

2024 JEE 31st Shift-2 Questions

HISTORY CREATED

39 YEARS OF ACADEMIC EXCELLENCE

ASIS'S GREATEST EDUCATION BRAND IN

IIT-JEE, NEET & OLYMPIADS

THE PERFECT HAT-TRICK WITH ALL-INDIA RANK 1

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31-Jan-2024 Shift-2

Physics

1. If for a given planet, $R_P = \frac{1}{3} R_E$, and $M_P = \frac{1}{6} M_E$, then find the v_{escape} for this planet if the escape velocity of earth is 11.2 km/hr.

Ans: 7.9

2. A 100Ω resistance and 200Ω resistance is connected in a series with 4 V battery. Voltmeter across 100Ω reads 1 V. Find internal resistance voltmeter.

Ans: 200

3. 5 A current is passing through a square frame of side length 1 m, then find the magnetic field at the center of this frame.

Ans: $4\sqrt{2} \times 10^{-6}$ T

4. Find the value of T_1 and T_2 respectively in the given setup?



Ans: 40, 64

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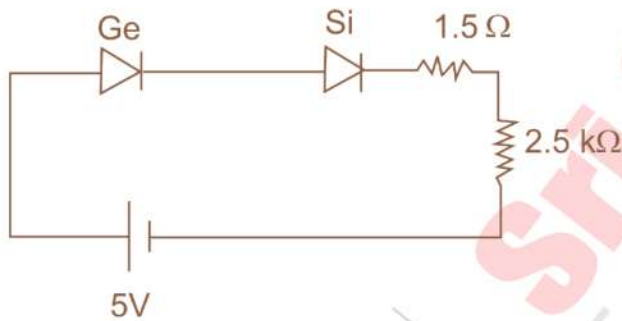
5. 1000 drops of surface energy E_1 coalesce to form 1 bigger drop of surface energy E_2 . Find the value of $\frac{E_2}{E_1} \times 10^3$.

Ans: 100

6. If $[C^P G^{-\frac{1}{2}} h^{\frac{1}{2}}] = [M]$ then find the value of P.

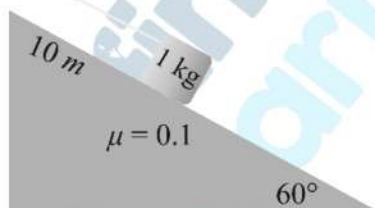
Ans: 1/2

7. Find voltage drop across $1.5\text{k}\Omega$ resistance.



Ans: $1.5\ \Omega$

8. A block of mass 1 kg is ascended an inclined plane by distance of 10 m as shown in diagram, with the help of force of 10 N along the incline. Find work done against the friction.



(a) 10 J

(b) $5\sqrt{3}$ J

(c) 5 J

(d) $(10 - 5\sqrt{3})J$

Ans: a

9. The slope of graph between stopping potential (V_0) and Frequency of incident photon (f) in photoelectric effect is ($h =$ Plank's Constant, $e =$ charge on electron)

a) h/e

(b) $h/2e$

(c) $2h/e$

(d) e/h

Ans: a

10. An electron revolves in a circle of radius r around an infinitely long uniformly charged wire (linear charge density $= \lambda$). Find its time period.

Ans: $2\pi R \sqrt{\frac{m}{2K\lambda}}$

11. A disc of moment of inertia 4kgm^2 is spinning freely at 10rad/s . A second disc of moment of inertia 2kgm^2 and angular speed 4rad/s slides down the spindle of the first disc and they spin together. What is the change in kinetic energy of the system.

Ans: 24J

12. An electron in 5^{th} excited state of He^+ atom moves to 1^{st} excited state. Find the number of possible spectral lines formed.

Ans: 10

13. Unpolarized light of intensity I_0 passes through two polarizers whose axis are at an angle of 45° with each other. Find intensity of transmitted light.

Ans: $I_0/4$

14. An electron is revolving in n^{th} orbital of H atom. Its magnetic moment depends on the radius of orbital as:

Ans: $\frac{eh}{4\pi m}$

15. Process A and B represents:

- (1) A: $PV^1 = \text{constant}$, B: $PV^1 = \text{constant}$
- (2) A: $PV^1 = \text{constant}$, B: $PV^2 = \text{constant}$
- (3) A: $PV^2 = \text{constant}$, B: $PV^{-1} = \text{constant}$
- (4) A: $PV^2 = \text{constant}$, B: $PV^1 = \text{constant}$

Ans: b

16. The Vernier scale of a travelling microscope has 50 divisions which coincide with 49 main scale divisions. If each main scale division is 0.5 mm, calculate the value of least count.

