Mock Paper 4

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. If arg (z) 0, then arg $(-z)$ – arg (z) is equal to

(a) (b) – (c) $\frac{-}{2}$ (d) $\frac{}{2}$

2. If $iz^3 \quad z^2 \quad z \quad i$ 0, then $|z|$ is equal to

(a) –1 (b) 1 (c) i d) i

3. For any complex number z, the minimum value of $|z| + |z-1|$ is

(a) 1 (b) 0 (c) $\frac{1}{2}$ (d) $\frac{3}{2}$

4. If the sum of first $2n$ terms of the AP sequence 2, 5, 8, ... is equal to the sum of the first n terms of the AP sequence 57, 59, 61, ... then n equals

(a) 10 (b) 12 (c) 11 (d) 13

5. Consider an infinite geometric series with first term a and common ratio r. If its sum is 4 and the second term is 3/4, then

(a) $a \quad 7/4, r \quad 3/7$ (b) $a \quad 2, r \quad 3/8$ (c) $a \quad 3/2, r \quad 1/2$ (d) $a \quad 3, r \quad 1/4$

6. Let p and q be the roots of the equation $x^2 \quad 2x \quad A \quad 0$ and let r and s be the roots of the equation $x^2 \quad 18x \quad B \quad 0.$

If $p \quad q \quad r \quad s$ are in arithmetic progression, then (A, B) is equal to

(a) (3, 77) (b) (3, 7) (c) (3, 77) (d) (3, 7)

7. The value of $x^2 \quad 2bx \quad c$ is positive, if

(a) $b^2 \quad 4c \quad 0$ (b) $b^2 \quad 4c \quad 0$ (c) $c^2 \quad b$ (d) $b^2 \quad c$

8. If $n \quad {}^{m}C_2$, then ${}^{n}C_2$ is equal to

(a) ${}^{m \quad 1}C_4$ (b) ${}^{m \quad 2}C_4$ (c) ${}^{m \quad 1}C_4$ (d) $3\ {}^{m \quad 1}C_4$

9. How many different nine digit numbers can be formed from the numbers 223355888 by rearranging its digits so that the odd digits occupy even positions?

(a) 16 (b) 36 (c) 60 (d) 180

10. In the binomial expansion of $(a \quad b)^n, n \quad 5$, the sum of the 5th and 6th terms is zero. Then $\frac{a}{b}$ equals

(a) $\frac{n \quad 5}{6}$ (b) $\frac{n \quad 4}{5}$ (c) $\frac{5}{n \quad 4}$ (d) $\frac{6}{n \quad 5}$

11. If n is an odd natural number, then $\sum_{r \ 0}^{n} \frac{(\ 1)^r}{{}^{n}C_r}$ equals

(a) 0 (b) $\frac{1}{n}$ (c) $\frac{n}{2^n}$ (d) None of these

12. If $\begin{matrix} 6i & 3i & 1 \\ 4 & 3i & 1 \\ 20 & 3 & i \end{matrix} \quad x \quad iy$, then (x, y) is

(a) (3, 1) (b) (1, 3) (c) (0, 3) (d) (0, 0)

13. If the system of equations $x \quad ky \quad z \quad 0, kx \quad y \quad z \quad 0, x \quad y \quad z \quad 0$ has a non-zero solution, then the possible values of k are

(a) {–1, 2} (b) {1, 2} (c) {0, 1} (d) {–1, 1)

14. The point with position vectors $60\hat{\mathbf{i}} \quad 3\hat{\mathbf{j}},\ 40\hat{\mathbf{i}} \quad 8\hat{\mathbf{j}},\ a\hat{\mathbf{i}} \quad 52\hat{\mathbf{j}}$ are collinear if

(a) $a \quad 40$ (b) $a \quad 40$ (c) $a \quad 20$ (d) None of these

15. A vector **a** has components $2p$ and 1 with respect to a rectangular cartesian system. This system is rotated through a certain angle about the origin in the counter clockwise. If with respect to new system, $\vec{a}$ has components $p + 1$ and 1, then

