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Memory Based Paper
Science (Group X) 25 July 2022 (All Shifts)

70 Questions

Que. 1 A thermometer works on the principle of

1. Law of stable equilibrium
2. Zeroth law of thermodynamics
3. First law of thermodynamics
4. Second law of thermodynamics

Correct Option **- 2**

Que. 2 What are the dimensions of angular momentum?

1. $[M L^2 T^{-2}]$
2. $[M L^2 T^{-3}]$
3. $[M L^2 T^{-1}]$
4. $[M L T^{-1}]$

Correct Option **- 3**

Que. 3 Which of the colour of light is maximum deviated when passed through a prism?

1. Red
2. Voilet
3. Blue
4. Green

Correct Option **- 2**

Que. 4 A boy runs from one end to other end of a semicircular track with radius 140 m. His displacement is:

1. 280 m
2. 180 m
3. 140 m
4. 493.6 m

Correct Option **- 1**

Que. 5 Which of the following is correct about the property of equipotential surface?

1. The electric field is always parallel to the potential surface.
2. An equipotential surface having variable voltage
3. The electric field is always perpendicular to the potential surface.
4. None of the above

Correct Option **- 3**

Que. 6 The average radius of a soap bubble is 0.004 m. Find the excess pressure inside the soap bubble if the surface tension of soap bubble is 12 N/m.

1. 0.048 Pa
2. 0.050 Pa
3. 12 KPa

4. 5 KPa

Correct Option - **3**

Que. 7 Angle between the electric component and magnetic component of an electromagnetic wave is _____.

1. 0
2. π
3. $\pi/2$
4. $\pi/4$

Correct Option - **3**

Que. 8 What is the current of an element in Ampere which produces 1200 Joules of heat in 6 seconds when the resistance of 12.5 ohms is applied to it?

1. 8
2. 4
3. 2
4. 1

Correct Option - **2**

Que. 9 With the rise of temperature, the conductivity of a metals:

1. decreases
2. increases
3. remains unchanged
4. first decreases then increases

Correct Option - **1**

Que. 10 Kepler's second law regarding the areal velocity of a planet is an application of the law of conservation of

1. Angular momentum
2. Energy
3. Linear momentum
4. None of these

Correct Option - **1**

Que. 11 A bar magnet of magnetic moment M is placed in a magnetic field (B) at an angle of θ with the field. Find the work done in rotating the bar magnet by 180°.

1. MB
2. 0.5 MB
3. 2 MB
4. 4 MB

Correct Option - **3**

Que. 12 If the cross-sectional area of a piece of metal is double, what will be its effect on its resistance (Keeping the length unchanged)?

1. It will be doubled
2. It will be halved

3. It will quadruple
4. It will not change

Correct Option - **2**

Que. 13 Which of the following statement is true regarding body is in equilibrium?

1. Body must be in translational equilibrium
2. Body must be in rotational equilibrium
3. Either 1 or 2
4. Both 1 and 2

Correct Option - **4**

Que. 14 For two parallel wires, separation d carrying current I_a and I_b in the same direction will have the force on a length of L of either wire is

1. $\frac{(\mu_0 \, L I_a I_b)}{2\pi d}$ *Repulsion*
2. $\frac{\mu_0 L I_a I_b}{\pi d}$ *Attraction*
3. $\frac{(\mu_0 \, L I_a I_b)}{\pi d}$ *Repulsion*
4. $\frac{\mu_0 L I_a I_b}{2\pi d}$ *Attraction*

Correct Option - **4**

Que. 15 A child is running towards a plane mirror with a velocity 5 m/s, then his image appears coming towards him with velocity:

1. 10 m/s
2. 2.5 m/s
3. 5m/s
4. 4m/s

Correct Option - **1**

Que. 16 Choose the CORRECT statement regarding the time period of a simple pendulum.

1. The time period of pendulum at pole of the earth is more than at equator.
2. The time period of pendulum at pole of the earth is less than at equator.
3. Time period is independent of acceleration due to gravity.
4. All are correct.

Correct Option - **2**

Que. 17 Which of the following equation shows the relationship between current (i) and drift velocity (V_d).

(n is number of free electrons/m^3, A is the cross-sectional area, e is change on an electron, R is resistance)

1. $V_d = I \, R^2$
2. $I = neAV_d$
3. $V_d = IR$
4. $V_d = I^2Rt$

Correct Option - **2**

Que. 18 What is the dimension of mutual Induction ?

