UPSEE- 2011 MODEL TEST PAPER

PAPER 7 (For students appearing for MCA)

Max marks : 400 **Time : 1hr 30 min.**

General Instructions:

- This model paper contain hundred questions.
- Each ***question*** carries ***four marks, only all correct answer will*** get marks for that question.
- There is no ***negative*** marking.
- The questions have different choices for indicating correct answer. Candidate is required to read the questions carefully and incase of more than one answer being correct indicate all the correct choices. Only **all correct choice will be awarded marks.** If only one correct choice is indicated in a question which has more than one correct answer marks for such case will not be awarded.

Choose the correct answer:-

1. The Square root (s) of $(49 + 20\sqrt{6})$ is / are

(a) $(4 + 3\sqrt{6})$ (b) $-(4 + 3\sqrt{6})$
(c) $(5 + 2\sqrt{6})$ (d) $-(5 + 2\sqrt{6})$

2. If α and β are the roots of the equation $x^2 - p(x+1) - q = 0$, then the value of

$$\frac{(\alpha+1)^2}{(\alpha+1)^2 + (q-1)} + \frac{(\beta+1)^2}{(\beta+1)^2 + (q-1)}$$ is

(a)2 (b) 1
(c) 4 (d) 3

3. If the coefficient of x^3 in the expansion of $(1+\alpha x)^4$ is 32, then α equals

(a) 2 (b) 3
(c) 4 (d) 6

4. If q, b, c, are all non-zero and the value of

$$\Delta = \begin{vmatrix} 1+a & 1 & 1 \\ 1 & 1+b & 1 \\ 1 & 1 & 1+c \end{vmatrix}$$

is zero, the value of $(a^{-1} + b^{-1} + c^{-1})$ is

(a)-1 (b) -2
(c) -3 (d) None of these

5. The least integer n such that $7^n > 10^5$, given that $\log_{10} 343 = 2.5353$

(a)5 (b) 6
(c) 4 (d) None of these

6. Three numbers from an increasing GP of the middle number is doubled, then the new numbers are in AP. The common ratio of the GP is

(a) $2 + \sqrt{3}$ (b) $2 - \sqrt{3}$
(c) $3 + \sqrt{2}$ (d) $3 - 2\sqrt{2}$

7. The Sum of the Series

$$\frac{1}{\lfloor 2} + \frac{1+2}{\lfloor 3} + \frac{1+2+3}{\lfloor 4} + \_\_\_\_\_ \text{ is}$$

(a) $\frac{e}{2}$ (b) $\frac{e}{2}$
(c) $\frac{-e}{2}$ (d) None of these.

8. If α is one root of the equation $4x^2 + 2x - 1 + 0$, then its other root is given by

(a) $4\alpha^3 - 3\alpha$ (b) $4\alpha^3 + 3\alpha$
(c) $\alpha - ½$ (d) $-\alpha - ½$

9. If $(1 + 2x + 3x^2)^{10} = a_0 + a_1x + a_2x^2 + \_\_\_\_\_ + a_{20}\, x^{20}$, then which one of the following is wrong?

(a)$a_1 + 20$ (b) $a_2 = 2010$
(c) $a_4 = 8085$ (c) $a_{20} = 2^2.3^3.7$

10. The determinant

$$\begin{vmatrix} a & b & a\alpha + b \\ b & c & b\alpha + c \\ a\alpha + b & b\alpha + c & 0 \end{vmatrix}$$

is equal to zero, if

(a)a, b, c are in AP (b) a, b, c are in GP
(c) a, b, c are in HP (d) α is a root of $ax^2 + bx + c + 0$.

11. One of the roots of a quadratic equation with real coefficients is $\frac{1}{(2-3i)}$ $(i = \sqrt{-1})$ which of the following implications is /are true?

1. The Second root of the equation will be $\frac{1}{(3-2i)}$
2. The equation has no real root.
3. The equation is $13x^2 - 4x + 1 = 0$.

Which of the above is /are correct?

(a)1 and 2 only
(b) 3 only
(c) 2 and 3 only
(d) 1, 2 and 3.

