JEE Main 2024 Question Paper Jan 27 Shift 1 (B.E./B.Tech)

JEE Main Physics Questions

Ques 1. A body of mass 1000 kg has a velocity of 6 m/s. If an extra 2000 kg mass is embedded in it, then what will be the velocity of the combined mass?

A. 5 m/s
B. 4 m/s
C. 2 m/s
D. 3 m/s

Ans. A

Ques 2. Two infinite current carrying wires having current I in opposite directions are shown below. Find the magnetic field in S.I units, at point

A. $7\mu_0 I/\pi$
B. $10\mu_0 I/\pi$
C. $5\mu_0 I/\pi$
D. $\mu_0 I/\pi$

Ans. B

Ques 3. If the diameter of earth becomes half keeping mass to be constant, then the acceleration due to gravity at surface of earth becomes

A. half
B. four times

C. twice
D. three times

Ans. C

Ques 4. Two masses m1 = 4 gm and m2 = 25 gm are having same kinetic energy; find the ration of linear momentum

A. 1:5
B. 2:5
C. 1:1
D. 1:6

Ans. B

Ques 5. A rod of length l having resistance R, is cut into two equal parts. These parts are connected in parallel then new resistance shall be?

A. R
B. R/2
C. R/4
D. 2R

Ans. C

Ques 6. A charge Q=10-6C is placed at origin. Find the potential difference between two points A and B whose position vectors are (V3î + V3ĵ) m and v6ĵ respectively î

A. zero
B. 1000 Volts
C. 2000 Volts
D. 500 Volts

Ans. A

Ques 7. Consider the system shown. Find the moment of inertia about the diagonal shown.

- **A. 1 kg.m^2**
- **B. 2 kg.m^2**
- **C. 4 kg.m^2**
- **D. 6 kg.m^2**

Ans. C

Ques 8. Statement 1: Linear momentum and moment of force have same dimensions.

Statement 2: Planck's constant and angular momentum have same Dimension.

- **A. Statement 1 is correct while statement 2 is false**
- **B. Statement 1 is false while Statement 2 is correct**
- **C. Both statements are correct**
- **D. Both statements are false**

Ans. B

Ques 9. A prism has a refractive index cot(A/2), where A is the refractive angle of the prism. The minimum deviation due to this prism is

- **A. π-3A**
- **B. π-2A**
- **C. A**
- **D. A/2**

Ans. B

Ques 10. A particle performing simple harmonic motion is such that its amplitude is 4 m and speed of particle at mean position is 10 m/s. Find the distance of particle from mean position where velocity becomes 5 m/s.

A. √3 m
B. 2√3 m
C. √3/2 m
D. 1/√2 m

Ans. B

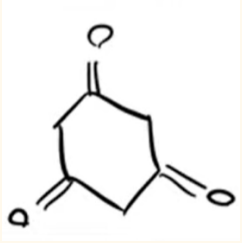
JEE Main Chemistry Questions

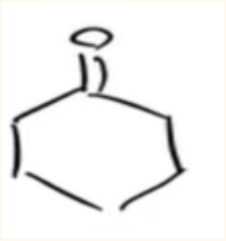
Ques 1. Which of the following can not show variable oxidation state?

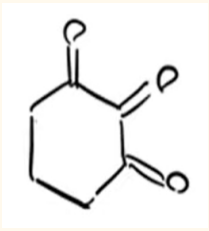
A. Chlorine
B. Fluorine
C. Bromine
D. Iodine

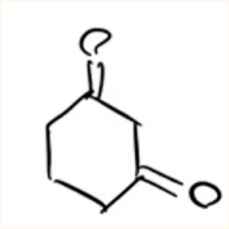
Ans. B

Ques 2. Which of the following has the highest enol content.

A. 

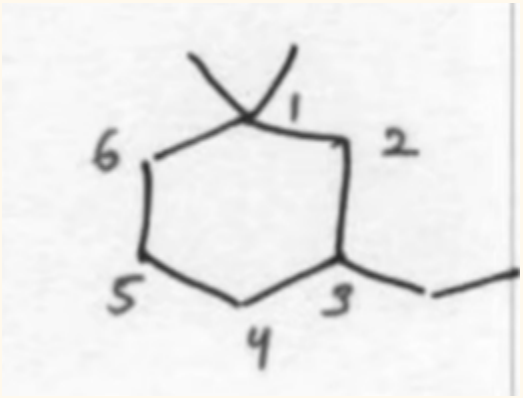
B. 

C. 

D. 

Ans. A

Ques 3. IUPAC name of this compound is?



A. 1 - ethyl - 3,3-dimethyl cyclohexane

B. 3 - ethyl - 1,1- dimethyl cyclohexane

C. 1 - ethyl - 3,3-dimethyl cyclohexene

D. 3 - ethyl - 1,1- dimethyl cyclohexene

Ans. B

Ques 4. The compound given below is?

A. Alicyclic
B. Aromatic
C. Antiaromatic
D. Acyclic

Ans. A

Ques 5. Which of the following is a Polar molecule?

A. CH2=CH2

B. CHCl3
C. CCL4
D. CH4

Ans. B

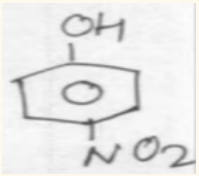
Ques 6. In which of the following compound central atom has +4 oxidation state?

