AEEE SAMPLE PAPER 2023

SUBJECT: Mathematics

Question 1 : If $A \subset B$ and $A \neq B$, then

(A) A is called a proper subset of B

(B) A is called a super set of B

(C) A is not a subset of B

(D) B is a subset of A

Question 2 : The number of non-empty subsets of the set{1, 2, 3, 4} is

(A) 15

(B) 14

(C) 16

(D) 17

Question 3 : If A = {1, 2, 3}, B = {3, 8}, then $(A \cup B) \times (A \cap B)$ is equal to

(A) {(8, 3), (8, 2), (8, 1), (8, 8)}

(B) {(1, 2), (2, 2), (3, 3), (8, 8)}

(C) {(3, 1), (3, 2), (3, 3), (3, 8)}

(D) {(1, 3), (2, 3), (3, 3), (8, 3)}

Question 4 : The Cartesian product A × A has 9 elements among which are found (-1, 0) and (0, 1). Then, the remaining elements of A × A are

(A) (0, 0), (0, 1), (0, -1), (-1, 1), (-1, 0), (1, 0), (1, -1)

(B) (-1, 1), (-1, 0), (0, 0), (0, -1), (0, 1), (1, 0), (1, -1)

(C) (0, -1), (1, 0), (1, -1)

(D) None of the above

Question 5 : If $\frac{(1+i)^2}{2-i} = x + iy$, then $x + y$ is equal to

(A) $-\frac{2}{5}$

(B) $\frac{6}{5}$

(C) $\frac{2}{5}$

(D) $-\frac{6}{5}$

Question 6 : What is the value of n sot that $\frac{a^{n+1}+b^{n+1}}{a^n+b^n}$ geometric mean between a and b ? where $a \neq b$

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

(B) $n = \frac{-1}{2}$

(C) n = 2

(D) -2

Question 7 : The sum of the divisors of 630 is

(A)
809

(B) 1439

(C) 1872

(D) 1579

Question 8 : The number of zeroes at the end, if 100! is fully expanded and written out is

(A) 23

(B) 26

(C) 25

(D) 24

Question 9 : How many 10-digit numbers can be written by using the digits 1 and 2?

(A) $^{10}C_1 + {}^9C_2$

(B) 2^{10}

(C) $^{10}C_2$

(D) 10!

Question 10 : If in the expansion of $(1 + x)^m (1 - x)^n$, the coefficient of x and x^2 and 3 and -6, respectively, then m is

(A) 6

(B) 9

(C) 12

(D) 24

Question 11 : If the roots of the equation $8x^3 - 14x^2 + 7x - 1 = 0$ are in GP, then the roots are

(A) $1, \frac{1}{2}, \frac{1}{4}$

(B) 2, 4, 8

(C) 3, 6, 12

(D) None of these

Question 12 : Let α, β be the roots of $x^2 - 2x\cos\phi + 1 = 0$, then the equation whose roots are α^n and β^n, is

(A) $x^2 - 2x\cos n\phi - 1 = 0$

(B) $x^2 - 2x\cos n\phi + 1 = 0$

(C) $x^2 - 2x\sin n\phi + 1 = 0$

(D) $x^2 + 2x\sin n\phi - 1 = 0$

Question 13 : The set of real x satisfying the inequality $\frac{5-2x}{3} \le \frac{x}{6} - 5$ is â€‹

(A) $(-\infty, 8)$

(B) $(8\ \infty)$

(C) $[8, \infty)$

(D) $(-\infty, 8]$

Question 14 : Which of the following is the solution set of the inequality $\frac{x}{4} < \frac{(5x-2)}{3} - \frac{(7x-3)}{5}$?

