Mock Paper 2

UP MCA

Uttar Pradesh MCA Entrance Test (UPMCAT)

Instructions

1. This Mock Paper consists of 100 questions of mathematics, statistics & logical ability.
2. Attempt all the questions/problems.
3. Each question carries 3 marks. (-1) will be awarded to wrong answer.
4. Use a soft HB pencil darken the appropriate bubble.

M. Marks: 300 **Time: 2.30 hrs.**

1. For 0 2 if

$x \quad \underset{n \quad 0}{} \cos^{2n} \;, \qquad y \quad \underset{n \quad 0}{} \sin^{2n} \qquad z \quad \underset{n \quad 0}{} \cos^{2n} \quad \sin^{2n} \;,$ then

(a) $xyz \quad xz \quad y$ (b) $xyz \quad xy \quad z$ (c) $xyz \quad x \quad y \quad z^2$ (d) $xyz \quad yz \quad x$

2. Let n be a positive integer such that

$$\cos \frac{}{2n} \quad \sin \frac{}{2n} \quad \frac{\sqrt{n}}{2}. \text{ Then}$$

(a) $6 \quad n \quad 8$ (b) $4 \quad n \quad 8$ (c) $4 \quad n \quad 8$ (d) $4 \quad n \quad 8$

3. The equation $(\cos p \quad 1)\, x^2 \quad (\cos p)\, x \quad \sin p \quad 0$, where x is a variable, has real roots. Then the interval of p may be any one of the followings

(a) (0, 2) (b) (, 0) (c) (2, 2) (d) (0,)

4. If $\cos^{1} p \quad \cos^{1} q \quad \cos^{1} r$, then $p^2 \quad q^2 \quad r^2 \quad 2pqr$ is equal to

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

5. If in a triangle PQR, sin P, sin Q, sin R are in AP, then

(a) the altitudes are in AP (b) the altitudes are in HP
(c) the medians are in GP (d) the medians are in AP

6. If $b \quad 3$, $c \quad 4$ and $B \quad 3$, then the number of triangles that can be constructed, is

(a) infinite (b) two (c) one (d) nil

7. The angle of elevation of the top of a tower standing on a horizontal plane from a point A is . After walking a distance a towards the foot of the tower the angle of elevation is found to be . The height of the tower is

(a) $\frac{a \sin \quad \sin}{\sin (\quad)}$ (b) $\frac{a \sin \quad \sin}{\sin (\quad)}$ (c) $\frac{a \sin (\quad)}{\sin \quad \sin}$ (d) $\frac{a \sin (\quad)}{\sin \quad \sin}$

8. The angle between the lines joining the origin to the points of intersection of the line $x \sqrt{3} \quad y \quad 2$ and the curve $y^2 \quad x^2 \quad 4$ is

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

9. The angle between a pair of tangents drawn from a point P to the circle $x^2 \quad y^2 \quad 4x \quad 6y \quad 9\sin^2 \quad 13\cos^2 \quad 0$ is 2 . The equation of the locus of the point P is

(a) $x^2 \quad y^2 \quad 4x \quad 6y \quad 4 \quad 0$ (b) $x^2 \quad y^2 \quad 4x \quad 6y \quad 9 \quad 0$

(c) $x^2 \quad y^2 \quad 4x \quad 6y \quad 4 \quad 0$ (d) $x^2 \quad y^2 \quad 4x \quad 6y \quad 9 \quad 0$

10. The equation of the circle on the chord $x \cos \quad y \sin \quad p \quad 0$, of the circle $x^2 \quad y^2 \quad a^2 \quad 0$, $(0 \quad p \quad)$ as diameter, is

(a) $x^2 \quad y^2 \quad a^2 \quad 2p(x \cos \quad y \sin \quad p) \quad 0$ (b) $x^2 \quad y^2 \quad a^2 \quad 2p(x \cos \quad y \sin \quad p) \quad 0$