12. The Sum of

$$\frac{1}{3} + \frac{1}{3.3^3} + \frac{1}{5.3^5} + \frac{1}{7.3^7} + \ldots\ldots\ldots\ldots$$

Is / are
(a)$1/2 \log_e 2$
(b) $\log_e \sqrt{2}$
(c) $3/2 \log_e 2$
(d) $1/3 \log_e 2$

13. Three fair dice are tossed together. The probability of obtaining a Sum of 15 of all the three numbers is
(a)3/100
(b) 4/88
(c) 5/108
(d) 7/108

14. Three of the six vertices of a regular hexagon are chosen at random. The probability that the triangle formed by these vertices is equilateral is
(a)1/2
(b) 1/3
(c) 1/10
(d) 1/20

15. A bag contains 3 black and 2 green balls while another bag contains 2 black and 5 green balls. A ball is drawn at random from one of the bags and it turns out to be black. What is the probability that it come from the first bag?
(a)29/31
(b) 21/31
(c) 20/31
(d) 15/31.

16. The complement of an event A is given by A'. Which of the following is true?
(a) P (A) + (A') = 1
(b) P (A) + P (A') = 0
(c) P (A and A') = 0
(d) both (a) and (c).

17. A natural number is chosen at random from amongst the first 500. What is the probility that the number So chosen is divisible by 3 or 5?
(a)230/500
(b) 233/500
(c) 235/500
(d) 241/500

18. A die is rolled. If the outcome is an odd number, what is the probability that it is prime?

(a)1/3 (b) 2/3
(c) 4/3 (d) 1 / 2

19. A bag contains four tickets marked with 112, 121, 211, 222, one ticket is drawn at random from the bag. Let E_i (I = 1, 2, 3) denote the event that ith digit on the ticket is 2. Then which one of the following is wrong?
(a)E_1 and E_2 are independent (b) E_2 and E_3 are independent
(c) E_3 and E_1 are independent (d) E_1, E_2, E_3 are independent

20. If E' and F' are complementary events of the events E and F, then
(a) P (E/F) + P (E'/F) = 1 (b) P (E/F) + P (E/F') = 1
(c)P (E'/F) + P (E/F') = 1 (d) P (E/F') + P (E'/F') = 1

21. Three Six face fair dice are thrown together. The probability that the Sum of the numbers appearing on the dice is k ($3 \leq k \leq 8$) is
(a)$\frac{(k-1)(k-2)}{432}$ (b) $\frac{k(k-2)}{432}$
(c) $^{k-1}C_2 * \frac{1}{216}$ (d) $\frac{k^2}{432}$

22. The value of $\text{Sin } 12^0 \text{ Sin } 48^0 \text{ Sin } 54^0$ is
(a) 1 / 4 (b) 1 / 8
(c)1 / 16 (d) None of these.

23. If α is a root of $25\cos^2\theta + 5\cos\theta - 12 = 0$, $\pi/2 < \alpha < \pi$, then $\text{Sin } 2\alpha$ is equal to
(a)24 / 25 (b) – 24 / 25
(c) 13 / 18 (d) – 13 / 18

24. In a triangle ABC, b Sin B = c Sin C, then which one of the following is correct?
(a) The triangle is right – angled (b) The triangle is isosceles
(c)The triangle is equilateral (d) None of these

25. IF $\cos^{-1}x + \cos^{-1}y + \cos^{-1}z = \pi$, then the value of $(x^2 + y^2 + z^2 + 2xyz)$ is
(a)0 (b) – 1v
(c) 1 (d) 1 / 2

26. The angle of elevation of the top of a tower standing on a horizontal plane from a point A is α. After walking a distance B towards the foot of the tower, the angle of elevation is found to be β. The height of the tower is
(a) $b\frac{\text{Sin } \alpha \text{ Sin } \beta}{\text{Sin } (\beta - \alpha)}$ (b) $\frac{b \text{ Sin } \alpha \text{ Sin } \beta}{\text{Sin } (\alpha - \beta)}$

(b) $\frac{b \text{ Sin } (\beta - \alpha)}{\text{Sin } \alpha \text{ Sin } \beta}$ (c) $\frac{b \text{ Sin } (\alpha - \beta)}{\text{Sin } \alpha \text{ Sin } \beta}$