(A) $(4, \infty)$

(B) $(-\infty, 4)$

(C) $[4, \infty)$

(D) $(-\infty, 4)$

Question 15 : If A is square matrix such that $A^2 = A$, then $(A + I_3)$ is equal to

(A) A + 1

(B) 7A + I

(C) 3A + I

(D) A – I

Question 16 : Determinate $\begin{vmatrix} x & \sin\theta & \cos\theta \\ -\sin\theta & -x & 1 \\ \cos\theta & 1 & x \end{vmatrix}$ is

(A) independent of θ â€‹

(B) dependent of θ â€‹

(C) dependent of θ and x

(D) None of these above

Question 17 : $\begin{vmatrix} 1 & bc & a(b+c) \\ 1 & ca & b(c+a) \\ 1 & ab & c(a+b) \end{vmatrix}$ is equal to

(A) a + b + c

(B) abc

(C) ZERO

(D) None of these

Question 18 : The value of

$$\left(1+\cos\frac{\pi}{6}\right)\left(1+\cos\frac{\pi}{3}\right)\left(1+\cos\frac{2\pi}{3}\right)\left(1+\cos\frac{7\pi}{6}\right)$$

is

(A) $\frac{3}{16}$ â€‹

(B) $\frac{3}{8}$

(C) $\frac{3}{4}$

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

Question 19 : Range of $\tan^{-1}\left(\frac{2x}{1+x^2}\right)$ is

(A) $\left[-\frac{\pi}{4}, \frac{\pi}{4}\right]$

(B) $\left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$

(C) $\left[-\frac{\pi}{2}, \frac{\pi}{4}\right]$

(D) $\left[\frac{\pi}{2}, \frac{\pi}{4}\right]$

Question 20 : $\lim_{x \to \tan^{-1} 3} \left(\frac{\tan^2 x - 2\tan x - 3}{\tan^2 x + 4\tan x + 3}\right)$ equal

(A) 1
(B) 2
(C) ZERO
(D) 3

Question 21 : If $x^2 + 2xy + y^3 = 42$, then $\frac{dy}{dx}$ is equal to

(A) $\frac{-2(x+y)}{2x+3y^2}$
(B) $\frac{-(2x+3y^2)}{2(x+y)}$
(C) $\frac{-2(x+y)}{2y+3x^2}$
(D) $\frac{2(x^2+y^2)}{2x+3y^2}$

Question 22 : Find the derivative of $\tan^{-1}\left(\frac{\cos x + \sin x}{\cos x - \sin x}\right)$ with respect to x.

(A) ZERO
(B) 1
(C) -1
(D) $\cos^2 x$

Question 23 : The equation of normal to the parabola $y^2 = 4ax$ at the point $(at^2, 2at)$ is
(A) $y + 2at^2 = xt - at^2$
(B) $y - 2at = xt - at^2$
(C) $y - 2at = -xt + at^3$
(D) None of the above

Question 24 : Length of normal to curve $y^2 = 4ax$ at $(at^2, 2at)$ is
(A) $2a\sqrt{t+1}$
(B) 2a
(C) $2a\sqrt{t^2+1}$
(D) None of these

Question 25 : $\int \frac{\sin x + \cos x}{\sqrt{1+\sin 2x}} dx$ is equal to
(A) log (sinx + cosx) + C
(B) x + C
(C) log(1 + sin 2x) + C
(D) sinx + cos x + C

Question 26 : The solution of $e^{-y} dy = e^x dx$ at (1,0) is
(A) $x = e^y - 1$
(B) $-e^{-y} = e^x - e - 1$
(C) $y = e^x - 1$
(D) None of these

Question 27 : If a DABC has vertices (0, 0), (11, 60) and (91, 0). If the line y = kx cuts the triangle into two triangles of equal area, then k is equal to
(A) $\frac{30}{51}$

(B) $\frac{4}{7}$

(C) $\frac{7}{4}$

(D) $\frac{30}{91}$

Question 28 : The equation of the circle which passes through the origin and cuts off intercepts 3 and 4 from the positive parts of the axes, respectively is

(A) $4x^2 + 12xy + 4y^2 - 16y = 0$

(B) $x^2 + y^2 - 3x - 4y = 0$

(C) $x^2 - 12x + 4y^2 + 16y = 0$

(D) None of the above

Question 29 : The point (-2.5, 3.5) lie with respect to the circle $x^2 + y^2 = 25$

