AEEE SAMPLE PAPER 2022

SUBJECT: Mathematics

Question 1 : If Y = {x : x is a positive factor of the number 2p – 1(2p – 1), where 2p – 1 is a prime number}, then Y can be represent in roster form as

(A) {2}

(B) {1, 2}

(C) {1, 2, 22, ... , 2p – 1}

(D) {1, 2, 22, 23,. ...2p – 1, (2p – 1)}

Question 2 : The set {x : x is a positive integer less than 6 and 3x - 1 is an even number} in roster form is

(A) {1, 2, 3, 4, 5}

(B) {1, 2, 3, 4, 5, 6}

(C) {2, 4, 6}

(D) {1, 3, 5}

Question 3 : Let A and B are two sets having 3 elements in common. If n(A) = 5 and n(B) = 4, then n[(A × B) ◠â€‹ (B × A)] is equal to

(A) 20

(B) 25

(C) 16

(D) 9

Question 4 : If n(A) = 3, n(B) = 4 then, n(A × A × B) is equal to

(A) 36

(B) 12

(C) 108

(D) None of these

Question 5 : If $3x^2 + 4x + 2 = 0$, then equation has

(A) real roots

(B) imaginary roots

(C) one real and one imaginary root

(D) distinct real roots

Question 6 : If a, 4, b are in Arithmetic Progression; a, 2, b are in Geometric Progression; then a, 1, b are in

(A) A.P

(B) G.P

(C) H.P

(D) None of these

Question 7 : The number of integers less than 720 and prime to it

(A) 144

(B) 192

(C) 216

(D) 36

Question 8 : The number of ways in which N = 2,778,300 can be resolved into the two factors prime to each other

(A) 10

(B) 9

(C) 8

(D) 7

Question 9 : The number of different four digit numbers that can be formed with the digits 2, 3, 4, 7 and using each digit only once is

(A) 120

(B) 96

(C) 24

(D) 100

Question 10 : If $(1 + ax)^n = 1 + 8x + 24^{x2} + ...$, then the values of a and n are

(A) 2, 4

(B)
2, 3

(C) 3, 6

(D) 1, 2

Question 11 : How many roots of the equation $x - \frac{2}{x-1} = 1 - \frac{2}{x-1}$ have ?

(A) one

(B)
Two

(C) Infinite

(D) None of these

Question 12 : If the sum of the squares of the roots of the equation $x^2 - (a - 2)x - (a + 1) = 0$ is least, then the value of a is

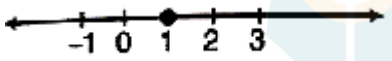
(A) -1

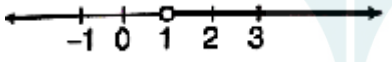
(B) 1

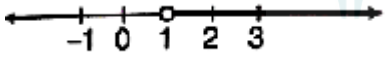
(C) 2

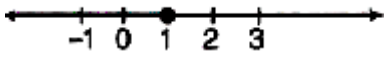
(D) -2

Question 13 : The graph of the solutions of inequaltiy $\frac{3x-4}{2} \geq \frac{x+1}{4} - 1$ on number line is â€‹

(A)


(B)


(C)


(D)


Question 14 : The solution set of the inequality $4x + 3 < 6x + 7$ is

(A) $[-2, \infty)$

(B) $(-\infty, -2)$

(C) $(-2, \infty)$

(D) None of the above

Question 15 : If $2X + 3Y = \begin{bmatrix} 2 & 3 \\ 4 & 0 \end{bmatrix}$ and $3X + 2Y = \begin{bmatrix} 2 & -2 \\ -1 & 5 \end{bmatrix}$, then the value of X and Y is

(A) $\begin{bmatrix} -5 & 0 \\ -1 & 4 \end{bmatrix}$ and $\begin{bmatrix} 2 & 0 \\ -1 & -1 \end{bmatrix}$

(B) $\begin{bmatrix} 5/2 & 0 \\ 1 & 0 \end{bmatrix}$ and $\begin{bmatrix} 2 & 1 \\ 0 & 1 \end{bmatrix}$

(C) $\begin{bmatrix} 4 & 1 \\ 3/2 & 2 \end{bmatrix}$ and $\begin{bmatrix} 1 & 1 \\ 1 & 5/2 \end{bmatrix}$