(a) $p = 0$ (b) $p \quad 1$ or $p \quad \frac{1}{3}$ (c) $p \quad 1$ or $p \quad \frac{1}{3}$ (d) $p \quad 1$ or $p \quad 1$

16. A tetrahedron has vertices at O (0, 0, 0), A (1, 2, 1), B (2, 1, 3) and C (–1, 1, 2) then the angle between the faces OAB and ABC will be

(a) $\cos^{\ 1} \frac{19}{35}$ (b) $\cos^{\ 1} \frac{17}{31}$ (c) 30° (d) 90°

17. Let PS be the median of the triangle with vertices P (2, 2), Q (6, 1) and R (7, 3). The equation of the line passing through (1, –1) and parallel to PS is

(a) $2x \quad 9y \quad 7 \quad 0$ (b) $2x \quad 9y \quad 11 \quad 0$ (c) $2x \quad 9y \quad 11 \quad 0$ (d) $2x \quad 9y \quad 7 \quad 0$

18. The equations to a pair of opposite sides of a parallelogram are $x^2 \quad 5x \quad 6 \quad 0$ and $y^2 \quad 6y \quad 5 \quad 0$. The equations to its diagonals are

(a) $x \quad 4y \quad 13$ and $y \quad 4x \quad 7$ (b) $4x \quad y \quad 13$ and $4y \quad x \quad 7$

(c) $4x \quad y \quad 13$ and $y \quad 4x \quad 7$ (d) $y \quad 4x \quad 13$ and $y \quad 4x \quad 7$

19. A circle is inscribed in an equilateral triangle of side a. The area of any square inscribed in the circle is

(a) $a^2/6$ (b) $a^2/3$ (c) $a^2/12$ (d) $a^2/24$

20. The equation of tangents drawn from the origin to the circle $x^2 \quad y^2 \quad 2rx \quad 2hy \quad h^2 \quad 0$ are

(a) $x \quad 0, y \quad 0$ (b) $x \quad 0, (h^2 \quad r^2)x \quad 2rhy \quad 0$

(c) $(h^2 \quad r^2)x \quad 2rhy \quad 0$ (d) $(h^2 \quad r^2)x \quad 2rhy \quad 0$

21. Circles are drawn through the point (2, 0) to cut intercept of length 5 units on the x axis. If their centres lie in the first quadrant, then their equation is

(a) $x^2 \quad y^2 \quad 9x \quad 2fy \quad 14 \quad 0$ (b) $3x^2 \quad 3y^2 \quad 27x \quad 2fy \quad 42 \quad 0$

(c) $x^2 \quad y^2 \quad 9x \quad 2fy \quad 14 \quad 0$ (d) $x^2 \quad y^2 \quad 2fx \quad 9y \quad 14 \quad 0$

22. $x^2 \quad k_1 y^2 \quad 2k_2 y \quad a^2$ represents a pair of perpendicular straight lines, if

(a) $k_1 \quad 1, k_2 \quad a$ (b) $k_1 \quad 1, k_2 \quad a$ (c) $k_1 \quad 1, k_2 \quad a$ (d) $k_1 \quad 1, k_2 \quad a$

23. If the line $x \quad 1 \quad 0$ is the directrix of the parabola $y^2 \quad kx \quad 8 \quad 0$, then one of the values of k is

(a) $\frac{1}{8}$ (b) 8 (c) 4 (d) $\frac{1}{4}$

24. An ellipse is described by using an endless string which is passed over two pins. If the axes are 6 cm and 4 cm, the necessary length of the string and the distance between the pins respectively in cms are

(a) $6, 2\sqrt{5}$ (b) $6, \sqrt{5}$ (c) $4, 2\sqrt{5}$ (d) $6 \quad 2\sqrt{5}, 2\sqrt{5}$

25. Let E be the ellipse $\frac{x^2}{9} \quad \frac{y^2}{4} \quad 1$ and C be the circle $x^2 \quad y^2 \quad 9$. Let P and Q be the points (1, 2) and (2, 1) respectively, then