(A) inside

(B) outside

(C) on the circle

(D) None of these

Question 30 : Vertex and Focus of the parabola $y^2 - 4y - 2x - 8 = 0$ are respectively

(A) $(-6,2)\left(\frac{-11}{2},2\right)$

(B) $(-5,2)\left(\frac{-11}{2},2\right)$

(C) $\left(\frac{-11}{2},2\right),(-6,2)$

(D) None of these

Question 31 : If $\hat{i}+\hat{j}, \hat{j}+\hat{k}$ and $\hat{i}+\hat{k}$ are the position vectors of the vertices of a ΔABC taken in order, then $\angle A$ is equal to

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

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

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

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

Question 32 : Let u, v and w be vectors such that u + v + w = 0. If |u| = 3, |v| = -1 and |w| = 5, then u.v + v.w + w.u is equal to

(A) ZERO

(B) -25

(C) 25

(D) 50

Question 33 : If the lines $\frac{x-2}{1}=\frac{y-3}{1}=\frac{z-4}{-k}$ and $\frac{x-1}{k}=\frac{y-4}{2}=\frac{z-5}{1}$ are coplanar, then k can have

(A) any value

(B) exactly one value

(C) exactly two values

(D) exactly three values

Question 34 : The weighted mean of the first n natural numbers, the weights being the corresponding numbers, is

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

(B) $\frac{n+2}{2}$

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

(D) None of these

Question 35 : Three of the six vertices of a regular hexagon are chosen at random. The probability that the triangle with three vertices is equilateral equals

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

(B) $\frac{1}{5}$

(C) $\frac{1}{10}$

(D) $\frac{1}{20}$

Question 36 : In a hurdle race, a runner has probability p of jumping over a specific hurdle. Given that in 9 trials, the runner succeeded 3 times, the conditionals probability that the runner had succeeded in the first trial, is

(A) $\frac{3}{5}$

(B) $\frac{2}{5}$

(C) $\frac{1}{5}$

(D) None of these

Question 37 : Which of the following statements is / are true?

(A) The intersection of any two subspaces of a vector space V(F) is again a subspace of V(F)

(B) The intersection of any two subspaces of a vector space V(F) is not a subspace of V(F)

(C) V(F) is the subspace of intersection of any two subspace of V(F)

(D) If V_1 and V_2 are two subspace of V, then $v_1 \in V_1$ and $v_2 \in V_2$, then $v_1 + v_2 \notin V_1 \cap V_2$

Question 38 : Which of the following(s) is/are linearly dependent set of vectors in R3?

(A) {(1, 0, 0), (1, 1, 0), (1,1, 1)}

(B) {(1, 1, 1), (-1, 0, 1), (0, -2, 1)}

(C) (1, 0, 0), (0, 1, 0), (1, 1, 1), (-1, 1, -1)

(D) All of the above

Question 39 : The power series $\sum_{n=0}^{\infty} 2^{-n} . z^{2n}$ converges, if

(A) radius of convergence is $\sqrt{2}$

(B) radius of convergence is $\sqrt{3}$

(C) radius of convergence is $\sqrt{5}$

(D) None of the above

Question 40 : Which one of the following is true?

(A) A constant function is Riemann integrable

(B) Constant function is not Riemann integrable

(C) A constant function may or may not be Riemann integrable

(D) None of the above

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) The atmosphere is changing

(B) so I have severe pain in my body

(C) if you have any painkiller, please give it to me

(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) No one is without fault

(B) because no one is God

(C) and only God is fault free

(D) No error

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

(A) The real important thing

(B) of our life is our livelihood

(C) which discriminates us from animals

(D) No error

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

(A) She is too much beautiful

(B) so most of the boys run after her and

(C) want to influence her

(D) No error

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

(A) By 8,000 in the

(B) morning he wrote

(C) four letters to his friends

(D) No error

SUBJECT: Physics

Question 46 : Which of the following is derived physical quantity ?