(D) $\begin{bmatrix} \frac{2}{5} & \frac{-12}{5} \\ \frac{-11}{5} & 3 \end{bmatrix}$ and $\begin{bmatrix} \frac{2}{5} & \frac{13}{5} \\ \frac{14}{5} & -2 \end{bmatrix}$

Question 16 : If $\begin{vmatrix} a & b & 0 \\ 0 & a & b \\ b & 0 & a \end{vmatrix} = 0$, then

(A) a is one of the cube roots to unity

(B) b is one of the cube roots of unity

(C) $\left(\frac{a}{b}\right)$ is one of the cube roots of unity

(D) $\left(\frac{a}{b}\right)$ is one of the cube roots of –1

Question 17 : If $A = \begin{bmatrix} 1 & 0 & 1 \\ 0 & 1 & 2 \\ 0 & 0 & 4 \end{bmatrix}$, then

(A) |3A| = 3 |A|

(B) |3A| = 9 |A|

(C) |3A| = 27 |A|

(D) None of these

Question 18 : $3(\sin x - \cot x)^4 + 6(\sin x + \cos x)^2 + 4(\sin^6 x + \cos^6 x)$ is equal to

(A) 12

(B) 13

(C) 14

(D) 11

Question 19 : $\tan^{-1}(1) + \cos^{-1}\left(-\frac{1}{2}\right) + \sin^{-1}\left(-\frac{1}{2}\right)$ is equal to

(A) $\frac{3\pi}{4}$

(B) $\frac{\pi}{4}$

(C) $\frac{\pi}{6}$

(D) $-\frac{3\pi}{4}$

Question 20 : 287 x 287 + 269 x 269 – 2 x 287 x 269 =?

(A) 534

(B) 446

(C) 354

(D) 324

Question 21 : Derivative of $\sqrt{e^{\sqrt{e}}}$ with respect to x is

(A) $\frac{e^{\sqrt{x}}}{2\sqrt{xe^{\sqrt{x}}}}$

(B) $\frac{4e^{\sqrt{x}}}{2\sqrt{xe^{\sqrt{x}}}}$

(C) $\frac{e^{\sqrt{x}}}{4\sqrt{xe^{\sqrt{x}}}}$

(D) $\frac{e^{\sqrt{x}}}{\sqrt{e^{\sqrt{x}}}}$

Question 22 : Find $\frac{dy}{dx}$, when $x = \frac{3at}{1+t^3}$ and $y = \frac{3at^2}{1+t^3}$.

(A) $\frac{t^3-4}{1-2t^2}$

(B) $\frac{t(2-t^3)}{1-2t^3}$

(C) $\frac{t(2+t^3)}{1+2t^3}$

(D) None of these

Question 23 : The approximate value of $\sqrt{36.6}$ is

(A) 6.02

(B) 6.04

(C) 6.05

(D) 6.06

Question 24 : Find the equation of the tangent to the curve $y = \frac{x-7}{(x-2)(x-3)}$ at the point, where it cuts the

(A) x + 20y + 7 = 0

(B) 20y + x – 7 = 0

(C) 20y – x + 7 = 0

(D) 20x – y – 7 = 0

Question 25 : $\int\frac{\cos 2x-1}{\cos 2x+1}dx$ is equal to

(A) tanx – x + C

(B) x + tanx + C

(C) x – tanx + C

(D) -x – cotx + C

Question 26 : The differential eqaution corisponding to $y^2 = m(a^2 - x^2)$ is

(A) $x\left[y\frac{d^2y}{dx^2}+\left(\frac{dy}{dx}\right)^2\right] = y\frac{dy}{dx}$

(B) $2x\frac{dy}{dx} = y$

(C) $x^2\frac{dy}{dx} = 1$

(D) None of these

Question 27 : If the points (k, 3), (2, k) and (-k, 3) are collinear, then the values of k are

(A) 2, 3

(B) 1, 0

(C) 1, 2

(D) 0, 3

Question 28 : The equation of the circle, the end points of whose diameter are the centres of the circles $x^2 + y^2 + 6x - 14y = 1$ and $x^2 + y^2 - 4x + 10y = 2$, is