1. $[ML^2T^{-3}A^{-1}]$
2. $[ML^2T^{-2}A^{-2}]$
3. $[ML^3T^{-4}A^{-1}]$
4. $[ML^3T^{-4}A^{-2}]$

Correct Option **- 2**

Que. 19 What is the net increase or decrease in internal energy of the system, when 25J is transferred by heat into the system and 45J work is done by the system?

1. -70 J
2. 70 J
3. -20 J
4. 20 J

Correct Option **- 3**

Que. 20 The efficiency of a Carnot engine operating with reservoir temperatures of 100°C and -23°C will be

1. 33
2. 67
3. 40
4. 80

Correct Option **- 1**

Que. 21 The work done to move a charge of 10 C. Between two point in equipotential surface of 5 Volt is

1. 50 J
2. 5 J
3. Zero
4. None of these

Correct Option **- 3**

Que. 22 The unit of energy in MKS system is

1. Volt
2. Erg
3. Ohm
4. Joule

Correct Option **- 4**

Que. 23 A spring of spring constant 5×10^3 N/m is stretched initially by 2 cm from the unstretched position. Then, the work required to stretch it further by another 8 cm.

1. 1 J
2. 25 J
3. 24 J
4. 30 J

Correct Option **- 3**

Que. 24 If the distance between the plates of a parallel plate capacitor is halved keeping other parameters unchanged. The the new capacitance will become-

1. Two times of the initial capacitance
2. One third of the initial capacitance
3. Nine times of the initial capacitance
4. Remains unchanged

Correct Option - **1**

Que. 25 Above curie temperature a ferromagnetic substance

1. becomes paramagnetic
2. becomes diamagnetic
3. becomes ferromagnetic
4. All of the above

Correct Option - **1**

Que. 26 The length of latus rectum of the parabola $x^2 = 20y$?

1. 5
2. 16
3. 20
4. 10

Correct Option - **3**

Que. 27 Evaluate, $\int \tan^3 x \sec^2 x \, dx$

1. $\sec^2 x$
2. $\frac{\tan^4 x}{4}$
3. $\frac{\tan^4 x}{2}$
4. $2\tan x \sec x$

Correct Option - **2**

Que. 28 $|\vec{a}| = |\vec{b}| = |\vec{c}| = 1$ and $|\vec{a} + \vec{b} + \vec{c}|^2 = 0$, then find the value of $\overline{ab} + \overline{bc} + \overline{ca}$.

1. $\frac{3}{2}$
2. $\frac{-3}{2}$
3. $\frac{1}{2}$
4. $\frac{-1}{2}$

Correct Option - **2**

Que. 29 What is the value of $\left(\frac{1+i}{1-i}\right)$?

1. $0 + i$
2. $1 + i$
3. $0 + 2i$
4. $2 + 2i$

Que. 30   What is the probability that a die is thrown?

1) A even number

2) A odd number

3) A prime number

1. $\frac{1}{2}, \frac{1}{2}, \frac{1}{2}$
2. 1, 1, 1
3. $\frac{1}{4}, \frac{1}{4}, \frac{1}{4}$
4. q

Correct Option - **1**

Que. 31   From 5 males and 6 females, in how many ways can 5 be chosen to include at least one female?

1. 461
2. 455
3. 467
4. 500

Correct Option - **1**

Que. 32   If the two points are (a.sinα, a.cosα), (a.sinβ, a.cosβ), then what is the distance between them?

1. $2asin\left(\frac{\alpha-\beta}{2}\right)$
2. $asin\left(\frac{\alpha-\beta}{2}\right)$
3. $2acos\left(\frac{\alpha-\beta}{2}\right)$
4. $acos\left(\frac{\alpha-\beta}{2}\right)$

Correct Option - **1**

Que. 33   What is $\lim\limits_{x\to 0} \frac{sinx + log(1-x)}{x^2}$ equal to?

1. 0
2. 1
3. -1/2
4. 1/2

Correct Option - **3**

Que. 34   Find the value of k for which the roots are real and equal in the equation $(k + 1)x^2 - 2(k - 1)x + 1 = 0$

1. 3
2. 0
3. 5
4. both a and b

Correct Option - **4**

Que. 35 The coefficient of x⁴ in the expansion of $(x^3 + \frac{1}{x^2})^8$, is:

1. 50
2. 60
3. 70
4. 100

Correct Option **- 3**

Que. 36 If 2 dice are thrown what is the probability of getting the same digits on both dice?