(a) Q lies inside C but outside E (b) Q lies outside both C and E

(c) P lies inside both C and E (d) P lies inside C but outside E

26. A common tangent to $9x^2 \quad 16y^2 \quad 144$ and $x^2 \quad y^2 \quad 9$ is

(a) $y \quad \frac{3}{\sqrt{7}}x \quad \frac{15}{\sqrt{17}}$ (b) $y \quad 3\sqrt{\frac{2}{7}}x \quad \frac{15}{\sqrt{7}}$ (c) $y \quad 2\sqrt{\frac{3}{7}}x \quad 15\sqrt{7}$ (d) None of these

27. Equation of the chord of the hyperbola $25x^2 \quad 16y^2 \quad 400$ which is bisected at the point (6, 2), is

(a) $16x \quad 75y \quad 418$ (b) $75x \quad 16y \quad 418$ (c) $25x \quad 4y \quad 400$ (d) None of these

28. The maximum value of $(\cos \quad _1).(\cos \quad _2) \ldots\ldots\ldots (\cos \quad _m)$, under the restrictions $0 \quad _1, \quad _2 \ldots\ldots\ldots\ldots \quad _n \quad \overline{2}$ and $(\cot \quad _1) \quad (\cot \quad _2) \ldots\ldots\ldots\ldots (\cot \quad _n) \quad 1$ is

(a) $1/2^{n/2}$ (b) $1/2^n$ (c) $1/2^{1/2n}$ (d) 1

29. The solution of the equation $\cos^2 \quad \sin \quad 1 \quad 0$, lies in the interval

(a) $\overline{4}, \frac{}{4}$ (b) $\frac{}{4}, \frac{3}{4}$ (c) $\frac{3}{4}, \frac{5}{4}$ (d) $\frac{5}{4}, \frac{7}{4}$

30. A pole stands vertically inside a triangular park ABC. If the angle of elevation of the top of the pole from each corner of the park is same, then in ABC the foot of the pole is at the

(a) centroid (b) circumcentre (c) incentre (d) orthocentre

31. If $\sin^{1} \quad x \quad \frac{x^2}{2} \quad \frac{x^3}{4} \quad \ldots\ldots\ldots \quad \cos^{1} \quad x^2 \quad \frac{x^4}{2} \quad \frac{x^6}{4} \quad \ldots\ldots\ldots\ldots \quad \overline{2}$ for $0 \quad |x| \quad \sqrt{2}$, then x equals

(a) 1/2 (b) 1 (c) –1/2 (d) –1

32. In a triangle ABC, $\quad B \quad \frac{}{3}$ and $\quad C \quad \frac{}{4}$. Let D divide BC internally in the ratio 1 : 3, then $\frac{\sin \quad BAD}{\sin \quad CAD}$ equals

(a) $1/\sqrt{6}$ (b) 1/3 (c) $1/\sqrt{3}$ (d) $\sqrt{2/3}$

33. If $x^y \quad e^{x \quad y}$, then $\frac{dy}{dx}$ is equal to

(a) $\frac{y}{1 \quad \log x}$ (b) $\frac{(x \quad y)}{(1 \quad \log x)^2}$ (c) $\frac{(x \quad y)}{(1 \quad \log x)}$ (d) $\frac{\log(x)}{(1 \quad \log x)^2}$

34. The inverse of the function $f(x) \quad \frac{e^x \quad e^{\ x}}{e^x \quad e^{\ x}} \quad 2$ is given by

(a) $\frac{1}{2}\log \frac{x \quad 2}{x \quad 1}$ (b) $\frac{1}{2}\log \frac{x \quad 1}{3 \quad x}$ (c) $\frac{1}{2}\log \frac{x}{2 \quad x}$ (d) $2\log \frac{x \quad 1}{1 \quad x}$

