JEE Main 2023 Question Paper with Answer Key April 12 Shift 1 (Memory-based)

JEE Main 2023 Physics Question Paper

Question 1. If a planet has mass equal to 16 times the mass of earth, and radius equal to 4 times that of earth. The ratio of escape speed of a planet to that of earth is?

A. 2:1
B. 1:2
C. √2:1
D. 4:1

Answer. A

Question 2. A particle is thrown vertically upward with initial velocity of 150m/s. Find the ratio of its speed at t = 3s and t = 5s. (Take g = 10ms^{-2})

Answer. 1.20

Question 3. Find the ratio of de-Broglie wavelength of a proton and a α - particle, when accelerated through a potential difference of 2V and 4V respectively.

A. 4:1
B. 2:1
C. 1:8
D. 16:1

Answer. A

Question 4. If a body of mass 5 kg is in equilibrium due to forces F1, F2 and F3. F2 and F3 are perpendicular to each other. If F1 is removed then find the acceleration of the body. Given F2 = 6N and F3 = 8N

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

Answer. A

Question 5. 64 identical balls made of conducting material each having a potential of 10 mV are joined to form a bigger ball. The potential of a bigger ball is?

Answer. 0.16V

Question 6. Ratio between rms speed of Ar to the most probable speed of O_2 at 27°C is

A. $\sqrt{8/\pi}$
B. $\sqrt{8/3}$
C. $\sqrt{4/\pi}$
D. $\sqrt{4/3}$

Answer. B

Question 7. If an object cools down from 80°C to 60°C in 5 min in a surrounding of temperature 20°C. The time taken to cool from 60°C to 40°C will be (Assume Newton's law of cooling to be valid)

A. 25/3 min
B. 5 min

C. 25/4 min
D. 9 min

Answer. A

Question 8. In a ice cube of thickness 24 cm, has bubbles trapped in it as shown in figure. If apparent side are 12 cm and 4 cm from side 1 and side 2 respectively, then refractive index of ice cube is

A. 4/3
B. 3/2
C. 2
D. 2.4

Answer. 2

Question 9. A dipole having dipole moment M is placed in two magnetic fields of strength B_1 and B_2 respectively. The dipole oscillates 60 times in 20 seconds in the B_1 magnetic field and 60 oscillations in 30 seconds in the B2 magnetic field. Then find the B_1/B_2

A. 3/2
B. ⅔
C. 4/9
D. 9/4

Answer. D

Question 10. Suppose a situation in which two planets orbits around the sun in the same orbit. If the mass of plant 1 is twice the mass of planet 2, then what do they have same?

A. Potential energy
B. Kinetic energy

C. Total energy
D. Velocity

Answer. D

JEE Main 2023 Chemistry Question Paper

Question 1. pH of 1 litre of HCL solution is 1. How much water (in litres) is added to make pH=2?

Answer. 9

Question 2. Consider the following reaction sequence:
[$CaCl_2 + Na_2CO_3 \rightarrow X + Y$] $\rightarrow$ Z

A. X: $CaCO_3$, Y: NaCl, Z: NCl
B. X: CaO, Y: NaCl + CO_2, Z: KCl
C. X: CaO, Y: NaCl + CO_2, Z: NaCl
D. X: $CaCO_3$, Y: NaCl, Z: KCl

Answer. A

Question 3. Match the following

Column 1 (Type of hydride)	Column II
A. Electron	1. MgH_2
B. Electron precise	2. HF
C. Electron rich	3. CH_4

D. Saline Hydride	**4. B_2H_6**

A. A - 4
B. B - 3
C. C - 1
D. D - 2

Answer. C

Question 4. Match the columns

Column I		**Column II**	
(a)	**Biodegradable**	**(p)**	**polyacrylonitrie**
(b)	**Synthetic**	**(q)**	**PHBV**
(c)	**Natural**	**(r)**	**dacron**
(d)	**Polyester**	**(s)**	**Rubber**

A. a-q; b-p; c-s; d-r
B. a-q; b-p; c-r; d-s
C. a-p; b-q; c-s; d-r
D. a-q; b-r; c-s; d-p

Answer. A

Question 5. A metal chloride contains 55% by mass of chlorine. 100 mL of vapours gives 0.57 gm of chlorine at STP. Calculate the molecular mass of metal chloride. (Nearest integer)

Answer. 232

Question 6. Given P_i = 3 atm
$V_{initial}$ = 2 L
V_{final} = 3 L
T = 350 K
If isothermal reversible process is carried out, calculate $\triangle S$ for system (in Joules)

Answer. 0.72

Question 7. How many of the given metals will show photoelectric effect when light of 400 nm falls on below metal?