(A) Mass

(B) Velocity

(C) Length

(D) Time

Question 47 : What are the units of magnetic permeability ?

(A) $Wb\ A^{-1}\ m^{-1}$

(B) $Wb^{-1}\ Am$

(C) $Wb\ A\ m^{-1}$

(D) $Wb\ A^{-1}\ m$

Question 48 : The dimensions of pressure gradient are

(A) $[ML^{-2}\ T^{-2}]$

(B) $[ML^{-2}\ T^{-1}]$

(C) $[ML^{-1}\ T^{-1}]$

(D) $[ML^{-1}\ T^{-2}]$

Question 49 : If an object covers equal distances in equal intervals of time, it is said to be in

(A) Circular Motion

(B) Uniform Motion

(C) Oscillatory Motion

(D) Non- uniform Motion

Question 50 : Average velocity of an object is obtained by.

(A) Dividing the total distance traveled b the total time taken

(B) Half of the sum of the initial velocity and the final velocity

(C) Both (a) and (b)

(D) None of the above

Question 51 : Negative value of acceleration signifies.

(A) The velocity is increasing

(B) The velocity is decreasing

(C) The velocity remains the same

(D) The object comes to rest

Question 52 : In distance-time graphs.

(A) Distance is taken along the X-axis

(B) Time is taken along the Y-axis

(C) Straight line indicates uniform motion

(D) Straight line indicates non-uniform motion

Question 53 : When a force of newton acts on a mass of 1 kg that is free to move, the object moves with a.

(A) speed of 1m/s

(B) speed of 1 km/s

(C) acceleration of 10 m/s^2

(D) acceleration of 1m/s^2

Question 54 : If an object experience a net zero unbalanced force, then the body.

(A) can be acclerated

(B) moves with constant velocity

(C) cannot remain at rest

(D) None of these

Question 55 : The energy of 4900 Joule was expanded in lifting a 50 kg mass. The mass was raised to a height of-

(A) 10 m

(B) 98 m

(C) 960 m

(D) 245000 m

Question 56 : A system consists of three particles, each of mass m and located at (1, 2) (2, 2) and (3,3). The co-ordinates of the centre of mass are

(A) (1, 1)

(B) (2, 2)

(C) (3, 3)

(D) (6, 6)

Question 57 : A cylinder of water, is rotating about its own axis with uniform angular velocity ?. The shape of free surface of water will be

(A) parabola

(B) elliptical

(C) circular

(D) spherical

Question 58 : All bodies whether large or small fall with the

(A) same force
(B) same acceleration
(C) same velocity
(D) same momentum

Question 59 : Weightlessness experienced while orbiting the earth in a spaceship is the result of
(A) zero gravity
(B) inertia
(C) accleration
(D) centre of gravity

Question 60 : An object just foats in water. if common salt is added into the water
(A) the volume of the object immersed in the liquid decreases
(B) the object sinks
(C) the object first sinks and then floats up
(D) cannot be determined

Question 61 : A substance float in water, but sinks in coconut oil. The density of the substance
(A) is less than the density of water
(B) is greater than the density of oil
(C) both (a) and (b)
(D) Cannot be decided from the given information

Question 62 : The speed of sound of a wave of frequency 200 Hz in air is 340 m/s. The speed of sound of wave of frequency 400 Hz in same air is
(A) 340 m/s
(B) 680 m/s
(C) 170 m/s
(D) 3×10^8 m/s

Question 63 : Ultrasonic waves have frequency
(A) below 20 Hz
(B) between 20 and 20,000 Hz
(C) only above 20,000 Hz
(D) only above 20,000 MHz

Question 64 : The temperature of the Sun is measure with
(A) platinum thermometer
(B) gas thermometer
(C) pyrometer
(D) vapour pressure thermometer

Question 65 : A mountain climber finds that water boils at 80°C. The temperature of this boiling water is..... Fahrenheit
(A) 50°
(B) 150°
(C) 176°
(D) 200°