35. Domain of the function $f(x) \quad \text{arc}\sin[\log_2(x^2/2)]$ is

(a) [2, 2] (b) (1, 1) (c) [2, 1] [1, 2] (d) [0, 2]

36. For all $x \quad (0, 1)$

(a) $e^x \quad 1 \quad x$ (b) $\log_e(1 \quad x) \quad x$ (c) $\sin x \quad x$ (d) $\log_e x \quad x$

37. Let $f(x) \quad e^x(x \quad 1)(x \quad 2)\,dx$. Then f decreases in the interval

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

38. $\lim_{x \quad 0} \frac{\sin(\quad \cos^2 x)}{x^2}$ equals

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

39. The function $f(x) \quad (x^2 \quad 1)|x^2 \quad 3x \quad 2| \quad \cos(|x|)$ is not differentiable at

(a) –1 (b) 0 (c) 1 (d) 2

40. The curve $y \quad e^{xy} \quad x \quad 0$ has a vertical tangent at the point

(a) (1, 1) (b) at no point (c) (0, 1) (d) (1, 0)

41. Let $f(x) \quad \begin{matrix} |x| & \text{for} & 0 \quad |x| \quad 2 \\ 1 & \text{for} & x \quad 0 \end{matrix}$ then at $x \quad 0$, f has

(a) a local maximum (b) no local maximum (c) a local minimum (d) no extremum

42. If $\int_0^{\ 3} \frac{\cos x}{3 \quad 4\sin x}\,dx \quad k\log \frac{3 \quad 2\sqrt{3}}{3}$, then k is

(a) 1/2 (b) 1/3 (c) 1/4 (d) 1/8

43. $\int_{\ 1}^{1/2} \frac{e^x(2 \quad x^2)\,dx}{(1 \quad x)\sqrt{1 \quad x^2}}$ is equal to

(a) $\frac{\sqrt{e}}{2}(\sqrt{3} \quad 1)$ and $\frac{\sqrt{3e}}{2}$ (b) $\frac{\sqrt{3e}}{2}$ (c) $\sqrt{3e}$ (d) $\sqrt{\frac{e}{3}}$

44. The value of the integral $\int_0 \frac{x \log x}{(1 \quad x^2)^2} dx$ is

(a) 1 (b) 0 (c) 2 (d) None of these

45. $\lim_{n} \left(1 \quad \frac{1}{n^2}\right)\left(1 \quad \frac{2^2}{n^2}\right) \ldots\ldots\ldots\ldots \left(1 \quad \frac{n^2}{n^2}\right)^{1/n}$

(a) $2e^{(\quad 4)/2}$ (b) $e^{(\quad 2)/4}$ (c) $e^{(\quad 4)/2}$ (d) $e^{(\quad 2)/4}$

46. The volume of the solid obtained by rotating the ellipse $\frac{x^2}{a^2} \quad \frac{y^2}{b^2} \quad 1$ about axis of x is

(a) $a^2 b$ *cu* unit (b) b^2 *cu* unit (c) $\frac{4}{3} \quad a^2 b$ *cu* unit (d) $\frac{4}{3} \quad ab^2$ *cu* unit

47. The differential equation of the family of curves $y \quad e^x (A \cos x \quad B \sin x)$, where A and B are arbitrary constants, is

(a) $\frac{d^2y}{dx^2} \quad 2\frac{dy}{dx} \quad 2y \quad 0$ (b) $\frac{d^2y}{dx^2} \quad 2\frac{dy}{dx} \quad 2y \quad 0$

(c) $\frac{d^2y}{dx^2} \quad \left(\frac{dy}{dx}\right)^2 \quad y \quad 0$ (d) $\frac{d^2y}{dx^2} \quad 7\frac{dy}{dx} \quad 2y \quad 0$

48. Let f be an injective map with domain $\{x, y, z\}$ and range $\{1, 2, 3\}$ such that exactly one of the following statements is correct and the remaining are false: $f(x) \quad 1, f(y) \quad 1\, f(z) \quad 2$. The value of $f^{\quad 1}(1)$ is