Metal	Li	Na	K	Mg	Cu	Ag
W(eV)	2.42	2.3	2.25	3.7	4.8	4.3

Answer. 3

Question 8. Select correct statements about lead storage battery:

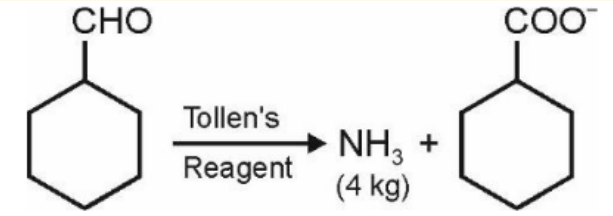
A. $PbSO_4$ converts into PbO_2 at anode during discharging
B. $PbSO_4$ converts into PbO_2 at cathode during discharge
C. 38% H_2SO_4 solution is taken as the electrolyte
D. H_2SO_4 is produced during discharging

Answer. C

Question 9. The number of sp^2 hybridized carbon atoms in the following peptide is
Ala – Phe – Gly – Ala – Phe - Ley

Answer. 18

Question 10. Calculate mass of Tollen's Reagent Required?



A. 18.70 kg
B. 37.40 kg
C. 9.35 kg
D. 55.10 kg

Answer. A

JEE Main 2023 Mathematics Question Paper

Question 1. Two circles having radius r1 and r2 touch both the coordinate axes. Line x + y = 2 makes intercept as 2 on both the circles. The value of $r1^2 + r2^2 - r1r2$ is:

A. 9/2
B. 6
C. 7
D. 8

Answer. 7

Question 2. ${}^nC_n / n+1 + {}^nC_{n-1}/n + \ldots\ldots + ½\ {}^nC_1 + {}^nC_0 = 255/8$, Then value of n is

Answer. 7

Question 3. If the value of $\int_{-0.15}^{0.15} |100x^2 - 1| dx = k/3000$, then the value of k is?

Answer. 575

Question 4. N>40000, where N is divisible by 5. How many such 5 digit numbers can be formed using 0,1,3,5,7,9 without repetition.

Answer. 120

Question 5. If $(1+x^2)dy = y(y-x)dx$ and $y(1) = 1$. Then $y(2\sqrt{2})$ is:

A. $4/\sqrt{2}$
B. $3/\sqrt{2}$
C. $1/\sqrt{2}$
D. $\sqrt{2}$

Answer. D

Question 6. For the expression $(1-x)^{100}$.Then sum of coefficient of first 50 terms is:

A. $^{99}C_{49}$
B. $-(^{100}C_{50})/2$
C. $-\ ^{99}C_{49}$
D. $-\ ^{101}C_{50}$

Answer. B

Question 7. Three numbers a, b, c are in A.P. and they are used to make a 9-digits number using each digit thrice, such that at least 3 consecutive digits are in A.P. then number of such numbers is?

Answer. 1260

Question 8. Given A, B, C represents angles of a△AB and cosA + 2 cosB + cosC = 2 and AB = 3 and BC = 7 then cosA – cosC is?

A. -10/7
B. 10/7
C. 5/7
D. -5/7

Answer. A

Question 9. Positive numbers a1, a2, ... a5 are in geometric progression. Their mean and variance are 31/10 and m/n respectively. The mean of the reciprocals is 31/40, then m + n is?

A. 209
B. 211
C. 113
D. 429

Answer. B

Question 10. Area of region enclosed by curve $y = x^3$ and its tangent at (–1, –1)

A. 4
B. 27
C. 4/27
D. 27/4

Answer. D