(A) $x^2 + y^2 - 2x + y - 41 = 0$

(B) $x^2 + y^2 - 2x - y - 41 = 0$

(C) $x^2 + y^2 + x - 2y - 41 = 0$

(D) $x^2 + y^2 + x - 2y + 41 = 0$

Question 29 : If $(2 + 4\cos\theta, -1 + 4\sin\theta)$ are parametric coodinates of the circle, then its cartesian equation is â€‹

(A) $(x + 2)^2 + (y + 1)^2 = 16$

(B) $(x - 2)^2 + (y - 1)^2 = 16$

(C) $(x + 2)^2 + (y - 1)^2 = 16$

(D) $(x - 2)^2 + (y + 1)^2 = 16$

Question 30 : Find the equation of parabola having focus at â€‹(-1, -2) and directrix x – 2y + 3 = 0

(A) $4x2 + y^2 + 4xy + 2x + 32y - 16 = 0$

(B) $4x^2 + y^2 + 4xy + 4x + 32y + 16 = 0$

(C) $x^2 + 4y^2 + 4xy + 4x + 32y + 16 = 0$

(D) $4x^2 + y^2 + 4xy - 4x + 32y + 16 = 0$

Question 31 : If a vector magnitude 50 is collinear wtih the vector $b = 6\hat{i} - 8\hat{j} - \frac{15}{2}\hat{k}$ and makes an acute angle with the positive direction Z-axis, then the vector $\mathbf{a}$ is equal to

(A) $24\hat{i} - 32\hat{j} - 30\hat{k}$ â€‹

(B) $-24\hat{i} + 32\hat{j} + 30\hat{k}$

(C) $16\hat{i} - 16\hat{j} - 15\hat{k}$

(D) $-12\hat{i} + 16\hat{j} - 30\hat{k}$

Question 32 : If $\mathbf{a}$ and $\mathbf{b}$ are two unit vectors inclined at an angle $\pi/3$, then the value of $|\mathbf{a} + \mathbf{b}|$ is

(A) equal to

(B) greater than 1

(C) equal to 0

(D) less than 1

Question 33 : Let O be the origin and P be the point at a distance 3 units from origin. If direction ratios of OP are (1, -2, -2), then coordinates of P is given by

(A) (1, -2, -2)

(B) (3, -6, -6)

(C) (1/3, -2/3, -2/3)

(D) (1/9, -2/9, -2/9)

Question 34 : The arithmetic mean of the marks from the following table is Marks 0-10 10-20 20-30 30-40 40-50 50-60 Number 12 18 27 20 17 6 of Students

(A) 20

(B) 28

(C) 2800

(D) 100

Question 35 : One mapping (function) is selected at random from all the mappings of the set A = {1, 2, 3...n} into itself. The probability that the mapping selected is one-one, is

(A) $\frac{n!}{n^{n-1}}$

(B) $\frac{n!}{n^n}$

(C) $\frac{n!}{2n^n}$

(D) None of these

Question 36 : Ram is visiting a friend. Ram knows that his friend has 2 children and 1 of them is a boy. Assuming that a child is equally likely to be a boy or a girl, then the probability that the other child is a girl is

(A) $\frac{1}{2}$

(B) $\frac{1}{3}$

(C) $\frac{2}{3}$

(D) $\frac{7}{10}$

Question 37 : Let **R** be the field of real numbers andQ be the field of rational numbers and show that $W = \{(x, y, z): x, y, z \in Q\}$

(A) W is a subspace of $V_3(R)$

(B) W is not a subspace of V3(R)

(C) W is closed under multiplication

(D) W is not closed under multiplication

Question 38 : If $W_1 = \{(0, x_2, x_3, x_4, x_5) : x_2, x_3, x_4, x_5 \in \mathbf{R}\}$ and $W_2 = \{(x_1, 0, x_3, x_4, x_5): x_1, x_3, x_4, x_5, \in \mathbf{R}\}$ be subspace of R^5, then dim $(W_1 \cap W_2)$ is equal to

(A) 5

(B) 4

(C) 3

(D) 2

Question 39 : Function $f(x) = x^2$ is

(A) not uniformly continuous on $[0, \infty[$ â€‹

(B) not uniformly continuous on $[-\infty, \infty]$

(C) uniformly continuous on $[0, \infty]$

(D) None of the above

Question 40 : The sequence of real-valued function $f_n(x) = x^n$ $x \in [0,1] \cup \{2\}$ is

(A) pointwise convergent

(B) uniformly convergent

(C) does not uniformly convergent

(D) pointwise limit is $f(x) = \begin{cases} 0, & x = 0 \\ 1, & x \neq 0 \end{cases}$

SUBJECT: English

Question 41 : Read sentence to find out whether there is any grammatical error in it. The sentences are In three separate parts and each one is labelled (a), (b), (c) and (d). In that case, letter (d) will signify a 'No error' response.