(a) x (b) y (c) z (d) None of these

49. The sum of the series $\log_4 2 \quad \log_8 2 \quad \log_{16} 2 \quad \ldots\ldots$ is

(a) e^2 (b) $\log_e \quad 2 \quad 1$ (c) $\log_e \quad 3 \quad 2$ (d) $1 \quad \log_e \quad 2$

50. An unbiased die with faces 1, 2, 3, 4, 5 and 6 is round 4 times. Out of four face values obtained the probability that the minimum face value is not less than 2 and the maximum face value is not greater than 5 is

(a) 16/81 (b) 1/81 (c) 80/81 (d) 65/81

51. Three of the six vertices of a regular hexagon are chosen at random. The possibility that the triangle with three vertices is equilateral, equals to

(a) 1/2 (b) 1/5 (c) 1/10 (d) 1/20

52. The probability of 'INFOSYS' winning a test match against 'WIPRO' is 1/2. Assuming independence from match to match, the probability that in a 5 match series 'INFOSYS's second win occurs at third test is

(a) 1/8 (b) 1/4 (c) 1/2 (d) 2/3

53. AB is the vertical diameter of a circle in vertical plane. Another diameter CD makes an angle of 60° with AB, then the ratio of the time taken by a particle to slide along AB to the time taken by it to slide along CD is

(a) 1 : 1 (b) $\sqrt{2} : 1$ (c) $1 : \sqrt{2}$ (d) $3^{1/4} : 2^{1/2}$

54. 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 $g \quad 10$ m/s^2, then the angle of projection is

(a) 30° (b) 45° (c) 60° (d) 90°

55. The sum of the magnitudes of two forces acting at a point is 18 and the magnitude of their resultant is 12. If the resultant is 90° with the force of smaller magnitude, then their magnitudes are

(a) 3, 15 (b) 4, 14 (c) 5, 13 (d) 6, 12

56. Two like parallel forces 5N and 15N, act on a light rod at two points *A* and *B* respectively, 6m apart. The resultant force and the distance of its point of action from the point A are

(a) 10N, 4.5 m (b) 20 N, 4.5 m (c) 20 N, 1.5 m (d) 10 N, 1.5 m

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

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

58. An elastic ball with coefficient of elasticity 1/2 is dropped from rest at a height *h* on a smooth floor. The total distance covered by the ball is

(a) more than $2h$

(b) less than $2h$ but more than $\frac{3}{2}h$

(c) less than $\frac{3}{2}h$ but more than $\frac{4}{3}h$

(d) less than $\frac{4}{3}h$

59. The AM of *n* numbers of a series is $\overline{X}$. If the sum of first $(n \quad 1)$ terms is *k*, then *n*th number is

(a) $\overline{X} \quad k$ (b) $n\overline{X} \quad k$ (c) $\overline{X} \quad nk$ (d) $n\overline{X} \quad nk$

60. The means of a set of numbers is $\overline{X}$. If each number is divided by 3, then the new mean is

(a) $\overline{X}$ (b) $\overline{X} \quad 3$ (c) $3\overline{X}$ (d) $\frac{\overline{X}}{3}$

61. Karl Pearson's coefficient of skewness of a distribution is 0.32. Its SD is 6.5 and mean 39.6. The median of the distribution is given by

(a) 28.61 (b) 38.91 (c) 29.13 (d) 28.31

62. A point is moving with uniform acceleration, in the eleventh and fifteenth seconds from the commencement, it moves through 720 and 960 cm respectively. Its initial velocity, and the acceleration with which it moves are

(a) 60, 40 (b) 90, 60 (c) 70, 30 (d) None of these

63. If a particle is projected with a velocity 49m/s making an angle 60° with the horizontal, its time of flight is given by

(a) $10\sqrt{3}$ s (b) $\sqrt{3}$ s (c) $5\sqrt{3}$ s (d) None of these.