Ans: 0.01mm

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31-Jan-2024 Shift-2

Chemistry

1. Which of the following has maximum ionic character?

- a) KCl
- b) AgCl
- c) CaCl₂
- d) BaCl₂

Ans: a

2. Statement I: S₈ disproportionate into H₂ S₂O₃ and S₂²⁻ in alkaline medium
Statement II: ClO₄⁻ undergoes disproportionation in acidic medium

- a) Statement I is correct but Statement II is incorrect
- b) Statement I is incorrect but Statement II is correct
- c) Both Statement I and Statement II are correct
- d) Both Statement I and Statement II are incorrect

Ans: a

3. Number of isomeric products formed by monochlorination Of 2-methyl butane in presence of sunlight is

Ans: 6

4. From the vitamins A, B-1, B-6, B-12, C, D, and K, the number of vitamins that can be stored in our body is

Ans: 3

5. If 5 moles of an ideal gas expands from 10 L to a volume of 100 L at 300k under isothermal and reversible condition then work, W , is $-xJ$. The value of x is (even $n = 8.314 \text{ J K}^{-1} \text{ mol}^{-1}$)

Ans: 12

6. Number of moles of H⁺ ions required by 1 mole of MnO₄⁻ to oxidise oxalate ion to CO₂ is

Ans: 8

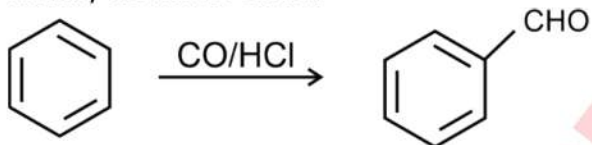
7. A compound (x) with molar mass 108 g mol^{-1} undergoes acetylation to give product with molar mass 192 g mol^{-1}

Ans: 2

8. The molarity of 1L of Orthophosphoric acid (H_3PO_4) having 70% purity by weight (specific gravity 1.51) is ____ (Molar mass of $\text{H}_3\text{PO}_4 = 98 \text{ g mol}^{-1}$)

Ans: 11

9. Identify the name reaction



- (a) Rosemond reaction
(b) Stephen reaction
(c) Etard reaction
(d) Gattermann - Koch reaction

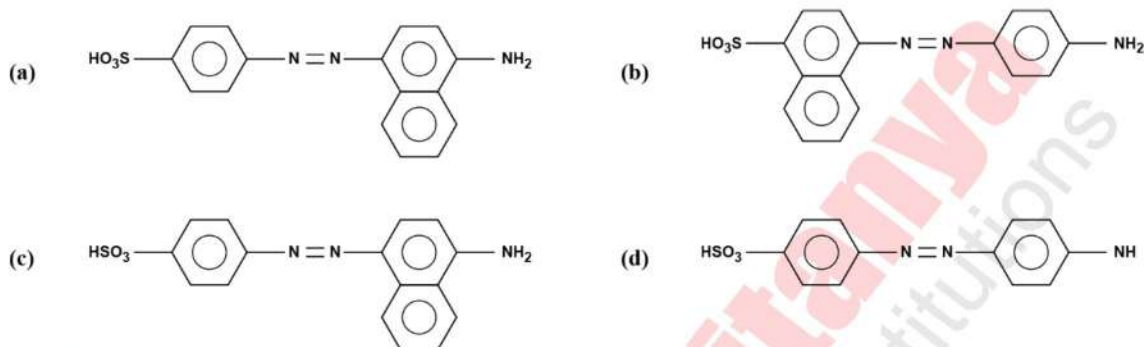
Ans: d

10. Quantum numbers for the outer most shell electron of potassium is?

- (a) $n = 4, l = 0, m = 0, s = 1/2$
(b) $n = 4, l = 1, m = 0, s = 1/2$
(c) $n = 3, l = 0, m = 0, s = 1/2$
(d) $n = 4, l = 0, m = 1, s = 1/2$

Ans: a

11. The Azo - Dye is formed, when X reacts with , the structure of the Dye is , the structure of the Dye is $\text{NaNO}_2 + \text{HCl}$



Ans: a

12. Statement I: S_8 disproportionate into $H_2 S_2O_3$ and S_2^{2-} in alkaline medium
Statement II: ClO_4^- undergoes disproportionation in acidic medium

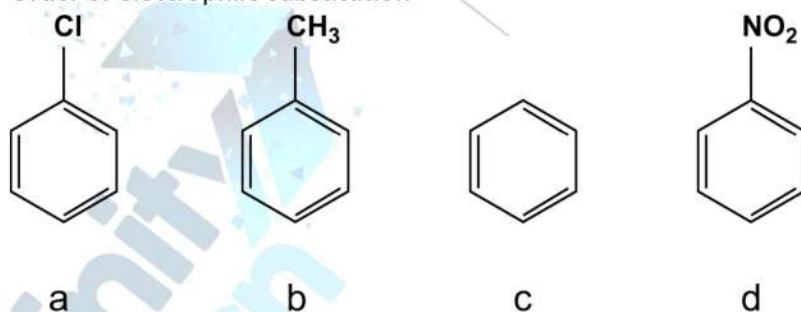
- (a) Statement I is correct but Statement II is incorrect
(b) Statement I is incorrect but Statement II is correct
(c) Both Statement I and Statement II are correct
(d) Both Statement I and Statement II are incorrect

Ans: a

13. Half life of a first order reaction is 36hr. Find out time (in hour) required for concentration of reactant to get reduced by 90%.