1. 1/3
2. 1/6
3. 1/36
4. 1/12

Correct Option **- 2**

Que. 37 If $y = 1 - x + \frac{x^2}{2!} - \frac{x^3}{3!} + \ldots$ then what is the value of $\frac{dy}{dx}$?

1. e^{-x}
2. $-e^{-x}$
3. $-e^{x}$
4. e^{x}

Correct Option **- 2**

Que. 38 Standard deviation of 1, 2, 3, 4, 5, 6, 7

1. 4
2. 7
3. 5
4. 2

Correct Option **- 4**

Que. 39 Two letters are chosen from the letters of the word 'HOME'. The probability that both letters are vowels is

1. $\frac{1}{4}$
2. $\frac{1}{6}$
3. $\frac{2}{6}$
4. $\frac{2}{4}$

Correct Option **- 2**

Que. 40 The probabilities of solving a problem by three students A, B and C are 1/2, 1/3 and 1/4, respectively. The probability that the problem will be not solved is

1. 1/4
2. 1/2
3. 3/4
4. 1/3

Correct Option **- 1**

Que. 41   Find the modulus of the complex number $\frac{1+2i}{1-(1-i)}$.

1. $\sqrt{5}$
2. $\sqrt{2}$
3. $\sqrt{7}$
4.   1

Correct Option **- 1**

Que. 42   Find the double derivative of y = x^3 .

1.   3x
2.   4x
3.   5x
4.   6x

Correct Option **- 4**

Que. 43

If A = $\begin{bmatrix} 1 & 3 & 3 \\ 1 & 4 & 3 \\ 1 & 3 & 4 \end{bmatrix}$ then adj (A) is

1. $\begin{bmatrix} 7 & -3 & -3 \\ -1 & 1 & 0 \\ -1 & 0 & 1 \end{bmatrix}$

2. $\begin{bmatrix} 7 & 3 & 3 \\ -1 & 1 & 0 \\ -1 & 0 & -1 \end{bmatrix}$

3. $\begin{bmatrix} 7 & -3 & -3 \\ 1 & 1 & 0 \\ -1 & 0 & 1 \end{bmatrix}$

4. $\begin{bmatrix} -7 & 3 & -3 \\ -1 & 1 & 0 \\ -1 & 0 & -1 \end{bmatrix}$

Correct Option **- 1**

Que. 44   Evaluate: $(1 - \sec^2 x)\cot^2 x$

1.   tan x
2.   sec x
3.   -1
4.   1

Correct Option **- 3**

Que. 45   Find the area bounded by the curve $y^2 = 4x$, the x axis and the lines x = 4 to 9.

1. $\frac{19}{3}$
2. $\frac{76}{4}$
3. $\frac{4}{3}$

4. $\frac{76}{3}$

Correct Option **- 4**

Que. 46 Find the order and degree of the differential equation $(\frac{d^3 y}{dx^3})^2 = \sqrt{\frac{dy}{dx} + 1}$?

1.   3, 4
2.   4, 3
3.   2, 1
4.   1, 2

Correct Option **- 1**

Que. 47 If y = tanx.tan2x.tan3x, then find the value of $\frac{dy}{dx}$.

1. $3\sec^2 3x - 2\sec^2 2x$
2. $2\sec^2 2x - \sec^2 x$
3. $3\sin^2 3x - 2\sin^2 2x - \sin^2 x$
4. $3\sec^2 3x - 2\sec^2 2x - \sec^2 x$

Correct Option **- 4**

Que. 48 If sin θ + cos θ = m and sec θ + cosec θ = n, then find the value of n(m + 1)(m - 1).

1.   n(m - 1)(m - 1) = 2m
2.   n(m + 1)(m - 1) = 2m
3.   n(m + 1)(m - 1) = m
4.   n(m + 1)(m + 1) = 2m

Correct Option **- 2**

Que. 49 If x(x + y + z) = 9, y(x + y + z) = 16, z(x + y + z) = 144, find the value of x.

1.   169
2.   0
3. $\frac{9}{13}$
4.   13

Correct Option **- 3**

Que. 50 If P(A ∪ B) = 3/4, P(A ∩ B) = 1/4, P($\overline{A}$) = 2/3, then find the value of P(B).