(c) $x^2 \quad y^2 \quad a^2 \quad 4p(x \cos \quad y \sin \quad p) \quad 0$ (d) $x^2 \quad y^2 \quad a^2 \quad 4p(x \cos \quad y \sin \quad p) \quad 0$

11. If the points $(au^2, 2au)$ and $(av^2, 2av)$ are the extremities of a focal chord of the parabola $y^2 \quad 4ax$, then

(a) $uv \quad 1 \quad 0$ (b) $uv \quad 1 \quad 0$ (c) $u \quad v \quad 0$ (d) $u \quad v \quad 0$

12. Let $f(x) \quad \cos px \quad \sin x$ be periodic. Then p must be

(a) rational (b) irrational (c) positive real number (d) None of these

13. If $f(x) \quad {}_{1}^{x} |t|\, dt, x \quad 1$, then

(a) f and f are continuous for $x \quad 1 \quad 0$ (b) f is continuous but f is not so for $x \quad 1 \quad 0$

(c) f and f are not continuous at $x \quad 0$ (d) f is continuous at $x \quad 0$ but f is not so

14. If $y \quad (\sin x)^{(\sin x)^{(\sin x)}}$ then dy/dx is

(a) $\frac{y^2 \cot x}{1 \quad y \log \sin x}$ (b) $\frac{y^2 \cot x}{1 \quad y \log x}$ (c) $\frac{y^2 \cot x}{1 \quad y \log \sin x}$ (d) None of these

15. The length of the subtangent to the curve $\sqrt{x} \quad \sqrt{y} \quad 3$ at the point (4, 1) is

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

16. If $y \quad 4x \quad 5$ is tangent to the curve $y^2 \quad px^3 \quad q$ at (2, 3), then

(a) $p \quad 2, q \quad 7$ (b) $p \quad 2, q \quad 7$ (c) $p \quad 2, q \quad 7$ (d) $p \quad 2, q \quad 7$

17. The maximum and minimum values of $f(x) \quad x^4 \quad \frac{2}{3}x^3 \quad 2x^2 \quad 2x$ in the interval [0, 3] are respectively

(a) 51 and 0 (b) $\frac{23}{48}$ and 0 (c) $\frac{1}{3}$ and 0 (d) $\frac{23}{48}$ and $\frac{1}{3}$

18. Using Rolle's theorem, the equation $a_0 x^n \quad a_1 x^{n \; 1} \quad \ldots\ldots \quad a_n \quad 0$ has at least one root between 0 and 1 if

(a) $\frac{a_0}{n} \quad \frac{a_1}{n \quad 1} \quad \ldots\ldots \quad a_{n \; 1} \quad 0$ (b) $\frac{a_0}{n \quad 1} \quad \frac{a_1}{n \quad 2} \quad \ldots\ldots \quad a_{n \; 2} \quad 0$

(c) $na_0 \quad (n \quad 1) a_1 \quad \ldots\ldots \quad a_{n \; 1} \quad 0$ (d) $\frac{a_0}{n \quad 1} \quad \frac{a_1}{n} \quad \ldots\ldots \quad a_n \quad 0$

19. If (n m) is odd, and $|m|$ $|n|$, then ${}_0$ $\cos mx \sin nx\, dx$ is

(a) $2n/(n^2 \quad m^2)$ (b) 0 (c) $2n/(m^2 \quad n^2)$ (d) $2m/(n^2 \quad m^2)$

20. The value of ${}_{1}^{3/2}$ $|x \sin \quad x|\, dx$ is

(a) $(3 \quad 1)/ \quad ^2$ (b) $3/(\quad ^2)$ (c) $(3 \quad 1)/ \quad ^2$ (d) None of these

21. If $g(x)$ ${}_0^x$ $\cos^4 t\, dt$, then $g(x \quad)$ equals

(a) $g(x) \quad g(\ )$ (b) $g(x) \quad g(\ )$ (c) $g(x)\, g(\ )$ (d) $g(x)/g(\ )$

