JEE Main 2024 Question Paper April 9 Shift 2 (B.E./B.Tech)

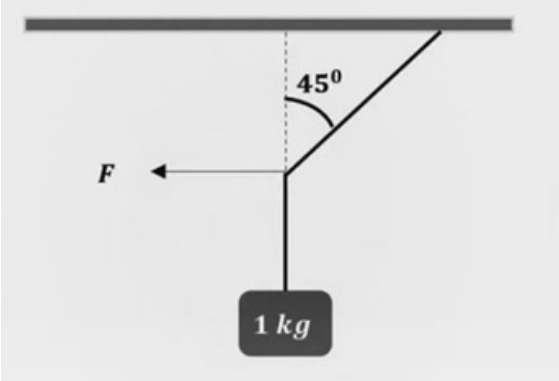
JEE Main Physics Questions

Ques 1. Dimensional formula of Plank's constant is:

A. [M2L2T-1] B. [M1L2T-1]
C. [M2L2T-2] D. [M1L2T-3]

Ans. B

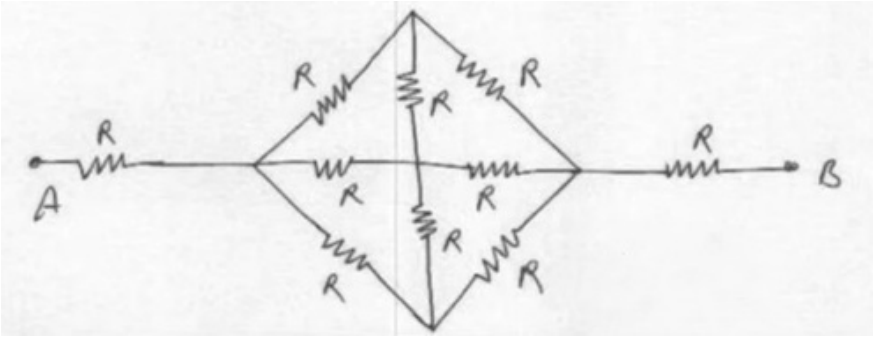
Ques 2. Find the magnitude of force F, if the given system is in equilibrium



A. 10 N
B. 10√2 N
C.0N
D. 1 / 10√2 N

Ans. A

Ques 3. The equivalent resistance between terminal A and B in the network shown



A. 4R/3
B. 8R/3
C.3R D.
5R/2

Ans. B

Ques 4. The nuclei at rest breaks into two parts with mass ratio 1 : 2. The ratio of their velocity and direction is

A. Opposite Direction 2 : 1
B. Same Direction 1 : 2
C. Opposite Direction 1:1
D. Same Direction 1 : 1

Ans. A

Ques 5. Two cars A and B are moving towards each other with speed 20 m/s each. When 300 m apart, they both apply breaks which causes deceleration of 2 m/s2. The distance between them when they stop will be:

A. 100 m
B. 50 m
C. 150 m
D. 200 m

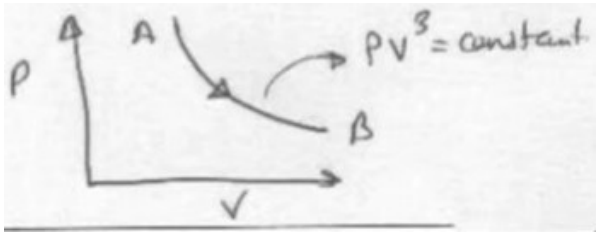
Ans. A

Ques 6. For a wire, the original resistance was 50 Ω at the initial temperature of 27° C. When the temperature is increased, its resistance becomes 62 Ω. If the thermal coefficient of resistivity of the wire is 2.4 x 10-2 K-1, find the final temperature.

A. 45° C
B. 37°C
C. 48°C
D. 32° C

Ans. B

Ques 7. Find the work done by a monoatomic gas from A and B. Here the temperature of gas (1 mol) changes from 300 K to 330 K.



A. 125 J
B. 250 J
C. 500 J
D. 6250 J

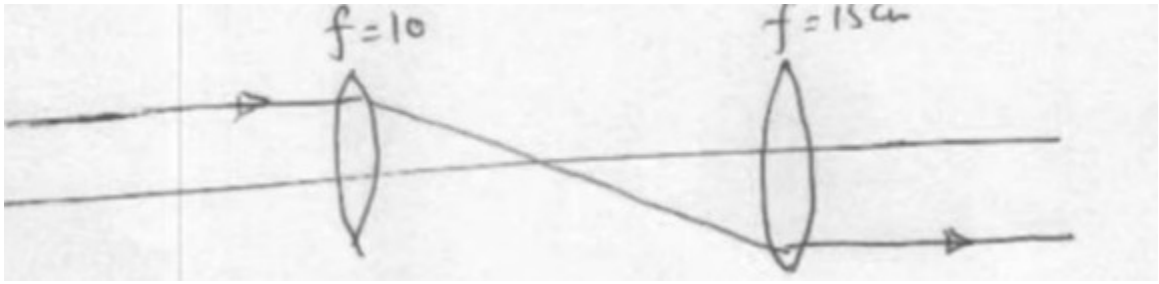
Ans. A

Ques 8. Two bubbles having radii rA and rB are having excess pressure PA and PB in them. If PA = 3PB, find rA/rB

A. 9: 1
B. 1:9
C. 1:3
D.3:1

Ans. C

Ques 9. In the given ray diagram, find the distance (in cm) between the two convex lenses.