(A) My friend is a software engineer

(B) and his wife is doctor

(C) so they don't have enough time for each other

(D) No error

Question 42 : Read sentence to find out whether there is any grammatical error in it. The sentences are In three separate parts and each one is labelled (a), (b), (c) and (d). In that case, letter (d) will signify a 'No error' response.

(A) I don't have much time that

(B) I hear you in detail with verbosity

(C) tell everything in nutshell

(D) No error

Question 43 : Spot the error part of the following sentences.

(A) It was most

(B) unfortunate that he

(C) died at the

(D) early age of 41

(E) No error

Question 44 : Spot the error part of the following sentences.

(A) In the last week

(B) I told him to come

(C) in time but he still comes late everyday

(D) No error

Question 45 : Find out the error part of the following sentences.

(A) The man disappeared after he

(B) was receiving a boy from

(C) drowning

(D) No error

SUBJECT: Physics

Question 46 : Potential is measured in

(A) joule/coulomb

(B) watt/coulomb

(C) newton-second

(D) None of these

Question 47 : One Nanometer is equal to

(A) 10^{-9}m

(B) 10^{-6}m

(C) 10^{-10}m

(D) 10^{-3}m

Question 48 : Maxwell is the unit of

(A) magnetic susceptibility

(B) intensity of Magnetisation

(C) magnetic Flux

(D) magnetic Permeability

Question 49 : A particle experiences constant acceleration for 20 seconds after starting from rest. If it travels a distances s_1 in the first 10 seconds and distances s_2 in the next 10 seconds, then

(A) $s_2 = s_1$

(B) $s_2 = 2s_1$

(C) $s_2 = 3s_1$

(D) $s_2 = 4s_1$

Question 50 : Motion of an object is the change in position with respect to a reference point known as

(A) Origin

(B) initial position

(C) final position

(D) distance

Question 51 : Displacement is the

(A) shortest distance between initial and final position

(B) the actual distance between initial and final positions

(C) the distance travelled by the object

(D) distance traveled by the object in a unit time

Question 52 : An object has traveled 10 km is 15 minutes, its displacement will be

(A) 10 km

(B) Can be zero

(C) More than 10 km

(D) All of the Above

Question 53 : When a bus suddenly starts, the standing passengers lean backwards in the bus. It is an example of.

(A) Newton's first law

(B) Newton's second law

(C) Newtron's third law

(D) None of Newton's law

Question 54 : Momentum has the same units as that of.

(A) couple

(B) torque

(C) impulse

(D) force

Question 55 : If a force F is applied on a body and it moves with velocity v, the power will be -

(A) Fv

(B) F/v

(C) Fv^2

(D) F/v^2

Question 56 : The sum of momentum of all the particles in a system about the centre of mass is always

(A) maximum

(B) minimum

(C) infinite

(D) zero

Question 57 : The centre of mass of two particle lies on the line

(A) joining the particles

(B) perpendicular to the line joining the particles

(C) at any angle to this line

(D) None of these

Question 58 : Newton's law of gravitaion is application to

(A) bodies of the solar system only
(B) bodies on the earth
(C) planets only
(D) all bodies of the universe

Question 59 : The force that causes acceleration and keeps the body moving along the circular path is acting
(A) towards the center
(B) away from the center
(C) along the tangent to the circular path
(D) in the direction of circular motion

Question 60 : Iron nails sinks in water because :
(A) weight of nail is less than the buoyant force acting on it due to water
(B) weight of nail is equal to the buoyant force acting on it due to water
(C) weight of nail is greater than the buoyant force acting
(D) weight of nail increases in the water

Question 61 : Water rises in a capillary tube to a height h. It will rise to a height more than h
(A) on the surface of sun
(B) in a lift moving down with an acceleration
(C) at the poles
(D) in a lift moving up with an acceleration

