JEE Main 2023 Question Paper with Answer Key April 13 Shift 1 (Memory-based)
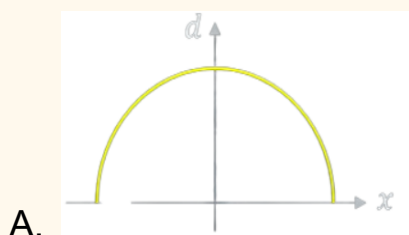
JEE Main 2023 Physics Question Paper
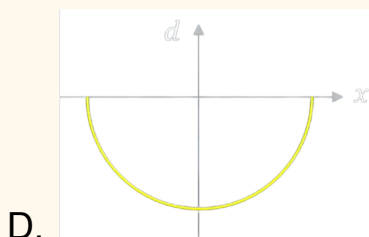
Question 1. If the height of the tower used for L.D.S is increased by 21% then percentage change in range is?

    A. 10%
    B. 21%
    C. 19%
    D. 42%

Answer. A

Question 2. Select the correct graph showing the difference (d) between total energy and potential energy of a particle in linear SHM with position x of the particle (x = 0 is the mean position)

A.

B.

C.

D.

Answer. A

Question 3. A dipole of charge 0.01C and separation 0.4mm, is placed in an electric field of strength 10 dyne/CC , Find the maximum torque exerted on the dipole in the field.

A. 4×10^{-9} Nm
B. 2×10^{-10} Nm
C. 4×10^{-10} Nm
D. 2×10^{-9} Nm

Answer. C

Question 4. Two bodies having the same linear momentum have a ratio of kinetic energy as 16:9. Find the ratio of masses of these bodies.

A. 9/16
B. 4/3
C. 3/4
D. 16/9

Answer. A

Question 5. What is the center of gravity of a semi-circular disc of radius (R)?

    A. $2R/\pi$
    B. $4R/3\pi$
    C. R/2
    D. 3R/8

Answer. B

Question 6. Pressure for polytropic process P varies with volume V as $P = av^{-3}$, find out the bulk modulus.
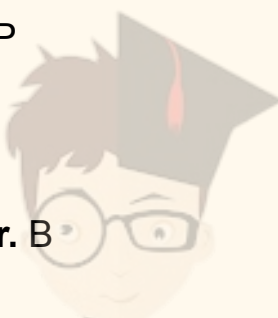
    A. 3V
    B. 3P
    C. P
    D. V

Answer. B

Question 7. The work function for two metals are 9eV and 4.5eV. Find the approx. difference between their threshold wavelength.(use hc = 1240 eV - nm)

    A. 138 nm
    B. 130 nm
    C. 112 nm
    D. 145 nm

Answer. A

Question 8. If a wire of resistance R is connected across Vo, then power is Po. The wire is cut into two equal parts and connected with

Vo individually, then the sum of power dissipated is P1, then Po/Pi is 1/x. Find the value of x.

Answer. 4

Question 9. A particle is performing SHM having position x = A cos 30°, and A = 40 cm. If its kinetic energy at this position is 200 J, the value of force constant in (kN/m) is?

Answer. 10

Question 10. For the given radioactive decay $^{298}_{94}X \rightarrow {}^{294}_{92}X + {}^4_2\alpha + Q$ - value, binding energy per nucleon of X, Y and α are a, b and c. The Q - value is equal to

   A. 294b + 4c - 298a
   B. 92b + 2c - 94a
   C. 294b + 4c + 298a
   D. 92b + 2c + 94a

Answer. A

JEE Main 2023 Chemistry Question Paper

Question 1. Which of the following free radicals helps in depletion of the ozone layer?

   A. NO
   B. Cl
   C. OH
   D. CH_3

Answer. B

Question 2. In which of the following options the species changes from paramagnetic to diamagnetic and bond order increases.

    A. $N_2 \rightarrow N_2^+$
    B. $O2 \rightarrow O2^+$
    C. $NO \rightarrow NO^+$
    D. $O_2 \rightarrow O^+$

Answer. C

Question 3. Radius of the 2nd orbit of He^+ is r_0. Radius of the 4th orbit of Be^{3+} is xr_0. Find x.

Answer. 2

Question 4. What happens when lyophilic sol is added to lyophobic sol. prevention from coagulation precipitation emulsion electrophoresis

    A. Prevention from coagulation
    B. Precipitation
    C. Emulsion
    D. Electrophoresis

Answer. A

Question 5. An organic compound on combustion gives 0.22 g of CO_2 and 0.126 g of H_2O. If the percentage of C in given organic compound is 40% , the percentage of H will be?

Answer. 9.34%

Question 6. Which of the following shows an incorrect method of refining?

    A. Zinc:Liquation
    B. Copper:Electrolysis
    C. Titanium:Van Arkel Method
    D. Nickel:Mond's Process

Answer. A

Question 7. For the 1st order reactions, the ratio of $t_{50\%}$ to $t_{87.5\%}$ will be:

Answer. 3

Question 8. The pair of lanthanides will exceptionally high 3rd ionisation enthalpy than neighbouring elements:

    A. Lu and Yb
    B. Eu and Gb
    C. Eu and Yb
    D. Dy and Yb

Answer. C

Question 9. If $(1+1/x)^{1/2} v_{av} = v_{rms}$, then x is:

Answer. 6

Question 10. Incorrect statement about Borazine is:

    A. It has banana shape bonds
    B. It has electron delocalisation

C. It reacts with water

D. Cyclic in nature

Answer. A

JEE Main 2023 Mathematics Question Paper

Question 1. Find the sum of series:
$2*2^2 - 2*3^2 + 2*4^2 + \ldots$ **(20 terms)**

    A. 462

    B. -462

    C. 460

    D. -460

Answer. D

Question 2. Let the number of matrices of order 3 x 3 are possible using the digits [0, 1, 2, 3, … , 10) is m^n, then (m + n) is ___. (where m is a prime number)

Answer. 20

Question 3. Remainder when 2^{2022} is divided by 15 is equal to__

Answer. 4

Question 4. The number of 7 digits numbers made using 1,2,3,4 whose sum of digits is 12 is?

    A. 413
    B. 311
    C. 308
    D. 393

Answer. A

Question 5. If dy/dx = y+7 and y(0) = 0, then the value of y(1) is?

    A. 7(e - 1)
    B. 2(e - 1)
    C. 7e
    D. None of these

Answer. A

Question 6. If g(x) = √x+1 & f(g(x)) = 3-√x+1 then f(0) = ?

Answer. 3

Question 7. Find area bounded by the curves y = max{sin x, cos x} and x-axis between x = -π and x = π

    A. 2 + √2
    B. √2
    C. 1 + √2
    D. 2√2

Answer. D

Question 8. For the data:

x_i	1	3	5	7	9
f_i	4	24	28	a	8

If the mean of data is 5 and mean deviation about mean is M and variance is σ^2 , then $3a/M+\sigma^2$ is?

Answer. 8

Question 9. The integral $\int_0^\infty 6/(e^{3x} + 6e^{2x} + 11e^x + 6)\, dx$

    A. ln 32
    B. ln 27
    C. ln 32/27
    D. ln 27/32

Answer. C

Question 10. Plane P_3 is passing through (1,1,1) and line of intersection of P_1 and P_2 where P_1: 2x - y + z = 5 and P_2: x + 3y + 2z + 2 = 0. Then distance of (1,1,10) from P_3 is:

    A. 53/85
    B. √85
    C. 52/√85
    D. 53

Answer. C