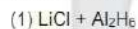
Ans. (0)

Sol. $\Delta U = \frac{F}{2} nR\Delta T$ (where F = degree of freedom)

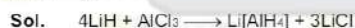
as process is isothermal so $\Delta T = 0$

so $\Delta U = 0$

7. The formation of LiAlH_4 can be done by using :



Ans. (3)



8. How many electrons are involved in the reduction of MnO_4^- to MnO_2 in acidic medium ?

Ans. (3)



Number of electrons involved in this reaction is 3.

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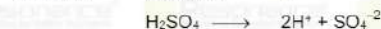
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9. 600 ml, 0.01 M HCl is mixed with 400 mL 0.01 M H_2SO_4 solution. The pH of mixture solution is $___ \times 10^{-2}$.
(Given $\log 7 = 0.845$, $\log 2 = 0.3010$)

Ans. (185)



Mili moles $0.01 \times 600 = 6$



Mili moles $0.01 \times 400 = 2 \times 4 = 8$

$$[\text{H}^+] = \frac{8+6}{1000} = 14 \times 10^{-3}$$

$$\text{pH} = -\log(14 \times 10^{-3})$$

$$= 3 - \log 14$$

$$= 3 - \log(2 \times 7)$$

$$= 3 - \log 2 - \log 7$$

$$= 3 - 0.301 - 0.845$$

$$= 1.854 = 185.4 \times 10^{-2}$$

10. Which of the following statements are correct regarding OF_2 molecule ?

(a) It has two lone pairs on oxygen atom.

(b) Oxidation state of oxygen is -2

(c) Shape of the molecule is linear

(d) Shape of the molecule is bent

(e) The F-O-F bond angle is less than 104.5° .

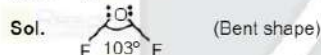
(1) A, D and E only

(2) A, B and C only

(3) A, B, D and E only

(4) A, C and E only

Ans. (1)



Oxidation number of oxygen is +2.

11. The speed of electron in the 7th orbit of hydrogen atom is 3.6×10^6 m/s, then the speed of electron in the 3rd orbit is :

(1) 3.6×10^6 m/s

(2) 6.4×10^6 m/s

(3) 7.5×10^5 m/s

(4) 1.8×10^6 m/s

Ans. (2)

Sol. $V_n = V_1 \times \frac{Z}{n}$ m/s

$$(V_7)_H = V_1 \times \frac{1}{7}$$

$$3.6 \times 10^6 = V_1 \times \frac{1}{7}$$

$$(V_1)_H = V_1 \times 3.6 \times 7 \times 10^6 \text{ m/s}$$

$$(V_3)_H = V_1 \times \frac{Z}{3}$$

$$= 1.2 \times 7 \times 10^6 \text{ m/s}$$

$$= 8.4 \times 10^6 \text{ m/s}$$

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12. The mass of CO₂ in 0.01 M, 300 ml soft drink is ___ × 10⁻³ gram (nearest integer)

Ans. (132)

Sol. Number of mole of CO₂ = M × V × 10⁻³

$$= 0.01 \times 300 \times 10^{-3}$$

$$= 0.01 \times 0.3$$

$$= 3 \times 10^{-3} \text{ mole}$$

$$\text{Mass of CO}_2 = 44 \times 3 \times 10^{-3} \text{ gram}$$

$$= 132 \times 10^{-3} \text{ gram}$$

13. Decomposition of a compound A takes place with first order reaction with K = 2.011 × 10⁻² sec⁻¹, then time required to reduce mass of substance from 7 gram to 2 gram is _____ sec. [Nearest integer]

$$[\log 7 = 0.84, \log 2 = 0.30]$$

Ans. (62)

$$\text{Sol. } K = \frac{1}{t} \ln \left(\frac{a}{a-x} \right)$$

$$K = \frac{1}{t} \ln \left(\frac{w_0}{w_t} \right)$$

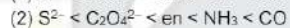
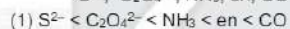
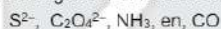
$$t = \frac{1}{K} \ln \left(\frac{7}{2} \right)$$

$$t = \frac{2.303}{K} [\log 7 - \log 2]$$

$$= \frac{2.303}{K} [0.84 - 0.30]$$

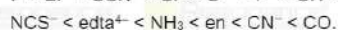
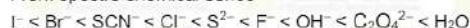
$$= \frac{2.303}{2.011 \times 10^{-2}} \times 0.54 = 61.8 \text{ sec}$$