27. The number of values of x in the interval [o, π] Satisfying the equation Sin x + Sin %x = Sin 3x is / are

(a)6 (b) 1

(c) 2 (d) 4

28. If Cos α = 3/5 and Cos β = 5/13, then which one of the following is wrong?

(a)cos (α+β) = 33/65 (b) Sin (α+ β) = 56/65

(c) $\sin^2 \frac{(\alpha - \beta)}{2} = 1/65$ (d) cos (α – β) = 63/65

29. If tan α and tan β are the roots of the equation $x^2 + px + q = 0$ ($p \neq 0$), then

(a) $\sin^2 (\alpha + \beta) + p \sin (\alpha + \beta) \cos (\alpha + \beta) - q \sin^2 (\alpha + \beta) = 0$

(b) Tan (α + β) =p/q-1

(c) Cos (α + β) = 1 – q

(d) Sin (α + β) = -p

30. If cos (Sin x) = 1/√2, then x must lie in the interval

(a)(π/4, π/2) (b) (-π/4, o)

(c) (π, 3π/2) (d) (π/2, π

31. If $\text{cosec}^{-1}x = \sin^{-1}(1/x)$, then x may not be

(a)1 (b) -1/2

(c) 3/2 (d) -3/2.

32. If a, b, A be given in a triangle and c_1 and c_2 two possible values of third side Such that $C_1^2 + C_1C_2 + C_2^2 = a^2$, then A is

(a)30^0 (b) 60^0

(c) 90^0 (d) 120^0

33. The equation of the line passing through (-1, -2) and having a Slope of 4/7 is

(a)7y + 10 = 4x (b) 7y = 4x + 10

(c) 7x = 4y + 10 (d) 4x + 7y + 10.

34. The lines represented by the equations $12x^2 + 7xy - 12y^2$ and $12x^2 + 7xy - 12y^2 - x + 7y = 1$ from the sides of a

(a)rectangle (b) Square

(c) Parallelogram (d) Rhombus.

35. If the Sum of the Slopes of the lines given by $4x^2 + 2\lambda ry - 7y^2 = 0$ is equal to the product of the slopes, then λ is equal to

(a)- 4 (b) 4

(c) – 2 (d) 2

36. The locus of the point $(\sqrt{3}h + 2, \sqrt{3}k)$, if (h, k) lies on $x+y = 1$, is

(a)a pair of straight lines (b) a circle

(c) a parabola (d) an ellipse.

37. If P and Q are the points $(a t_1^2, 2a t_1)$, $(a t_2^2, 2a t_2)$ and normals at P and Q meet on the parabola $Y^2 = 4ax$, then t_1t_2 equals

(a)2 (b) -1

(c)-2 (d) -4

38. If the normal at the end of latus rectum of the ellipse $b^2x^2 + a^2y^2 = a^2b^2$ passes through (0, -b), then $e^4 + e^2$ (where e is the eccentricity) equals

(a)1 (b) $\sqrt{2}$

(c) $\frac{\sqrt{5}-1}{2}$ (d) $\frac{\sqrt{5}+1}{2}$.

39. If the lines $x - 2y - 6 = 0$, $3x + y - 4 = 0$ and $\lambda x + 4y + \lambda^2 = 0$ are concurrent, then

(a)$\lambda = 2$ (b) $\lambda = -3$

(c) $\lambda = 4$ (d) $\lambda = -4$

40. If $x^2 + \alpha y^2 + 2\beta y = a^2$ represents a pair of perpendicular straight lines, then

(a)$\alpha = 1, \beta = a$ (b) $\alpha = 1, \beta = -a$

(c) $\alpha = -1, \beta = -a$ (d) $\alpha = -1, \beta = a$.

41. The tangents drawn from their origin to the circle $x^2 + y^2 - 2qy = q^2 = 0$ are perpendicular. Then, which one of the following is wrong?

(a)$p = q$ (b) $p^2 = q^2$

(c) $q = -p$ (d) $p^2 + q^2 = 1$

42. The normal $y = mx - 2am - am^3$ to the parabola $y^2 = 4ax$ Subtends a right angle at the vertex if

(a)$m = 1$ (b) $m = \sqrt{2}$

(c) $m = -\sqrt{2}$ (d) $m = 1/\sqrt{2}$.

43. The equation of tangent to the hyperbola $3x^2 - y^2 = 3$ parallel to the line $y = 2x + 4$ is

(a)$y = 2x + 3$ (b) $y = 2x + 1$

(c) $y = 2x - 1$ (d) $y = 2x + 2$.