Question 62 : The ratio of the speed of a body to the speed of sound is called
(A) Sonic Index
(B) Liquid ratio
(C) Mach number
(D) Refractive Index

Question 63 : Sound is transmitted through a medium. The medium can be
(A) Solid
(B) Liquid
(C) Gas
(D) Solid, liquid or gas

Question 64 : The gas thermometers are more sensitive than liquid thermometers because gases
(A) expand more than liquids
(B) are easily obtained
(C) are much lighter
(D) do not easily change their states

Question 65 : When water is heated from 0°C to 10°C, its volume
(A) increases
(B) decreases
(C) does not change
(D) first decreases and then increases

Question 66 : The temperature of an iron block is 140°F. Its temperature on the Celsius scale is
(A) 60°
(B) 160°
(C) 140°
(D) 132°

Question 67 : For the construction of a thermometer, one of the essential requirements ia thermometric substance which
(A) remains liquid over the entire range of temperatures to be measured
(B) has property that varies linearly with temperature

(C) has a property that varies with temperature

(D) obey Boyle's law

Question 68 : A piece of wire of resistance R is drawn to double its length. The new resistance is

(A) R

(B) 2 R

(C) 4 R

(D) $\frac{R}{4}$

Question 69 : Direction of the force experienced by a current-carrying conductor when placed in a magnetic field is dependant on

(A) direction of the current alone

(B) direction of the magnetic field alone

(C) direction of current as well as the direction of magnetic field

(D) None of these

Question 70 : Potential difference is defined as

(A) the amount of work done is moving a unit charge in a unit time

(B) distance between two terminals

(C) length of the connecting wire

(D) the amount of work done in moving a unit charge

Question 71 : An inverted image can be seen in a convex mirror-

(A) under no circumstances

(B) when the object is very far from the mirror

(C) when the object is at a distance equal to the radius of curvature of the mirror

(D) when the distance of the object from the mirror is equal to the focal length of the mirror

Question 72 : In case of a concave mirror, when the object is situated at the principal focus, the image formed is

(A) real and inverted

(B) of infinite size

(C) lies at infinity

(D) All of these

Question 73 : The main constitudent of LPG is butaen.Then

(A) butane can be liquefied easily under high pressure.

(B) butane is liquefied by chemically reacting with ethane and propane.

(A) Only A is true

(B) Only B is true

(C) Only A and B are true

(D) Both A and B are false

Question 74 : In Davison-Germer experiment, an electron beam is incident on a crystel. The relfected beam consists

(A) photons

(B) protons

(C) x-rays

(D) electrons

Question 75 : The specific charge for cathode rays is

(A) constant

(B) variable

(C) depend upon the material of the cathode

(D) depend upon the nature of gas in the discharge tube

SUBJECT: Chemistry

Question 76 : What is the reson for white cement to be white ?

(A) It does not contain carbon

(B) It does not contain silicon
(C) It does not contain iron
(D) It does not contain calcium

Question 77 : Which fertilizer is assimilated directly by the plant ?
(A) Super phosphate
(B) Nitrolim
(C) Muriate of Potash
(D) Humus

Question 78 : Which of the following processes is known as fusion ?
(A) change of liquid to solid
(B) Change of solid to liquid
(C) Change of liquid to vapour
(D) Change of gaseous state to solid state

Question 79 : The one, in which interparticle forces are strongest, is.
(A) sodium chloride
(B) hydrogen
(C) ether
(D) carbon dioxide

Question 80 : Which of the following is compound ?
(A) Stainless steel
(B) Brass
(C) Iron sulphide
(D) Diamond

Question 81 : Which one of the following is non-crystalline or amorphous ?
(A) Diamond
(B) Graphite
(C) Glass
(D) Common Salt

Question 82 : Which among the following is popularly called Hypo ?
(A) Silver bromide
(B) Silver nitrate
(C) Sodium thiosulphate
(D) Sodium phosphate

Question 83 : The number of neutrons in $^{27}Al_{13}$ is.
(A) 40
(B) 27
(C) 14
(D) 13

Question 84 : The nucleus of a singly ionized carbon atom contains.
(A) 6 protons and 6 neutrons
(B) 5 protons and 6 neutrons
(C) 6 protons, 6 nuetrons and 6 electrons
(D) 12 proton, 6 nuetrons and 6 electrons

Question 85 : Protons and neutrons are bound in a nucleus by the.
(A) short range 'weak interaction'
(B) short range 'strong interaction'
(C) long range 'electromagnetic interaction'

(D) long range 'gravitational interaction'

Question 86 : According to Newland's law of octaves, which element in the repetiton of the first element in the periodic table ?