22. A force **F** $2\hat{\mathbf{i}}$ $\hat{\mathbf{j}}$ $5\hat{\mathbf{k}}$, is applied at the point A (1, 2, 5). If its moment about the point (1, 2, 3) is $16\hat{\mathbf{i}}$ $6\hat{\mathbf{j}}$ 2 $\hat{\mathbf{k}}$, then equals

(a) 2 (b) 1 (c) zero (d) 2

23. Let **a** $\hat{\mathbf{i}}$ $\hat{\mathbf{j}}$, **b** $\hat{\mathbf{j}}$ $\hat{\mathbf{k}}$, **c** $\hat{\mathbf{k}}$ $\hat{\mathbf{j}}$. If **d** is a unit vector such that **a** **d** [**b**, **c**, **d**] 0, then **d** equals

(a) $(\hat{\mathbf{i}} \quad \hat{\mathbf{j}} \quad 2\hat{\mathbf{k}})/\sqrt{6}$ (b) $(\hat{\mathbf{i}} \quad \hat{\mathbf{j}} \quad \hat{\mathbf{k}})/\sqrt{3}$ (c) $(\hat{\mathbf{i}} \quad \hat{\mathbf{j}} \quad \hat{\mathbf{k}})/\sqrt{3}$ (d) $\hat{\mathbf{k}}$

24. Which is the correct order for a given number 1 in increasing order?

(a) $\log_2$, $\log_3$, $\log_e$, $\log_{10}$ (b) $\log_{10}$, $\log_3$, $\log_e$, $\log_2$
(c) $\log_{10}$, $\log_e$, $\log_2$, $\log_3$ (d) $\log_3$, $\log_e$, $\log_2$, $\log_{10}$

25. Let $2\sin^2 x \quad 3\sin x \quad 2 \quad 0$ and $x^2 \quad x \quad 2 \quad 0$, ($x$ is measured in radians) then x lies in the interval

(a) (6, 5 6) (b) (1, 5 6) (c) (1, 2) (d) (6, 2)

26. The values of a for which the roots of the equation $x^2 \quad x \quad a \quad 0$ are real and exceed 'a' are

(a) $0 \quad a \quad \frac{1}{4}$ (b) $a \quad \frac{1}{4}$ (c) $a \quad 2$ (d) $2 \quad a \quad 0$

27. Let a_n be the nth term of the GP of positive numbers. Let ${}_{n\ 1}^{100}$ a_{2n} and ${}_{n\ 1}^{100}$ $a_{2n\ 1}$,

such that , then the common ratio is

(a) (b) (c) $\sqrt{\quad}$ (d) $\sqrt{\quad}$

28. If (1) is a cube root of unity, then

$$\begin{matrix} 1 & 1 \quad i & \quad ^2 & ^2 \\ 1 \quad i & & 1 & ^2 \quad 1 \\ i & i & 1 & 1 \end{matrix}$$

equals

(a) 0 (b) 1 (c) i (d) w

29. Let $z_1 \quad a \quad ib$, $z_2 \quad c \quad id$ be two complex numbers such that $|z_1| \quad |z_2| \quad 1$ and $\mathrm{Re}(z_1\bar{z}_2) \quad 0$. If $w_1 \quad a \quad ic$ and $w_2 \quad b \quad id$, then $\mathrm{Re}(w_1\overline{w}_2)$ is

(a) 1 (b) 0 (c) 1 (d) None of these

30. The positive integer which is just greater than $(1 \quad 0.0001)^{10000}$ is

(a) 2 (b) 3 (c) 4 (d) 5

31. The value of ${}_{n\ 1}$ $\frac{1}{2n(2n \quad 1)}$ is

(a) $\log_e \frac{2}{e}$ (b) $1 \quad \log_e 2$ (c) $1 \quad \log_e \frac{1}{2e}$ (d) None of these