44. Let $A = \{1, 2, 3, 4\}$ and $b = \{ 1, 2\}$. Then the number of onto functions from A to B is

(a)14 (b) -14

(c) 6 (d) 4.

45. If $A = \{ x : x = 3^n, n \leq 6, n \in N\}$ and

$B = \{ x : x = 9^n, n \leq 4, n \in N \}$, then which of the following is false?

(a) $A \cup B = \{3, 9, 27, 81, 243, 729, 6561\}$

(b) $A \cap B = \{9, 81, 729, 6561\}$

(c) $A - B = \{3, 27, 243\}$

(d) $A \Delta B = +3, 27, 243, 6561\}$

46. If $f(x) = 3x - 5$, $f^{-1}(x)$

(a) is given by 1/3x-5

(b) is given by (x+5)/3

(c) does not exist because f is not one-one

(d) exists because f is one – one and onto.

47. The domain of the function $y = 1/\sqrt{|x|} - x$ is equal to

(a)(0, 00) (b) (- ∞, 0

(c)(-∞, -1) (d) (-∞, ∞)

48. Let R = { (3, 3), (6, 6) , (9, 9), (12, 12), (6, 12), (3, 9), (3, 12) (3,6)} be relation on the A = {3, 6, 9, 12}. The relation is

(a)reflexive and Symmetric only (b) an equivalence relation

(c) reflexive only (d) reflexive and transitive only.

49. Range of $\tan^{-1}(2x/1 + x^2)$ is

(a)[- π/4, π/4] (b) [-π/2, π/2]

(c) [-π/2, π/4] (d) [π/4, π/2]

50. If $e^x + e^{f(x)} = e$, then for F(x)

(a)Domain = (- ∞, 1) (b) range = (- ∞, 1)

(c) domain = (- ∞, 0) (d) range = (- ∞, 1)

51. The composite mapping fog of the maps $F : R \rightarrow R$, F ® = Sin x, $g : R \rightarrow R$, $g(x) = x^2$, is

(a)Sin $x = x^2$ (b) $(\text{Sin } x)^3$

(c) Sin x^2 (d) $\text{Sin}x/x^2$

52. If F(x) = x-1/x+1, then which of the following statement (s) is/are correct

(a)F(1/x) = f(x) (b) F(1/x) = - F(x)

(c)F(-1/x) = 1/f(x) (d) F(-1/x) = -1/f9x).

53. Let A and B be Sets and Let A' and B' denote the complements of the sets A and B. The Set

(A –B) U (B – A) U (A – B) is equal to

(a)AUB (b) A'UB'

(c) AΠB (d) AΠB

54. If F(x) = log |x|, $x \neq 0$, then f'(x) equals

(a)1/|x| (b) 1/x

(c) -1/x (d) None of these.

55. $\lim_{x \to 0} \frac{\{x \cos x - \sin x\}}{x^2 \sin x}$ is equal to

(a)1/3 (b)-1/3

(c) 1 / 2 (d) - 1 / 2.

Raman was driving in New Town, where all roads ran either North – South or East-West forming a grid. Roads were at a distance of 1km each other in parallel.

56. Raman started at the inter-section of streets no. 7 and 8. He drove 3km north, 3km west, and 4km South which further route could bring him back to his starting point?

(I) 3km East, then 2km South;
(II) 3km East, then 1 km North;
(III) 1km North, then 2km West;

(a) I only
(b) II only
(c) I and II only
(d) II and III Only

57. Sita and Raman both start form a point towards North and walk 10km. Sita turns to her left and Raman turns to his right. Sita waits for some time and then walks another 5km in the same direction in which she turned. On the other hand Raman walks only 3km Sita, then turns towards her left and Raman turns towards his right. Both now walk 15km forward. How far is Sita from Raman Now?

(a) 15km (b) 10 km (c) 8 km (d) 12km

58. After driving as started in Question 15, Raman did not return to his starting point, but instead drove 4km east and 1km north. How far is he from his starting point?

(a) 5km (b) 4km (c) 1km (d) 7km

59. Raman travels 7km eastwards and then turns right and travel 3km and further turns right and travels 13km. how far is Raman form the starting point?