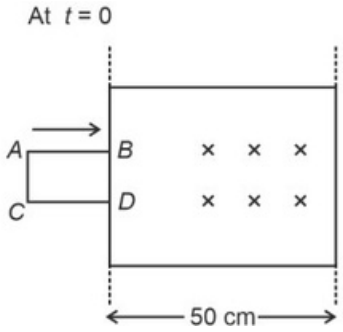


Ans. 25

Ques 10. Find the work done (in J) by force F = 3x2 + 2x - 5 in moving a particle x = 2 to x = 4.

Ans. 58

Ques 11. Find the induced emf in the square loop of side 15 cm moving with 2 cm/s after 10 seconds.



A.0 B.
0.3V
C.3V
D.9V

Ans. A

Ques 12. A proton and deuteron, having same kinetic energy, enters a transverse uniform magnetic field. Radius of circular paths for proton and deuteron are in ratio of

A.$\sqrt{2}$
B. $1/2\sqrt{2}$
C. $1/\sqrt{2}$
D. $2\sqrt{2}$

Ans. C

JEE Main Chemistry Questions

Ques 1. Correct order of bond angle of following compounds is:
BF_3, PF_3, ClF_3

A. $BF_3 > PF_3 > ClF_3$
B. $PF_3 > ClF_3 > BF_3$
C. $ClF_3 > PF_3 > BF_3$
D. $BF_3 > ClF_3 > PF_3$

Ans. A

Ques 2. Identify the correct electronic configuration of Einsteinium is

A. [Rn]5f146d17s2
B. [Rn]5f117s2
C. [Rn]5f106d17s2
D. [Rn]5f116d17s1

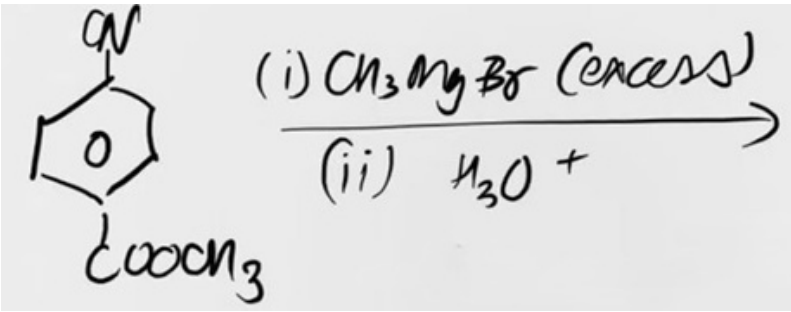
Ans. B

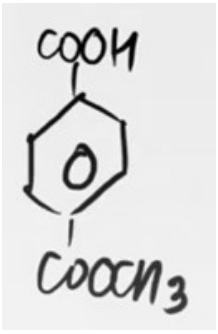
Ques 3. Ca^{2+} makes which type of complex with EDTA

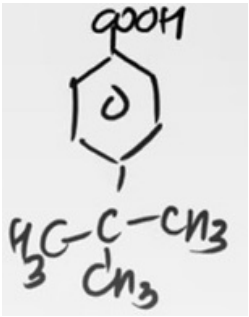
A. Trigonal bipyramidal
B. Square Planer
C. Tetrahedral
D. Octahedral

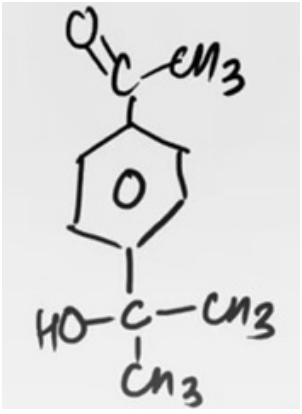
Ans. D

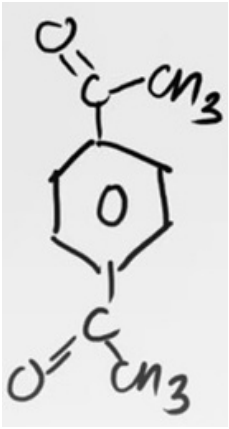
Ques 4. The product obtained in the following reaction is:



A. 

B. 