14. The increasing order of field strength of following ligands is :



Ans. (1)

Sol. From spectro chemical series

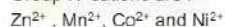


15. In qualitative analysis of cations which of the following is not a group IV cation :



Ans. (1)

Sol. Group IV cations are :



Hence answer is Fe³⁺

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16. The role of SiO₂ in copper extraction is :

- (1) Converts FeO to FeSiO₃
- (2) Converts CaO to CaSiO₃
- (3) Reduces Cu₂S to Cu
- (4) Reduces Cu₂O to Cu

Ans. (1)

Sol. The ore is heated in a reverberatory furnace after mixing with silica. In the furnace, iron oxide 'slags off' as iron silicate



17. A solution containing 2 g a solute and 20 g water has boiling point 373.52 K. The molecular mass (g/mol) of solute is : (Given $k_b = 0.52 \text{ K.kg/mol}$ & solute is non-electrolyte)

Ans. 100

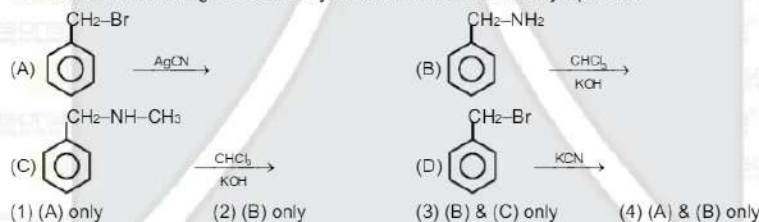
Sol. $\Delta T_b = k_b m$

$$(373.52 - 373) = 0.52 \times \left(\frac{2 \times 1000}{M \times 20} \right)$$

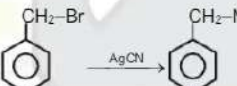
$$M = \frac{2 \times 1000}{20} = 100 \text{ g/mol}$$

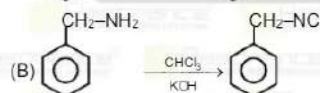
Molecular mass of solute = 100 gm/mol.

18. In which of the following reaction isocyanide will be formed as major product.



Ans. (4)

Sol. (A)  [S_N² mechanism]



19. **Statement-1** : Ketose give selivanoff test faster than aldose.

Statement-2 : Ketose give furfuraldehyde derivative with α -Naphthol and conc. H₂SO₄.





- (1) Both statement are correct
- (2) Both statement are incorrect
- (3) Statement-1 is correct but Statement-2 is incorrect
- (4) Statement-1 is incorrect but Statement-2 is correct

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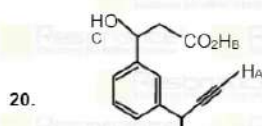
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Ans. (1)

Sol. **Statement-1**: Ketose-(example Fructose) gives fiery red solution at faster rate than aldose

Statement-2: All carbohydrate (Aldose or Ketose) gives furfural derivative with 5% α -Naphthol solution and a few drops of conc. H₂SO₄.



H_b

Which of the given hydrogen is most acidic.

- (1) A (2) B (3) C (4) D

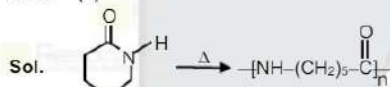
Ans. (2)

Sol. (-COOH) carboxylic acid is more acidic than alcohol or terminal alkyne.

21. Caprolactam when heated at high temperature gives :

- (1) Nylon 6, 6 (2) Dacron (3) Teflon (4) Nylon 6

Ans. (4)



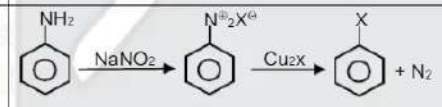
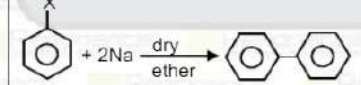
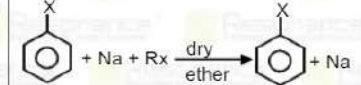
22. Which of the following is Antacid.

- (1) Ranitidine (2) Brompheniramine (3) Iproniazid (4) Morphine

Ans. (1)

Sol. Ranitidine is an antacid. It is an antihistamine and decreases the reaction of gastric juice in stomach.