(a) 6km (b) 7km (c) 16km (d) None of these

60. The line $x/a + y/b = 1$ touches the curve $y = b e^{-x/a}$ at the point

(a)(a, b/a) (b) (-a, b/a)

(c) (a, a/b) (d) none of these

61. If the line $as + by + c = 0$ is a normal to the curve $xy = 1$. Then

(a)$a > 0, b > 0$ (b) $a > 0, b < 0$

(c) $a < 0, b > 0$ (d) $a < O, b < o$.

62. The maximum and minimum values of $(a \cos 2\theta + \sin 2\theta)$ are

(a) $\sqrt{a^2 + b^2}$ and $-\sqrt{a^2 + b^2}$ (b) $(a + b)$ and $(a - b)$

(c)$(a^2 + b^2)$ and $-(a^2 + b^2)$ (d) None of these

63. If $\int \frac{\sqrt{\sin x}}{\sin(x-\alpha)}\,dx = Ax + B\log\sin(x-\alpha) + C$, then

(a) $A = \cos\alpha$ (b) $B = \sin\alpha$

(c) $A = \sin\alpha$ (d) $B = \cos\alpha$.

64. The value of the integral $\int_{\bullet}^{\pi/2} \frac{1}{1+\sqrt{\cot x}}\,dx$ is

(a) $\pi/4$ (b) $\pi/2$

(c) $\pi/3$ (d) None of these

65. The value of α Such that the vectors $(2\hat{i} - \hat{j} + \hat{r})$ $(\hat{i} + 2\hat{j} - 3\hat{k})$ and $(3\hat{i} + \alpha\hat{j} + 5\hat{k})$ are coplanar is

(a)4 (b) -4

(c) 3 (d) -3

66. Let $\vec{A} = 2\hat{i} + \hat{k}$, $\vec{B} = \hat{i} + \hat{j} + \hat{k}$ and $\vec{C} = 4\hat{i} - 3\hat{j} + 7\hat{k}$, then R, which Satisfies $\vec{R} \times \vec{B} = \vec{C} \times \vec{B}$ and $\vec{R}.\vec{A} = 0$, is

(a)$-\hat{i} - 8\hat{j} + 2\hat{k}$ (b) $\hat{i} - 8\hat{j} + 2\hat{k}$

(c) $-\hat{i} - 8\hat{j} - 2\hat{k}$ (d) $\hat{i} - 8\hat{j} - 2\hat{k}$

67. If $\hat{i}$ and $\hat{j}$ are two unit vectors and α be the angles between them, then the value of α Such that $(\hat{i} + \hat{j})$ is a unit vector is

(a)60^o (b) 30^o

(c) 120^o (d) 90^o

68. The equation of a plane passing through the point A(3, - 2, 1) and perpendicular to the vector $(4\hat{i} + 7\hat{j} - 4\hat{k})$ is

(a) $4x + 7y - 4z + 6 = 0$ (b) $4x + 7y - 4z = -6$

(c)$4x - 7y + 4z = 6 = 0$ (d) $4x - 7y + 4z = -6$

69. If a triangle with vertices at $2\hat{i} + \hat{j}$, $2\hat{j} + \hat{k}$, $\alpha\hat{k} + \hat{i}$ has centroid at $\hat{i} + \hat{j} + \hat{k}$, then α is

(a)1 (b) -1

(c) 2 (d) 3

70. If the vector $\vec{c}$, $\vec{a} = x\hat{i} + y\hat{j} + z\hat{k}$ and $\vec{b} = \hat{j}$ are such that $\vec{a}$, $\vec{c}$ and $\vec{b}$ form a right handed System, then $\vec{c}$ is

(a) $z\hat{i} - x\hat{k}$ (b) $x\hat{k}$

(c)$y\hat{j}$ (d) $-z\hat{i}$

71. If a vector $\vec{r}$ Satisfies the equation $\vec{r} \times (\hat{i} + 2\hat{j} + \hat{k}) = \hat{i} - \hat{k}$, then $\vec{r}$ is not equal to

(a) $+ 3\hat{j} + \hat{k}$ (b) $3\hat{i} + 7\hat{j} + 3\hat{k}$

9c)$\hat{j}$ + t ($\hat{i}$ + 2$\hat{j}$ + $\hat{k}$), where t is any Scalar (d) $\hat{i}$+(t+3)$\hat{j}$+$\hat{k}$, where t is any Scalar.