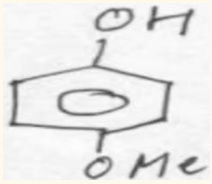
A. SO_3
B. H_2SO_3
C. $H_2S_2O_7$
D. $BaSO_4$

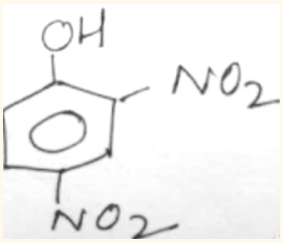
Ans. B

Ques 7. Which of the following is most acidic ?

A. Bu-OH

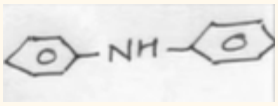
B. 

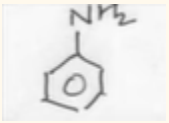
C. 

D. 

Ans. D

Ques 8. Select the strongest base

A. 

B. 

C. 

D. 

Ans. D

Ques 9. The electronic configuration of Neodymium (60) Nd is

A. [Xe] $4f^4 6s^2$
B. [Xe] $5f^1$
C. [Xe] $4f^2 6s^2$
D. [Xe] $5f^4 4d^1$

Ans. A

Ques 10. Ethanol shows turbidity with lucas reagent (conc.Hcl + anhydrous $ZnCl_2$) ?

A. Immediately
B. After 5 to 7 mins
C. Upon heating
D. After 10 - 12 mins

Ans. C

Ques 11. Which type of linkage is present in nucleotide between base and sugar?

A. Peptide linkage

B. Glycosidic linkage
C. N-Glycosidic linkage
D. Amide linkage

Ans. C

JEE Main Mathematics Questions

Ques 1. If å= î+2ĵ + k, b = 3(î - ĵ + k), å · c = 3 and å x č = b, then å·((xb)-b-č)=

A. 24
B. 38
C. 10
D. None of these

Ans. A

Ques 2. The vertices of a triangle ABC are A(1,2), B(-3,4) and C(5,8) then orthocentre of △ABC is

A. (⅔ , 1)
B. (-7/3 , 2)
C. (2, 3)
D. (3/2 , 1)

Ans. D

Ques 3. S1 = 3,9, 15, ... 25 terms and S2 = 3,8, 13, ... 37 terms, then the number of common terms in S1, S2 is equal to

A. 3
B. 4
C. 5
D. 6

Ans. C

Ques 4. The value of k for (2k, 3k) , (0, 0), (1,0) and (0,1) to be on the circle is:

A. 2/13
B. 5/13
C. 1/13
D. 2/13

Ans. B

Ques 5. $\int_0^1 \frac{1}{\sqrt{3+x}+\sqrt{1+x}} dx = a + b\sqrt{2} + c\sqrt{3}$ **then 2a-3b-4c is equal to _____.**

A. 10
B. 0
C. 12
D. 20

Ans. C

Ques 6. If $^{n-1}C_r = (k^2 - 8)^nC_{r+1}$ **Find k.**

A. $k \in [-3, -2\sqrt{2}) \cup (2\sqrt{2}, 3]$

B. $k \in [-4, -2\sqrt{3}) \cup (2\sqrt{3}, 4]$

C. $k \in [2\sqrt{3}, 4]$

D. $k \in [3, 2\sqrt{3}]$

Ans. A

Ques 7. If f(x) - f(y) = ln(x/y) +x-y, then find $\sum_{k=1}^{20} f'\left(\frac{1}{k^2}\right)$

A. 2890
B. 2390
C. 1245
D. None of this

Ans. A

Ques 8. Shortest distance between the parabola y^{2}=4x and $x^2 + y^2 - 4x - 16y + 64 = 0$ is equal to

A. $2\sqrt{3} - 2$
B. $3\sqrt{2} - 3$
C. $4\sqrt{5} - 2$
D. $2\sqrt{5} - 2$

Ans. D

Ques 9. If f(x)= $\begin{bmatrix} \cos x & -\sin x & 0 \\ \sin x & \cos x & 0 \\ 0 & 0 & 1 \end{bmatrix}$

Statement I ⇒ f(x).f(y) = f(x+y)
Statement II ⇒f(-x) =0 is invertible

A. Statement I is True, Statement II is False

B. Statement I is True, Statement II is True
C. Statement I is False, Statement II is True
D. Statement I is False, Statement II is False

Ans. B

Ques 10. If $\lim_{x\to 0}\frac{\sqrt{1+\sqrt{1+x^4}}-\sqrt{2}}{x^4}$ **=A and** $\lim_{x\to 0}\frac{\sin^2 x}{\sqrt{2}-\sqrt{1+\cos x}}$ **=B, then** AB^3**=_____.**

A. 8
B. 32
C. 6
D. None of these

Ans. B

Ques 11. Two lines L_1 & L_2 passing through origin trisecting the line segment intercepted by the line 4x + 5y = 20 between the coordinate axes. Then the tangent of angle between the lines L_1 and L_2 is:

A. $\sqrt{3}$
B. $1/\sqrt{3}$
C. 1
D. 30/41

Ans. D

Ques 12. If cos 2x-a sin x=2a-7 then range of a is:

A. $-2 \le a \le 0$
B. $2 \le a \le 6$
C. $a \ge 6$
D. $6 \le a \le 8$

Ans. B