Question 66 : For a constant volume gas thermometer one shoulld fill the gas at
(A) low temperature and low pressure
(B) low temperature and high pressure
(C) high temperature and low pressure
(D) high temperature and high pressure

Question 67 : When a gas is in thermal equilibrium, its molecules
(A) have the same average kinetic energy of molecules

(B) have different energies which remain constant

(C) have a certain constant energy

(D) do not collide with one another

Question 68 : A cooler of 1500W, 200 volt and a fan of 500W, 200 volt are to be used from a supply. The rating of fuse to be uses is

(A) 2.5 A

(B) 5.0 A

(C) 7.5 A

(D) 10 A

Question 69 : A fuse wire repeatedly gets burnt when used with a good heater. It is advised to use a fuse wire of

(A) more length

(B) less radius

(C) less length

(D) more radius

Question 70 : Rheostat is a device used to vary

(A) voltage

(B) current

(C) resistance

(D) power

Question 71 : An object placed at F of a concave mirror will produce an image

(A) at infinity

(B) highly enlarged

(C) real and inverted

(D) All of these

Question 72 : The relation between u, v and R for a spherical mirror is

(A) $R = \frac{2uv}{u+v}$

(B) $R = \frac{2}{u+v}$

(C) $R = \frac{2(u+v)}{(uv)}$

(D) None of these

Question 73 : Which element contained in a fuel contributes to its high calorific value ?

(A) Carbon

(B) Hydrogen

(C) Oxygen

(D) Nitrogen

Question 74 : Cathode rays are made to pass between the poles of a magnet perpendicular to axis, the effect of the magnetic field is

(A) to increase the velocity of rays

(B) to deflect them towards the north pole

(C) to deflect them towards the south pole

(D) to deflect them upwards above the plane of paper

Question 75 : A strong argument for the particle nature of cathode rays is that they

(A) produce fluroscence

(B) travel through vacuum

(C) get deflected by electric and magnetic fields

(D) cast shadow

SUBJECT: Chemistry

Question 76 : Which of the following chemicals is used in foam fire extinguishers ?

(A) Aluminium sulphate

(B) Copper sulphate

(C) Cobalt sulphate

(D) Nickel sulphate

Question 77 : What is a mixture of potassium nitrate, powdered charcoal and sulphur called ?

(A) Glass

(B) Cement

(C) paint

(D) Gun powder

Question 78 : The size of colloidal particles usually lies in the range.

(A) $10^{-5} - 10^{-7}$ cm

(B) $10^{-7} - 10^{-9}$ cm

(C) $10^{-3} - 10^{-5}$ cm

(D) $10^{-5} - 10^{-6}$ cm

Question 79 : Oil and water can form a stable dispersion with the help of a third substance commonly called.

(A) emulsifier

(B) dispersant

(C) protective colloid

(D) None of these

Question 80 : Why is helium preferred over hydrogen for use in airships.

(A) Helium has a low density

(B) Helium has a high density

(C) Helium is chemically less reactive

(D) Helium is chemically more reactive

Question 81 : Which one of the following mixture is homogeneous ?

(A) Starch and sugar

(B) Methanol and water

(C) Graphite and charcoal

(D) Calcium carbonate and calcium bicarbonate

Question 82 : Which one among the following most correctly determines the atomic number of an element ?

(A) number of protons

(B) Number of protons and electrons

(C) Number of ions

(D) Number of nucleons

Question 83 : The number of protons in a negatively charged atom (anion) is.

(A) more than the atomic number of the element

(B) less than the atomic number of the element

(C) more than the number of electrons in the atom

(D) less than the number of electrons in the atom

Question 84 : Which one among the following is correct regarding ^{20}Ne, $^{23}Na^{+}$, $^{19}F^{-}$ and $^{24}Mg^{2+}$?

(A) They are isomers of each other

(B) They are isotopes of each other

(C) They are isoelectronic with each other

(D) All of the above

Question 85 : Which formula gives the maximum number of electrons in a shell ?