32. The number of divisors of 9600 including 1 and 9600 are

(a) 60 (b) 58 (c) 48 (d) 46

33. If p and q are choosen randomly from the set {1, 2, 3,...., 10} with replacement. Then the probability that the roots of the equation $x^2 \quad px \quad q \quad 0$ are real is equal to

(a) 0.62 (b) 0.31 (c) 0.63 (d) None of these

34. An unbiased dice is tossed until a number greater than 4 appears. The probability that an even number of tosses is needed, is

(a) 1/2 (b) 2/5 (c) 1/5 (d) 2/3

35. A dice is thrown n times. For the probability of a six appearing at least once to be more than 1/2 is

(a) $n \quad 4$ (b) $n \quad 4$ (c) $n \quad 2$ (d) $n \quad 6$

36. Let $f(x) \quad \begin{matrix} x^3 & \sin x & \cos x \\ 6 & 1 & 0 \\ p & p^2 & p^3 \end{matrix}$ where p is a constant. Then $\dfrac{d^3}{dx^3} f(x)$, at $x \quad 0$ is

(a) p (b) $p \quad p^2$ (c) $p \quad p^3$ (d) independent of p

37. If $f(x) \quad \begin{matrix} 1 & x & x \quad 1 \\ 2x & x(x \quad 1) & x(x \quad 1) \\ 3x(x \quad 1) & x(x \quad 1)(x \quad 2) & x(x \quad 1)(x \quad 1) \end{matrix}$, then $f(100)$ is equal to

(a) 0 (b) 1 (c) 100 (d) 100

38. Let a be an element in the set of real numbers and A be any set of numbers. Let $aA \quad \{ax : x \quad A\}$. Then

(a) $N \quad (\quad N) \quad Z$ (b) $Z \quad N \quad N$

(c) $Z \quad (\quad N) \quad W$, the set of non-negative integers (d) None of these

39. For real numbers x and y, we write $x\,R\,y$ iff $x \quad y \quad \sqrt{2}$ is an irrational number. Then the relation R is

(a) reflexive (b) symmetric (c) transitive (d) None of these

40. The domain of the real valued function $\log_3 \sqrt{\log_3 \dfrac{x^2 \quad 3x}{4}}$ is

(a) [1, 4] (b) (1, 4) (c) (, 1] [4,) (d) (, 1) (4,)

41. The value of is

(a) 22/7 (b) 3.14 (c) $3.\overline{14}$ (d) None of these

42. If $P(x, y)$, $F_1(3, 0)$, $F_2(\quad 3, 0)$ and $16x^2 \quad 25y^2 \quad 400$, then $PF_1 \quad PF_2$ equals

(a) 8 (b) 6 (c) 10 (d) 12

43. If $x \quad 9$, is the chord of contact to hyperbola $x^2 \quad y^2 \quad 9$, then the equation of the corresponding pair of tangents is

(a) $9x^2 \quad 8y^2 \quad 18x \quad 9 \quad 0$ (b) $9x^2 \quad 8y^2 \quad 18x \quad 9 \quad 0$

(c) $9x^2 \quad 8y^2 \quad 18x \quad 9 \quad 0$ (d) $9x^2 \quad 8y^2 \quad 18x \quad 9 \quad 0$

44. The slope of the tangent of the curve $y \quad f(x)$ at $x, f(x)$ is $2x \quad 1$. If the curve passes through the point (1, 2), then the area bounded by the curve, the x axis, and the line $x \quad 1$ is

(a) 5/6 (b) 6/5 (c) 1/6 (d) 6

45. The equation $(4x \quad 3y \quad 1)\, dx \quad (3x \quad 2y \quad 1)\, dy \quad 0$ represents a family of

(a) circles (b) parabolas (c) ellipses (d) hyperbolas

46. The equation $\sqrt{x \quad 1} \quad \sqrt{x \quad 1} \quad \sqrt{4x \quad 1}$ has

(a) no solution (b) one solution (c) two solutions (d) more than two solutions

47. The escape velocity for a body projected vertically upwards is 11.2 km/s. If the body is projected in a direction making an angle of 60° with the vertical, then the escape velocity will be