64. Forces proportional to *AB*, *BC* and 2*CA* act along the sides of triangle *ABC* in order, their resultants represented in magnitude and direction is

(a) AC (b) CA (c) CB (d) BC

65. A body is in equilibrium under the action of three coplanar forces, then

(a) they must meet in a point

(b) they must act in a straight line

(c) their horizontal and vertical components must be equal

(d) None of the above

66. The resultant of the forces 4, 3, 4 and 3 units acting along the sides *AB*, *BC*, *CD*, *DA* of a square *ABCD* of side '*a*' respectively is

(a) a force $5\sqrt{2}$ through the centre of the square

(b) a couple of moment $7a$

(c) a null force

(d) None of the above

67. The centre of gravity of three particles placed at the vertices of a triangle is at its

(a) incentre (b) centroid (c) circumcentre (d) orthocentre

68. Forces M and N acting at a point O make an angle 150°. Their resultant acts at O, has magnitude 2 units and is perpendicular to M. Then, in the same unit, the magnitudes of M and N are

(a) $2\sqrt{3}, 4$ (b) $\frac{\sqrt{3}}{2}, 2$ (c) 3, 4 (d) 4, 5

69. If tan 2 tan 1 then is equal to

(a) $n \quad \frac{\ }{6}$ (b) $n \quad \frac{\ }{6}$ (c) $2n \quad \frac{\ }{6}$ (d) None of these

70. If m rupee coins and n ten paise coins are placed in a line then the probability that the extreme coins are ten paise coins, is

(a) ${}^{m \quad n}C_m$ (b) $\frac{n\,(n \quad 1)}{(m \quad n)\,(m \quad n \quad 1)}$ (c) ${}^{m \quad n}P_m$ (d) ${}^{m \quad n}P_n$

71. The value of b such that the scalar product of the vector $\hat{\mathbf{i}} \quad \hat{\mathbf{j}} \quad \hat{\mathbf{k}}$ with unit vectors parallel to the sum of the vector $2\hat{\mathbf{i}} \quad 4\hat{\mathbf{j}} \quad 5\hat{\mathbf{k}}$ and $b\hat{\mathbf{i}} \quad 2\hat{\mathbf{j}} \quad 3\hat{\mathbf{k}}$ is one, is

(a) 2 (b) 1 (c) 0 (d) 1

72. The equation of the curve passing through the origin and satisfying the differential equation $(1 \quad x^2)\frac{dy}{dx} \quad 2xy \quad 4x^2$ is

(a) $(1 \quad x^2)y \quad x^3$ (b) $2\,(1 \quad x^2)\,y \quad 3x^3$ (c) $3\,(1 \quad x^2)\,y \quad 4x^3$ (e) None of these

73. The value of the integral $\int_0 \frac{x\,dx}{1 \quad \cos \quad \sin x}, 0$ is

(a) $\frac{\ }{\sin}$ (b) $\frac{\ }{1 \quad \sin}$ (c) $\frac{\ }{\cos}$ (d) $\frac{\ }{1 \quad \cos}$

74. $\frac{x \quad 2}{(x^2 \quad 3x \quad 3)\sqrt{x \quad 1}}\,dx$ is equal to

(a) $\frac{1}{\sqrt{3}} \tan^{\ 1} \frac{x}{\sqrt{3\,(x \quad 1)}} \quad c$ (b) $\frac{2}{\sqrt{3}} \tan^{\ 1} \frac{x}{\sqrt{3\,(x \quad 1)}} \quad c$

(c) $\frac{2}{\sqrt{3}} \tan^{\ 1} \frac{x}{\sqrt{x \quad 1}} \quad c$ (d) None of these

75. If $y \quad \frac{x \quad c}{1 \quad x^2}$ where c is a constant, then when y is stationary, xy is equal to

(a) $\frac{1}{2}$ (b) $\frac{3}{4}$ (c) $\frac{5}{8}$ (d) None of these

76. The slope of a common tangent to the ellipse $\frac{x^2}{a^2} \quad \frac{y^2}{b^2} \quad 1$ and a concentric circle of radius r is