72. The vector $\overrightarrow{AB}$ = 3$\hat{i}$-2$\hat{j}$ + 2$\hat{k}$ and $\overrightarrow{BC}$ = - $\hat{i}$ - 2$\hat{k}$ are the adjacent Sides of a parallelogram. The angle between the diagonals is / are

(a)$\pi/4$ (b) $\pi/3$

(c)$3\pi/4$ (d)$2\pi/3$

73. The volume of the Tetrahedron whose vertices are points with position vectors ($\hat{i}$-6$\hat{j}$+10$\hat{k}$), (-$\hat{i}$-3$\hat{j}$+7$\hat{k}$), (5$\hat{i}$-$\hat{j}$+$\lambda\hat{k}$) and (7$\hat{i}$-4$\hat{j}$+7$\hat{k}$) is 11 cubic units, then the value of λ is

(a)-1 (b) 1

(c)-7 (d) 7

74. If $\overrightarrow{a}$ and $\overrightarrow{c}$ are unit vectors and l b l = 4 with $\overrightarrow{a}$ * $\overrightarrow{b}$ = 2 $\overrightarrow{a}$ * $\overrightarrow{c}$. the angle between $\overrightarrow{a}$ and $\overrightarrow{c}$ is $\cos^{-1}(1/4)$. Then $\overrightarrow{b}$ - $\overrightarrow{2c}$ = $\overrightarrow{\alpha a}$, if $\overrightarrow{\alpha}$ is

(a)3 (b) 1 / 4

(c) -4 (d) -1/4

75.Arrange the following words in alphabetical order and tick the one that comes at the second place:

(a)Scissors (b) Scorpion

(c) Schedule (d) Semester

76. Three of the following four are alike in a certain way and so form a group. Which is the one that does not belong to the group:

(a)143 (b) 168

(c) 257 (d) 195

77. Ram is seventh in a queue from either end. How many people are there in the queue?

(a)14 (b) 11

(c) 12 (d) 13

78. A is the brother of D, D is the father of B, B and C are sisters. How is she related to A?

(a)Cousin (b) Niece

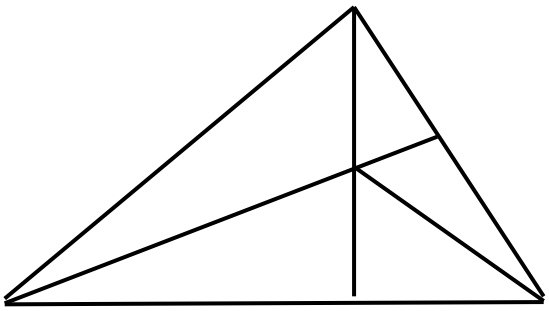
(C) Aunt (d) Nephew.

79. Each letter of the product from A to Z has been given a value from 1 to 26 serially. Thus, A+B=C, D – C = A and E – B = c. then D + F stands for

(a)J (b) A

(C) C (d) Q

80. How many triangles does the following figure contain?



(a)12 (b) 6
(c) 10 (d) 11

The following question has two statements: Statement – I (Assertion) and Statement – II (Reason).
It has also four alternative choices, only one of which is the correct answer you have to select one of the codes (a), (b), (c), (d) given below:

(a) Statement – I is false, Statement – II is true
(b) Statement –I is true, Statement – ii is true; Statement – II is a correct explanation for statement – I.
(c) Statement – I is true, Statement – II is true; Statement – II is not a correct explanation for statement – I.
(d) Statement – I I strue, Statement – II is false.

81. Statement – I: If 3,6,9 are in GP, then 9, 12, 18 are in HP.
Statement – II: If middle term is added in three consecutive terms of a GP, resultant will be In HP.
If y = F(x) be a differentiable function of x whose second, third, _____, nth derivatives Exist and nth derivative is denoted by $Y_n(x)$. On the basis of the above information, answer The following question:

82. If $Y = e^{3x+7}$, then the value of $Y_n(0)$ is
(a)1 (b)3^n
(c) $3^n . e^7$ (d) $3^n . e^7 \lfloor 7$.

83. A man is facing south, He turns 135^o in the anticlockwise direction and then 180^o in the Clockwise direction. In which direction is he facing now?
(a)NW (b) NE
(c) SE (d) SW

84. If a variant X is expressed as a Linear function of two variants U and V in the form $X=aU+bV$, Then mean X of X is
(a)$a\bar{U} + b\bar{V}$ (b) $\bar{U} + \bar{V}$
(c) $b\bar{U} + a\bar{V}$ (d) None of these