(a) 11.2 km/s (b) $5.6\sqrt{3}$ km/s (c) 5.6 km/s (d) None of these

48. A body starts from rest and moves in a straight line with uniform acceleration F, the distances covered by it in second, fourth and eighth seconds are

(a) in AP (b) in GP (c) in the ratio 1 : 3 : 7 (d) in the ratio 3 : 7 : 15

49. Two particles of m_1 and m_2 gms are projected upwards such that the velocity of projection of m_1 is double that of m_2. If the maximum heights of which m_1 and m_2 rise be h_1 and h_2 respectively, then

(a) $h_1 \quad 2h_2$ (b) $2h_1 \quad h_2$ (c) $h_1 \quad 4h_2$ (d) $4h_1 \quad h_2$

50. The times of ascent and descent of a particle projected along an inclined plane of inclination   are t_1 and t_2 respectively, the coefficient of friction is

(a) $\frac{t_2 \quad t_1}{t_2 \quad t_1}$ tan (b) $\frac{t_2 \quad t_1}{t_2 \quad t_1}$ tan (c) $\frac{t_2^2 \quad t_1^2}{t_2^2 \quad t_1^2}$ tan (d) $\frac{t_2^2 \quad t_1^2}{t_2^2 \quad t_1^2}$ tan

51. From the top of a tower of height 100 m, a ball is projected with a velocity of 10 m/s. It takes 5 s to reach the ground. If $g \quad 10\ \text{m/s}^2$, then the angle of projection is

(a) 30° (b) 45° (c) 60° (d) 80°

52. If the angle   between two forces of equal magnitude is reduced to $\frac{\quad}{3}$, then the magnitude of their resultant become $\sqrt{3}$ times of the earlier one. The angle   is

(a) 2 (b) 2 3 (c) 4 (d) 4 5

53. If the forces 6W, 5W acting at a point P(2, 3) in cartesian rectangular coordinates are parallel to the positive x and y axes respectively, then the moments of the resultant force about the origin is

(a) 8W (b) 3W (c) 3W (d) 8W

54. If $x_1, x_2, \ldots\ldots, x_n$ denote the set of n observations whose mean is $\bar{x}$, then,

(a) $\overset{n}{\underset{i \quad 1}{}} (x_i \quad \bar{x}) \quad 0$ (b) $\overset{n}{\underset{i \quad 1}{}} (x \quad \bar{x}_i) \quad 0$ (c) $\overset{n}{\underset{i \quad 1}{}} (x_i \quad \bar{x}) \quad 0$ (d) $\overset{n}{\underset{i \quad 1}{}} (x_i \quad x) \quad 0$

55. If a variable takes the discrete values $4, \quad \frac{7}{2}, \quad \frac{5}{2}, \quad 3, \quad 2, \quad \frac{1}{2}, \quad \frac{1}{2}, \quad 5\ (\quad 0)$, then the median is

(a) $\frac{5}{4}$ (b) $\frac{1}{2}$ (c) 2 (d) $\frac{5}{4}$

56. For a normal distribution if the mean is M, mode is M_o and median is M_d, then

(a) $M \quad M_d \quad M_o$ (b) $M \quad M_d \quad M_o$ (c) $M \quad M_d \ M_o$ (d) $M \quad M_d \quad M_o$

57. If the mean of a set of observations $x_1, x_2, x_3 \ldots\ldots x_n$ is $\overline{X}$, then the mean of the observations $x_i \quad 2i; i \quad 1, 2, \ldots\ldots, n$ is

(a) $\overline{X} \quad 2$ (b) $\overline{X} \quad 2n$ (c) $\overline{X} \quad (n \quad 1)$ (d) $\overline{X} \quad n$