1.   1/3
2.   1
3.   5/3
4.   2/3

Correct Option **- 4**

Que. 51 **Select the most appropriate synonym of the following given word:**
      Abhorrent

1.   Innocuous
2.   Inoffensive
3.   Attractive

4.   Awful

Correct Option - **4**

Que. 52 | **Out of the given four words only one is spelled correctly. Find the word that is correctly spelled.**

1.   Democratic
2.   Suferred
3.   Weaher
4.   Horible

Correct Option - **1**

Que. 53 | <u>**Direction**</u>**: Select the segment of the sentence that contains the grammatical error. If there is no error, mark 'No error' as your answer.**

Hardly had he completed (A)/ his homework than the (B)/ lights went out. (C)/ No error (D)

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

Correct Option - **2**

Que. 54 | Identify the word that is opposite in meaning of the word 'INADVERTENT'.

1.   adequate
2.   available
3.   intentional
4.   negligent

Correct Option - **3**

Que. 55 | **Direction: Choose the appropriate word for the given sentence:**

Your brother will be failed _____ he does not come tomorrow.

1.   if
2.   though
3.   unless
4.   until

Correct Option - **1**

Que. 56 | **Select the most appropriate synonym for the given word.**

Fury

1.   Crime
2.   Sin
3.   Anger
4.   Risk

Correct Option - **3**

Que. 57 | **Directions: Choose the appropriate preposition for the given sentence:**

His path was beset _____ difficulties.

1. with
2. within
3. among
4. by

Correct Option **- 1**

Que. 58 **What is the antonym of the word given below?**

Initiate

1. Start
2. Begin
3. Commence
4. Finish

Correct Option **- 4**

Que. 59 **Select the correctly spelt word.**

1. Attendance
2. Attendence
3. Attandence
4. Attandance

Correct Option **- 1**

Que. 60 Read the sentence to find out whether there is any error in it. The error, if any, will be in one part of the sentence. The number of that part is the answer. If there is no error, the answer is (5). Ignore errors of punctuation, if any.

(1) How much boys/**(2)** were present/**(3)** in the assembly./**(4)** No Error

1. 1
2. 2
3. 3
4. 4

Correct Option **- 1**

Que. 61 **Identify the segment in the sentence which contains the grammatical error.**

We went for swimming into the river on Sunday.

1. We went for swimming
2. into the
3. river on
4. Sunday

Correct Option **- 2**

Que. 62 **Direction: In the following question, out of the four alternatives, select the alternative which will improve the underlined part of the sentence. In case no improvement is needed, select "No improvement".**

No sooner <u>Riya reached</u> the station than she met her friend.

1. Did Riya reached
2. Did Riya reach

3. Riya did reached

4. No improvement

Correct Option - **2**

Que. 63 | **Direction: Change the Narration-**

"What are you doing?" He said to me

1. He asked me what I was doing.

2. He asked me what I were doing.

3. He asked me that what I was doing.

4. He asked me what he was doing.

Correct Option - **1**

Que. 64 | People in the villages of Rajasthan lead a very simple life. Their way of living has not changed over the years. They live in circular huts. The walls of these huts are covered with cowdung. Every hut has a small place for worship. The life of these people is full of difficulties. It is very hot in summers and cold in winters. Water is a major problem. Sometimes they have to walk a long distance to get drinking water. For their agriculture they depend on rains. But these people are very brave. They have learnt to face difficulties and they never lose hope. They also like to enjoy their life. Women like to wear dresses full of bright colours. People living in villages in Rajasthan have a rich tradition of music and dance. The people of Rajasthan are very proud of their culture.

Which of the following word is a synonym for 'brave'?

1. hardworking

2. valiant

3. prosperous

4. enthusiastic

Correct Option - **2**

Que. 65 | 'The way of living' can be replaced with the word

1. livelihood

2. liveliness

3. lifelike

4. lifestyle

Correct Option - **4**

Que. 66 | **In the following question, one part of the sentence may have an error. Find out which part of the sentence has an error and click the button corresponding to it. If the sentence is free from error, click the "No error" option.**

If aspirin will ease my headache, I will take a couple tonight.

1. If aspirin will ease

2. No error

3. I will take a couple tonight.

4. my headache

Correct Option - **1**

Que. 67 | **Select the most appropriate synonym of the given word.**

CRUCIAL

1. Vital

2. Easy

3. Menial

4. Trivial

Correct Option **- 1**

Que. 68 **Find the correct spelling in the given option:**

1. Independant

2. Influentail

3. Professor

4. Beneficeal

Correct Option **- 3**

Que. 69 **Choose the word which best expresses nearly the same meaning as the word**
CONDUCIVE:

1. Ineffectual

2. Contributive

3. Prodigious

4. Hindering

Correct Option **- 2**

Que. 70 **Select the misspelt word.**

1. Beaten

2. Stolen

3. Writen

4. Eaten

Correct Option **- 3**