(a) $\tan^{\ 1}\sqrt{\frac{r^2 \quad b^2}{a^2 \quad r^2}}$ (b) $\sqrt{\frac{r^2 \quad b^2}{a^2 \quad r^2}}$ (c) $\frac{r^2 \quad b^2}{a^2 \quad r^2}$ (d) $\sqrt{\frac{a^2 \quad r^2}{r^2 \quad b^2}}$

77. The two circles $x^2 \quad y^2 \quad 2x \quad 2y \quad 7 \quad 0$ and $3(x^2 \quad y^2) \quad 8x \quad 29y \quad 0$

(a) touch externally
(b) touch internally
(c) cut each other orthogonally
(d) do not cut each other

78. The equations to a pair of opposite sides of a parallelogram are $x^2 \quad 5x \quad 6 \quad 0$ and $y^2 \quad 6y \quad 5 \quad 0$. The equation of its diagonals are

(a) $x \quad 4y \quad 13$ and $y \quad 4x \quad 7$
(b) $4x \quad y \quad 13$ and $4y \quad x \quad 7$
(c) $4x \quad y \quad 13$ and $y \quad 4x \quad 7$
(d) $y \quad 4x \quad 13$ and $y \quad 4x \quad 7$

79. The distance of the point (3, 5) from the line $2x \quad 3y \quad 14 \quad 0$ measured parallel to the line $x \quad 2y \quad 1$ is

(a) $\frac{7}{\sqrt{5}}$
(b) $\frac{7}{\sqrt{13}}$
(c) $\sqrt{5}$
(d) $\sqrt{13}$

80. $\dfrac{\frac{1}{2!} \quad \frac{1}{4!} \quad \frac{1}{6!} \quad \ldots\ldots}{1 \quad \frac{1}{3!} \quad \frac{1}{5!} \quad \ldots\ldots\ldots}$ equals

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

81. If $C_0, C_1, C_2, \ldots.., C_n$ denote the coefficient in the expansion of $(1 \quad x)^n$, then the value of $\displaystyle \quad_{r \quad 1}^{n} r\,{}^nC_r$ is

(a) $n \quad 2^{n \quad 1}$
(b) $(n \quad 1)\,2^n$
(c) $(n \quad 1)\,2^{n \quad 1}$
(d) $(n \quad 2)\;2^{n \quad 1}$

82. If $(1 \quad 2x \quad 3x^2)^{10} \quad a_0 \quad a_1x \quad a_2x^2 \quad \ldots\ldots \quad a_{20}x^{20}$, then a_1 equals

(a) 10
(b) 20
(c) 210
(d) None of these

83. If $f(x)$, $g(x)$ and $h(x)$ are three polynomials of degree 2, then $(x) \quad \begin{matrix} f(x) & g(x) & h(x) \\ f\;(x) & g\;(x) & h\;(x) \\ f\;(x) & g\;(x) & h\;x \end{matrix}$ is a polynomial of degree

(a) 2
(b) 3
(c) 4
(d) None of these

84. If $S \quad \frac{1}{1\;2} \quad \frac{1}{2\;3} \quad \frac{1}{3\;4} \quad \frac{1}{4\;5} \quad \ldots\ldots\ldots$, then e^5 equals

(a) $\log_e \; \frac{4}{e}$
(b) $\frac{4}{e}$
(c) $\log_e \; \frac{e}{4}$
(d) $\frac{e}{4}$

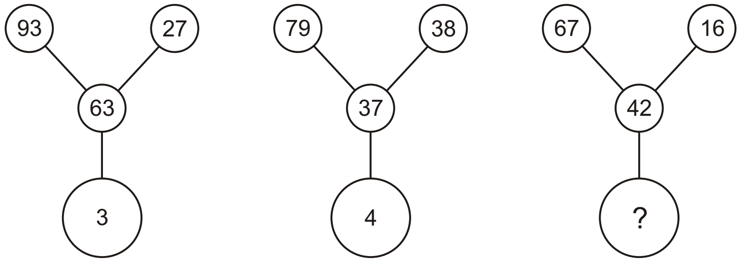
85. The term independent of x in $\left(\sqrt{\frac{x}{3}} \quad \sqrt{\frac{3}{2x^2}}\right)^{10}$ is