58. The standard deviation of first five natural numbers is

(a) 1.414 (b) 14.14 (c) 0.1414 (d) None of these

59. For $x \quad R$, $\lim_{x} \left(\frac{x \quad 3}{x \quad 2}\right)^{x}$ is equal to:

(a) e (b) $e^{\quad 1}$ (c) $e^{\quad 5}$ (d) e^{5}

60. If z_1, z_2, z_3 are complex numbers such that $|z_1| \quad |z_2| \quad |z_3| \quad \frac{1}{z_1} \quad \frac{1}{z_2} \quad \frac{1}{z_3} \quad 1$, then $|z_1 \quad z_2 \quad z_3|$ is

(a) equal to 1 (b) less than 1 (c) greater than 3 (d) equal to 3

61. Let , be the roots of $x^2 \quad x \quad p \quad 0$ and , be the roots of $x^2 \quad 4x \quad q \quad 0$. If , , , are in GP, then the integral values of p and q respectively are

(a) 2, 32 (b) 2, 3 (c) 6, 3 (d) 6, 32

62. The value of $\frac{\cos^2 x}{1 \quad a^x} dx$, $a \quad 0$ is

(a) (b) a (c) 2 (d) 2

63. The value of the integral $y \quad \log [x^3 \quad \sqrt{(1 \quad x^6)}]\, dx$ is

(a) zero (b) even (c) odd (d) None of these

64. For the probability distribution

X	8	12	16	20	24
$P(X)$	1/8	1/6	3/8	1/4	1/12

The value of $E(x)$ is

(a) 8 (b) 16 (c) 20 (d) 40

65. Three letters are written to different persons and addresses on three envelopes are also written. Without looking at the addresses, the probability that the letters go into right envelopes is

(a) $\frac{1}{6}$ (b) $\frac{1}{27}$ (c) $\frac{1}{9}$ (d) None of these

66. The value of sin 12 sin 48 sin 54 is

(a) 1/4 (b) 1/8 (c) 1/16 (d) None of these

67. In a ABC, $\tan \frac{A}{2} \quad \frac{5}{6}$, $\tan \frac{C}{2} \quad \frac{2}{5}$, then

(a) a, c, b in AP (b) a, b, c in AP (c) b, a, c in AP (d) a, b, c in GP

68. If the forces acting along the sides of a triangle taken in order, are equivalent to a couple, then the forces are

(a) equal (b) proportional to sides of triangle

(c) in equilibrium (d) in arithmetic progression

69. A men on a lift ascending with acceleration f m/s^2 throws a ball vertically upwards with a velocity of v m/s relative to the lift and catches it again in t seconds. The value of t is

(a) $\frac{2v}{f \quad g}$ (b) $\frac{v}{f \quad g}$ (c) $\frac{v}{f \quad g}$ (d) $\frac{2v}{f \quad g}$

70. The area of the figure bounded by y $\sin x$, y $\cos x$ in the interval $0, \frac{}{2}$ is

(a) $2(\sqrt{2}$ $1)$ sq unit

(b) $(\sqrt{3}$ $1)$ sq unit

(c) $2(\sqrt{3}$ $1)$ sq unit

(d) None of these

71. $_0 \frac{dx}{[x \quad \sqrt{x^2 \quad 1}]^3}$ is equal to

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

(b) $\frac{1}{8}$

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

(d) None of these

72. $\lim_{n} \quad 1 \quad \frac{1}{n} \quad 1 \quad \frac{2}{n} \quad 1 \quad \frac{3}{n} \ldots\ldots. \quad 1 \quad \frac{n}{n}^{1/n}$ is equal to