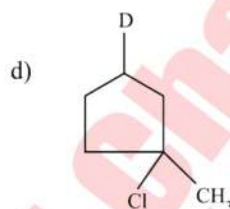
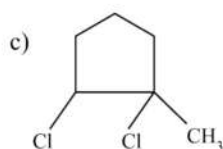
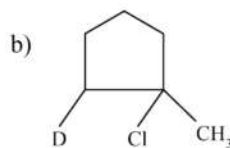
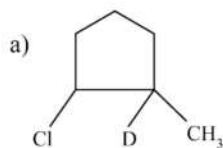
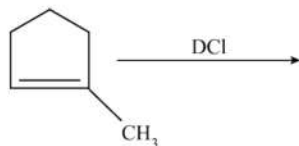
Ans: 120

14. Order of electrophile substitution



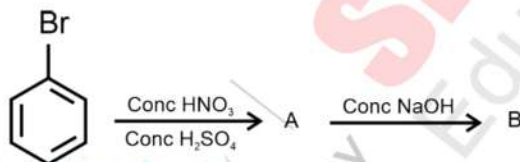
Ans: $b > c > a > d$

15.

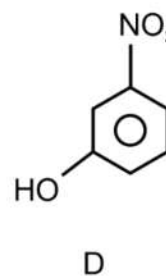


Ans: b

16.



Product B is



Ans: c

17. Statement-1: Among 15th group hydrides, reducing character decreases from NH_3 to BiH_3

Statement-2: E_2O_3 and E_2O_5 are always basic (Where E is group 15 element)

(a) Both statement 1 and statement 2 are correct

(b) Statement 1 is correct and statement 2 is false

- (c) Statement 1 is false and statement 2 is correct
- (d) Both statement 1 and statement 2 are false

Ans: d

31-Jan-2024 Shift-2

Maths

1. Let $f: \mathbb{R} \rightarrow (0, \infty)$ be increasing function such that $\lim_{x \rightarrow \infty} \frac{f(7x)}{f(x)} = 1$ then

$\lim_{x \rightarrow \infty} \left\{ \frac{f(5x)}{f(x)} - 1 \right\}$ is equal to

- a) 0
- b) 4
- c) 1
- a) $\frac{4}{5}$

Ans: (a)

2. $z_1^3 + z_2^3 = 20 + 15i$ then $|z_1^4 + z_2^4|$ is equal to

- (a) $15\sqrt{15}$
- (b) 75
- (c) $30\sqrt{3}$
- (d) $25\sqrt{3}$.

Ans: (b)

3. $a = \sin^{-1}(\sin(5))$ and $b = \cos(\cos(5))$ then $a^2 + b^2 =$

Ans: $(8\pi^2 - 40\pi + 50)$

4. A coin is biased so that a head is twice as likely occurs as a tail. If the coin is tossed 3 times, then the probability of getting two tails and one head is

- a) $\frac{1}{9}$
- b) $\frac{2}{9}$
- c) $\frac{2}{27}$
- d) $\frac{1}{27}$

Ans: (b)

5. The number of solution of equation $e^{\sin x} - 2e^{-\sin x} = 2$ is

- a) More than 2
- b) 2

- c) 1
- d) 0

Ans: (d)

6. If 2nd, 8th, 44th terms of A.P. are 1st, 2nd and 3rd terms respectively of G.P. and first term of A.P. is 1, then the sum of first 20 terms of A.P. is
- a) 970
 - b) 916
 - c) 980
 - d) 990

Ans: (a)

7. Let the mean and variance of 6 observations a, b, 68, 44, 48, 60 be 55 and 194 respectively. If a > b then a + 3b is
- a) 180
 - b) 190
 - c) 210
 - d) 200

Ans: (a)

8. The value of $\frac{120}{\pi^3} \left| \int_0^{\pi} \frac{x^2 \sin x \cos x}{(\sin x)^4 + (\cos x)^4} dx \right|$ is

Ans: (15)

9. The number of ways to distribute the 21 identical apples to three children so that each child gets at least 2 apples is?

Ans: (136)

HISTORY CREATED

SRI CHAITANYA STUDENTS SECURE TOP RANKS
in JEE ADVANCED 2023

ALL-INDIA OPEN CATEGORY RANKS

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