85. If a variable takes the discrete values $\alpha + 4$, $\alpha - 7/2$, $\alpha - 5/2$, $\alpha - 3$, $\alpha - 2$, $\alpha + 1/2$, $\alpha + 5$ ($\alpha > o$), then the median is

(a) $\alpha - 5/4$ (b) $\alpha - 1/2$

(c) $\alpha - 2$ (d) $\alpha + 5/4$

86. The standard deviation of the first five natural numbers is

(a)1.414 (b) 14.14

(c) 0.1414 (d) None of these

87. In a frequency distribution, the mean and median are 21 and 22 respectively, then its mode is approximately

(a)24.0 (b) 25.5

(c)20.5 (d) 22.0

88. In a grouped data, if the Sum of deviations of the items from a value 'A', ignoring Signs is Least, then 'A' is known as

(a)Mean (b) Median

(c) Mode (d) Mean deviation.

89. If the mean of the distribution

Variant X	1	2	3	4	5
Frequency	4	5	K	1	2

Is 2.6, then value of k is

(a) 8 (b) 10

(c) 12 (d) 18

90. A body of mass 20 kg is pulled along a Smooth horizontal table by a constant force. It Describes 18 m from rest in 3 Seconds. The magnitude of force is

(a)20 N (b) 40 N

(c) 80 N (d) 120 N

91. An object travels a distance b along a straight line in t seconds. It starts from rest and ends at rest. If in the first part of the journey, it moves with a constant acceleration f and in the Second part with a constant retardation f_1, then

(a) $t = \sqrt{2}\, b\, (f + f_1)$ (b) $t = \dfrac{\sqrt{2b}\, (f + f_1}{f\, f_1}$

(c) $t = \sqrt{2}\, b\, (f - f_1)$ (d) $t = \dfrac{\sqrt{2}\, b\, (f_1 - f)}{f\, f_1}$

92. If the greatest height attained by a projectile is one quarter of its range on the horizontal Plane, then the angle of projection is

(a)$\pi/4$ (b) $\pi/6$

(c) $\pi/3$ (d) $\pi/2$

93. A force $\vec{f} = 3\,\hat{i} + 4\,\hat{j} - 2\,\hat{k}$ acts on a particle and the displacement of the point of application is given by $\vec{d} = 2\,\hat{i}+5\hat{j}+3\hat{k}$. The work done by the force is

(a) 15 units (b) 25 units

(c) 20 units (d) 30 units.

94. The particles of masses m and 2m are attached to the two ends of a string, which is passed Over a fixed smooth pulley. When the System is free to move, the acceleration will be

(a)1/2g (b) 1/3 g

(c) 2/3 g (d) 3 / 4 g

95. A man running at a speed of 5 m/sec., the rain drops appear to be falling at an angle of 45^o from the vertical. If the rain drops are actually falling vertically downwards, their velocity in m/sec is

(a) 5 (b) $5\sqrt{3}$

(c) $5\sqrt{2}$ (d) 4.

96. Two forces P+Q, P-Q inclined at 120^o with each other are Such that their resultant makes an Angle of 30^o with P+Q, then (P+Q): (P-Q) is

(a) 3 : 1 (b) 1 : 1

(c) 2 : 1 (d) 6 : 3

97.A weight W hangs by a string and is drawn by a horizontal force until the string makes an Angle of 60^o with the vertical. Then, the horizontal force and tension in the string are

(a)1 /2 W (b) 2 W, $\sqrt{3}$ W

(c) $\sqrt{3}$ W, 2W (d) None of these

98. Like parallel forces act at the vertices A,B and C of a triangle and are proportional to the Lengths BC, CA and AB respectively. The centre of the force is at the

(a) centroid (b) circum – centre

(c) in-centre (d) None of these

99. If the forces 6W, 15W acting at a point P (2, 3) in Cartesian rectangular coordinates are Parallel to the positive direction of x and y axes respectively, then the moment of the Resultant force about the region is

(a) 8 W (b) – 3 W

(c) 3 W (d) 12 W

100. The force required just to move a body of weight W placed on a rough horizontal Surface is

(a)W Sin λ (b) W cos λ

(c) W cot λ (d) W tan λ,

Where λ is the angle of friction.