(a) $\frac{e}{4}$

(b) $\frac{4}{e}$

(c) $\frac{2}{e}$

(d) None of these

73. If $f(x)$ $a \log|x|$ bx^2 x has its extremum values at x 1 and x 2, then

(a) a $2, b$ 1

(b) a $2, b$ $1/2$

(c) a $2, b$ $1/2$

(d) None of these

74. Tangents are drawn from the origin to the curve y $\cos x$. Their points of contact lie on

(a) x^2y^2 y^2 x^2

(b) x^2y^2 x^2 y^2

(c) x^2y^2 x^2 y^2

(d) None of these

75. If $y^{1/m}$ x $\sqrt{1 \quad x^2}$, then $(1 \quad x^2)\, y_2$ xy, is equal to

(a) m^2y

(b) my^2

(c) m^2y^2

(d) None of these

76. Let $f(x)$ $\begin{matrix} x^n \sin \frac{1}{x}, & x & 0 \\ 0, & x & 0 \end{matrix}$ Then $f(x)$ is continuous but not differentiable at x 0, if

(a) n $(0, 1]$

(b) n $[1, \quad)$

(c) n $(\quad , 0]$

(d) n 0

77. If $\lim_{x \quad a} \frac{f(x)}{g(x)}$ exists, then

(a) both $\lim_{x \quad a} f(x)$ and $\lim_{x \quad a} g(x)$ must exists

(b) $\lim_{x \quad a} f(x)$ need not exists but $\lim_{x \quad a} g(x)$ exists

(c) neither $\lim_{x \quad a} f(x)$ nor $\lim_{x \quad a} g(x)$ may exists

(d) $\lim_{x \quad a} f(x)$ exists but $\lim_{x \quad a} g(x)$ need not exists

78. If $f(x)$ $\frac{x \quad 1}{x \quad 1}$, then $f(2x)$ is

(a) $\frac{f(x) \quad 1}{f(x) \quad 3}$

(b) $\frac{3f(x) \quad 1}{f(x) \quad 3}$

(c) $\frac{f(x) \quad 3}{f(x) \quad 1}$

(d) $\frac{f(x) \quad 3}{3f(x) \quad 1}$

79. On the ellipse $4x^2 \quad 9y^2 \quad 1$, the points at which the tangents are parallel to the line $8x \quad 9y$ are

(a) $\frac{2}{5}, \frac{1}{5}$ (b) $-\frac{2}{5}, \frac{1}{5}$ (c) $-\frac{2}{5}, -\frac{1}{5}$ (d) None of these

80. The locus of the points of trisection of the double ordinates of the parabola $y^2 \quad 4ax$ is

(a) $y^2 \quad ax$ (b) $9y^2 \quad 4ax$ (c) $9y^2 \quad ax$ (d) $y^2 \quad 9ax$

81. The equation of a circle which passes through $(2a, 0)$ and whose radical axis in relation to the circle $x^2 \quad y^2 \quad a^2$ is $x \quad a/2$, is

(a) $x^2 \quad y^2 \quad ax \quad 0$ (b) $x^2 \quad y^2 \quad 2ax \quad 0$

(c) $x^2 \quad y^2 \quad 2ax \quad 0$ (d) $x^2 \quad y^2 \quad ax \quad 0$

82. If the pairs of straight lines $ax^2 \quad 2hxy \quad ay^2 \quad 0$ and $bx^2 \quad 2gxy \quad by^2 \quad 0$ be such that each bisects the angles between the other, then

(a) $hg \quad ab \quad 0$ (b) $ah \quad bg \quad 0$ (c) $h^2 \quad ab \quad 0$ (d) $ag \quad bh \quad 0$

83. The coefficient of x^n in the series $1 \quad \frac{a \quad bx}{1!} \quad \frac{(a \quad bx)^2}{2!} \quad \frac{(a \quad bx)^3}{3!}$ ...... is

(a) $\frac{b^n}{n!}$ (b) $e^b \frac{b^n}{n!}$ (c) $e^a \frac{b^n}{n!}$ (d) $\frac{e^b a^n}{n!}$

84. The coefficient of x^6 in the expansion of $(1 \quad x^2 \quad x^3)^8$ is

(a) 80 (b) 84 (c) 88 (d) 92

85. The number of ways in which 20 persons can be divided into 10 couples, is

(a) $\frac{20!}{2^{10}}$ (b) ${}^{20}C_{10}$ (c) $\frac{20!}{(2!)^9}$ (d) None of these

86. If $p, q \quad \{1, 2, 3, 4\}$, the number of equations of the form $px^2 \quad qx \quad 1 \quad 0$ having real roots is

(a) 15 (b) 9 (c) 7 (d) 8

Directions (87–88)

In each of the following letter series, some of the letters are missing which are given in that order as one of the alternatives below it.