(A) n^2

(B) $2n^2$

(C) $3n^2$

(D) $4n^2$

Question 86 : Which of the following elements A, B, C, D and E with atomic number 3, 11, 15, 18 and 9 respectively belong to the same group ?

(A) A, B, C

(B) B, C, D

(C) A, D, E

(D) A, B, E

Question 87 : Which of the following statement is not true about noble gases ?

(A) They are non-metallic in nature

(B) They exist in atomic form

(C) They are radioactive in nature

(D) Xenon is the most reactive among them

Question 88 : Which among the following atoms has highest atomic radiation ?

(A) Na

(B) Rb

(C) K

(D) Cs

Question 89 : Which one of these group of elements is also caled the hologen family ?

(A) Group 16

(B) Group 18

(C) Group 10

(D) Group 17

Question 90 : In $KMnO_4$ molecule, the oxidation states of the elements Potassium (K), Manganese (Mn) and Oxygen (O) are respectively

(A) +1, +5, -2

(B) +1, +7, - 2

(C) 0, 0, 0

(D) +1, +7, 0

Question 91 : In the reaction $4Fe + 3O_2 ? 4Fe^{3+} + 6O^{2-}$
Which of the following statement is incorrect ?

(A) It is a redox reaction

(B) Metallic iron acts as a reducing agent

(C) O_2 acts as an oxidising agent

(D) Metallic iron is reduced to Fe^{3+}

Question 92 : Most of the explosions in mines occur due to the mixing of

(A) hydrogen with oxygen

(B) oxygen with acetylene

(C) Methane with air

(D) carbon dioxide with ethane

Question 93 : If a limestone piece is dipped in water, a bubble evolves. The bubbling is due to

(A) hydrogen

(B) oxygen

(C) water vapour

(D) carbon dioxide

Question 94 : Which one among the following is not a property of salt ?

(A) Salts have ordered packing arrangements called lattices
(B) Salts have low melting points but high boiling points
(C) Salts are brittle
(D) Salts conduct electricity when dissolved in water or even in the molten state

Question 95 : Metal reacts with oxygen to form
(A) neutral oxides
(B) basic oxides
(C) acidic oxides
(D) None of these

Question 96 : The metal used to built bridges is
(A) gold
(B) silver
(C) platinum
(D) iron

Question 97 : Non-metallic oxide are
(A) acidic
(B) basic
(C) neutral
(D) (a) and (c)

Question 98 : Which of the following can be used to distinguish between ethane and ethene ?
(A) A lighted splinter
(B) Aqueous bromine
(C) Litmus solution
(D) Lime water

Question 99 : Gas welding used for welding broken pieces of iron, we normally use a mixture of :
(A) ehtane and oxygen
(B) ethene and oxygen
(C) ethyne and oxygen
(D) ethene and air

Question 100 : On the basis of following features identify the correct option
A. Drinks containing ethanol
B. These drinks are major source of income to government
(A) Alcoholic beverages
(B) Soft drinks
(C) Carbonated beverages
(D) Rectified spirit

ANSWER KEY

1. A
2. A
3. D
4. C
5. B
6. A
7. C
8. D
9. B
10. C
11. A
12. B
13. C
14. A
15. B
16. A
17. C
18. A
19. A
20. B
21. A
22. A
23. C
24. C
25. C
26. B
27. D
28. B
29. B
30. A
31. D
32. B
33. B
34. C
35. C
36. A
37. A
38. C
39. A
40. A
41. B
42. A

43. A

44. A

45. A

46. B

47. A

48. A

49. B

50. B

51. B

52. C

53. D

54. B

55. A

56. B

57. A

58. B

59. A

60. A

61. C

62. A

63. C

64. C

65. C

66. C

67. A

68. D

69. D

70. B

71. D

72. A

73. B

74. D

75. C

76. A

77. D

78. A

79. A

80. C

81. B

82. A

83. D

84. C

85. B

86. D

87. C

88. D

89. D

90. B

91. D

92. B

93. D

94. B

95. B

96. D

97. D

98. B

99. C

100. A