C. 

D. 

Ans. C

Ques 5. Fuming sulphuric acid has how many oxygen atoms?

Ans. 7

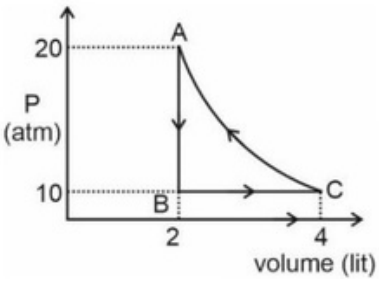
Ques 6. Total sum of number of electrons in π* orbitals of O2 , O+2 and O-2is:

Ans. 6

Ques 7. Which one of the following statements regarding glucose is incorrect?

A. Glucose is one of the monosaccharides of sucrose
B. Glucose dissolves in water because it has aldehyde group.
C. Glucose has six carbon atoms in its structure
D. Glucose is an aldose

Ans. B



Ques 8.

What is the work done on the gas in cyclic process ABCA

A. +773.7 J
B. –773.7 J
C. +4762.3 J
D. –4762.3 J

Ans. A

Ques 9. Which of the following compounds does not give Tollen's test?

A. Formaldehyde
B. Formic acid
C. Benzaldehyde
D. Acetone

Ans. D

Ques 10. What is the correct order of C – C bond length of ethane, ethene and ethyne?

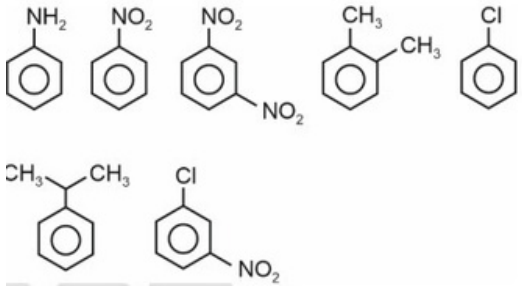
A. Ethane > Ethene > Ethyne B. Ethene > Ethane > Ethyne C. Ethyne > Ethene > Ethane D. Ethyne > Ethane > Ethene

Ans. A

Ques 11. Among the elements – Sc, Ti, V, Cr, Mn find magnetic moment of element which have highest ionization enthalpy in +2 oxidation state. [Nearest integer]

Ans. 6

Ques 12. How many of the following compounds will give Friedel Craft's reaction?



Ans. 3

JEE Main Mathematics Questions

Ques 1. If (z-2i)/(z+2i) is purely imaginary, then maximum value of |z + 8 + 6i| is equal to

A.6
B.8
C.10
D.12

Ans. D

Ques 2. $\int_{\frac{1}{4}}^{\frac{3}{4}} \cos\left(2\cot^{-1}\sqrt{\frac{1-x}{1+x}}\right)dx =$

A.-¼
B. 3/2

C. 1/16
D. -4/3

Ans. A

Ques 3. $\lim_{x \to 0} \frac{e-(1+2x)^{\frac{1}{2x}}}{x}$

A.e B. e/4 C. e/8 D. 11e/24

Ans. A

Ques 4. In the given data

x_f	f_i
C	2
2C	1
3C	1
4C	1
5C	1
6C	1

If σ2 = 160. Find the value of |C|.

A.7
B.5
C.6
D.4

Ans. A

Ques 5. $\int_{-1}^{2} \log(x+\sqrt{x^2+1})dx$

A. log[(2 + √(5))2 * (√(2) - 1)] - √(5) + √(2)

B. log[(2 + √(5))2 * (√(2) - 1)] + √(5) - √(2)
C. log[(2 + √(5))2 * (√(2) - 1)] + √(5) + √(2)
D. log(2 + √(5))2 + √(5) + √(2)

Ans. A

Ques 6. Dice is thrown 3 times, then find the probability that x1 < x2 < x3. (here x1, x2, x3 ∈ [1, 6]) (where x1, x2, x3 are outcomes on dice)

A. 7/54
B. 5/54
C. 11/54
D. 17/54

Ans. 2

Ques 7. Find the area bounded by ellipse x2 + 3y2 = 18 below the line y = x is (in first quadrant)

A.3π+1
B. √3* π
C.3π-¾
D.3π+¼

Ans. B

Ques 8. Sum of infinite terms of a, ar, ar2... and a3r3, a3r6, a3r9.... is 57 and 9747 respectively, then a + 18r is

Ans. 31

Ques 9. The number of numbers between 100 to 1000 such that sum of their digits is 14, is

Ans. 70.00

Ques 10. Find the number of solutions of $3\sin^{-1}x + 2\cos^{-1}x = 2\pi/5$.

Ans. 0

Ques 11. If $f(x) = 2(2 - p)x - (p^2 - 6p + 8)\cos 4x + 7$, then for what values of p, does f(x) not have a vertical point?

Ans. 4