Choose the correct alternative

87. ccbab_caa_bccc_a_

(a) babb (b) bbba (c) baab (d) babc

88. cccbb_aa_cc_bbbaa_c

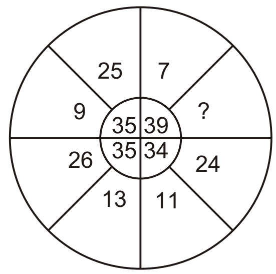
(a) acbc (b) baca (c) baba (d) acba

89. If '+' means '×' '–' means ' ', ' ' means '+' and '×' means '–', then what will be the value of 16 64 4 4 3 ?

(a) 20 (b) 15.12 (c) 52 (d) 12

(e) None of these

90. Find out the missing number



(a) 28 (b) 36 (c) 81 (d) 49

91. If (i) *P* is taller than *Q*
(ii) *R* is shorter than *P*
(iii) *S* is taller than *T* but
Shorter than *Q*, then who among them is the tallest ?

(a) *P* (b) *Q* (c) *S* (d) *T*
(e) can't be determined

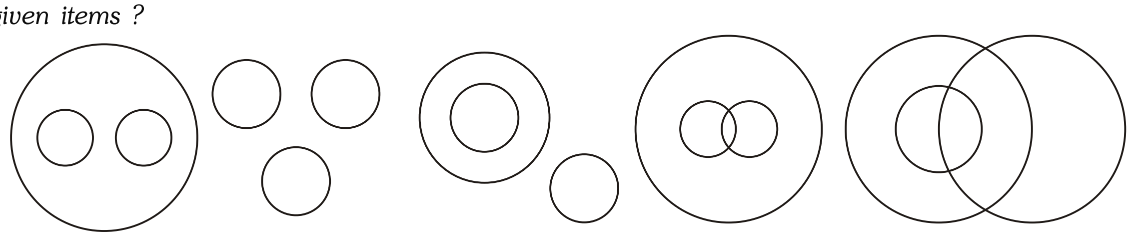
92. **Statements :** 1. Some doors are mangoes
2. All mangoes are bananas

Conclusions : I. All bananas are mangoes
II. All doors are bananas
III. Some doors are bananas
IV. Some mangoes are doors

(a) only I and II follow (b) None follows (c) all follow (d) only III and IV follow
(e) only II and III follow

Directions (93–95)

In each of the following questions, choose the Venn diagram which best illustrates the relationship among three given items ?



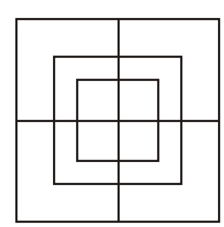
(a) (b) (c) (d) (e)

93. Diseases, Scurvy, Leprosy

94. Hockey, Games, Cricket

95. Yak, Bear, Zebra

96. How many squares are there in the following figure



(a) 13
(b) 14
(c) 15
(d) 16
(e) None of the above

Directions (97–98)

A cube is coloured red on all its faces. It is then cut in to 64 smaller cubes of equal size. The smaller cube so obtained are now separated.

97. How many smaller cubes have no face coloured

(a) 24 (b) 16 (c) 8 (d) 10

98. How many smaller cubes will have at least two surfaces painted with red colour ?

(a) 4 (b) 8 (c) 32 (d) 24

Directions (99–100)

Arrange the given words in alphabetical order and tick the one that comes at the second place:

99. (a) Scissors (b) Scorpion (c) Schedule (d) Semester

(e) Sensitive

100. (a) Livestock (b) Litter (c) Literary (d) Little

(e) Livelihood

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