(A) Oxygen

(B) Nitrogen

(C) Chlorine

(D) Sulphur

Question 87 : Which one of the following is a diagonally related pair ?

(A) H, Be

(B) Na, Mg

(C) B, Si

(D) K, Ca

Question 88 : Which element is most electronegative among hologens ?

(A) Br

(B) Cl

(C) F

(D) I

Question 89 : On moving horizontally across a period, the number of electrons in the outermost shell increases from..... to .....

(A) 2, 8

(B) 2, 18

(C) 1, 8

(D) 1, 18

Question 90 : An ionic compound when dissolved in water has produced m A^{n-}, n B^{m-} ions. What is the formula of the compound ?

(A) A_mB_n

(B) A_nB_m

(C) A_mB_m

(D) A_nB_n

Question 91 : What are the types of bonds present in $CuSO_4.5H_2O$?

(A) Electrovalent and covalent

(B) Elecrovalent and coordinate covalent

(C) Electrovalent, covalent, coordinate covalent and hydrogen bonds

(D) Covalent and coordinate covalent

Question 92 : Consider the following equation for the formation of ammonia from nitrogen and hydrogen :

$$N_2 + 3H_2 \rightarrow 2NH_3$$

How many hydrogen molecules are required to react with 100 molecules of nitrogen ?

(A) 100

(B) 200

(C) 300

(D) 400

Question 93 : As compared to covalent compounds, electrovalent compounds, generally have

(A) low melting point and low boiling point

(B) low melting point and high boiling point

(C) high melting point and low boiling point

(D) high melting point and high boiling point

Question 94 : Arrange the following bases in increasing order of their, basic strength
1. Sodium hydroxide
2. Magnesium hydroxide
3. Aluminium hydroxide
4. Ammonium hydroxide
Select the correct answer using the code given below

(A) A B C D
4 2 1 3

(B) 4 1 2 3

(C) 4 3 2 1

(D) 1 2 3 4

Question 95 : The most abundant metal in the earth's crust is-

(A) iron

(B) copper

(C) aluminiam

(D) mercury

Question 96 : The metals that reacts with cold water is-

(A) mercury

(B) sodium

(C) zinc

(D) tungsten

Question 97 : The only metal that is liquid at room temperature is-

(A) mercury

(B) sodium

(C) zinc

(D) tungsten

Question 98 : Identify the enzyme which converts glucose to ehtyl alcohol .

(A) Zymase

(B) Invertase

(C) Maltase

(D) Diastase

Question 99 : 'Drinking alcohol' is very harmful and it ruins the health. 'Drinking alcohol' stands for :

(A) drinking methyl alcohol

(B) drinking ethyl alcohol

(C) drinking propyl alochol

(D) drinking isopropyl alcohol

Question 100 : Which of the following has shortest carbon bond length ?

(A) C_2H_2

(B) C_2H_4

(C) C_2H_6

(D) C_6H_6

ANSWER KEY

1. D
2. D
3. D
4. A
5. B
6. C
7. B
8. C
9. A
10. A
11. D
12. B
13. A
14. C
15. D
16. D
17. C
18. B
19. A
20. D
21. C
22. B
23. C
24. C
25. C
26. A
27. D
28. C
29. D
30. B
31. B
32. B
33. B
34. B
35. B
36. C
37. B
38. D
39. A
40. C
41. B
42. C
43. D
44. A
45. B
46. A
47. A
48. C
49. C
50. A
51. A
52. D
53. A
54. C
55. A
56. D
57. A
58. D
59. A
60. C
61. B
62. C
63. D
64. A
65. D
66. A

67. C

68. C

69. C

70. D

71. A

72. D

73. A

74. D

75. A

76. C

77. D

78. B

79. A

80. C

81. C

82. C

83. C

84. A

85. B

86. A

87. C

88. C

89. C

90. A

91. C

92. C

93. D

94. C

95. C

96. A

97. A

98. B

99. B

100. A