23. Match the column :

	Column-I	Column-II
(A)	$C_2H_5Cl + NaI \rightarrow C_2H_5-I + NaCl$	(i) Sandmeyer's reaction
(B)		(ii) Finkelstein reaction
(C)		(iii) Wurtz-fitting reaction
(D)		(iv) Fitting reacting

(1) (A)-(iii), (B)-(iv), (C)-(ii), (D)-(i)

(3) (A)-(ii), (B)-(iii), (C)-(iv), (D)-(ii)

(2) (A)-(iv), (B)-(iii), (C)-(i), (D)-(ii)

(4) (A)-(ii), (B)-(i), (C)-(iv), (D)-(iii)

Ans. (4)





Sol. Based on historical facts.

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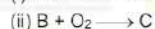
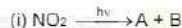
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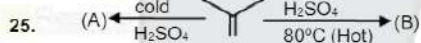
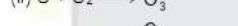
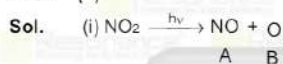
24. The reactions taking place in photochemical smog formation is :



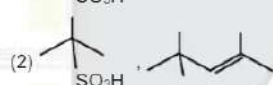
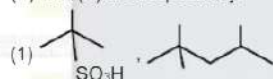
A, B, C are respectively.

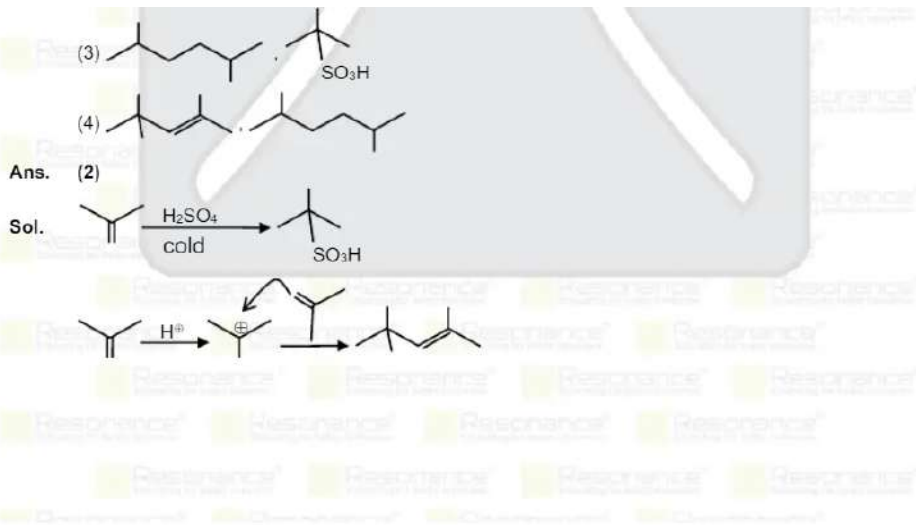
- (1) NO, O, O
- ₃
- (2) O
- ₃
- , NO, O (3) N
- ₂
- O, O, O
- ₃
- (4) NO, O, NO
- ₃
- ⁻

Ans. (1)



(A) and (B) are respectively.





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RESONites ने फिर लहराया सफलता का परचम

STUDENTS FROM CLASSROOM PROGRAM (OFFLINE/ ONLINE)

AIR 6
KARTHIKEYA POLISETTY
 Roll No.: 21925115

AIR-1 GEN-EWS

AIR 8
DHEERAJ KURUKUNDA
 Roll No.: 21920114

Students in TOP-100 All India Ranks (AIRs)

AIR-11 Roll No.: 2191044	AIR-15 Roll No.: 21925126	AIR-35 Roll No.: 21925133	AIR-50 Roll No.: 2192022	AIR-54 Roll No.: 21920954	AIR-58 Roll No.: 21920484
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ADMISSIONS OPEN FOR ACADEMIC SESSION 2023-24

TARGET: JEE (Adv.) 2024
 for Class XII Passed Student
VISHESH COURSE
 MODE: OFFLINE / ONLINE
 CLASS STARTS 10th & 17th April

TARGET: JEE (Main) 2024
 for Class XII Passed Student
ABHYAAS COURSE
 MODE: OFFLINE / ONLINE
 CLASS STARTS 10th & 24th 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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