(a) $\frac{5}{12}$
(b) ${}^{10}C_1$
(c) 1
(d) None of these

86. If $\;,\;$ are the roots of $ax^2 \quad bx \quad c \quad 0$, then the equation $ax^2 \quad bx\,(x \quad 1) \quad c\,(x \quad 1)^2 \quad 0$ has roots

(a) $\frac{}{1}, \frac{}{1}$
(b) $\frac{1}{}, \frac{1}{}$
(c) $\frac{}{1}, \frac{}{1}$
(d) $\frac{1}{}, \frac{1}{}$

87. Which one number can be placed at the sign of interogation ?



(a) 5 (b) 6 (c) 8 (d) 9

88. Urvashi said to her friend, "Yesterday I attended the birthday party of the son of the only son in law of my mother's mother''. How is Urvashi related to the man, whose birthday party she attended ?

(a) niece (b) daughter (c) sister (d) mother

(e) None of these

89. **Statement:** "Z–TV, the only TV which gives the viewers chance to watch two Programmes simultaneously'' — An advertisement.

Assumptions: I. Sale of Z–TV may increase because of the advertisement.

II. Some people may be influenced by the advertisement and buy Z–TV.

III. The sale of Z–TV may be on the downward trend.

(a) None is implicit

(b) only II and III are implicit

(c) only I and II are implicit

(d) all are implicit

(e) None of the above

90. **Statement:** Should we impart sex education in schools ?

Arguments: I, Yes, all the progressive nations do so.

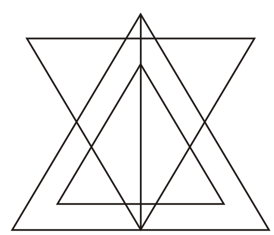
II. No, we can not impart it in co-educational schools.

(a) if only argument I is strong (b) if only argument II is strong

(c) if either I or II are strong (d) if neither I nor II is strong and

(e) if both I and II are strong

91. How many triangles are there in the following figures ?



(a) 27

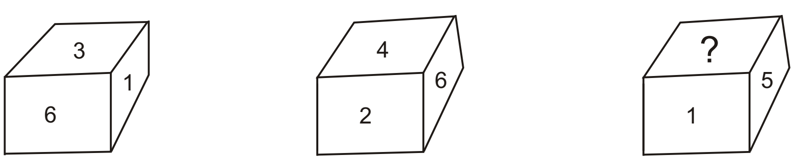
(b) 23

(c) 21

(d) 25

(e) None of the above

92. On the basis of the following figures you have to tell which number will come in place of '?'



(i) (ii) (iii)

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

Directions (93–95)

A cube is painted red on two adjacent surfaces and black on the surfaces opposite to red surfaces and green on the remaining faces. Now the cube is cut into sixty four smaller cubes of equal size.

93. How many smaller cubes have only one surface painted ?

(a) 8 (b) 16 (c) 24 (d) 32

94. How many smaller cubes will have no surface painted ?

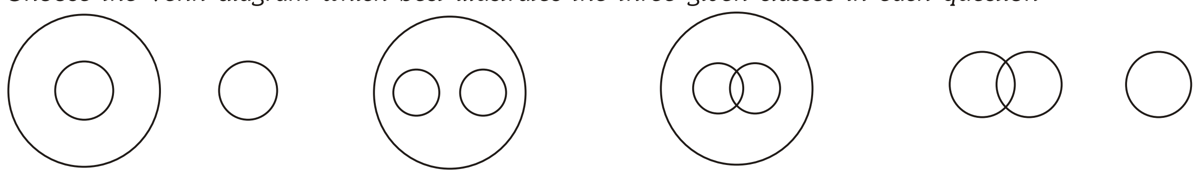
(a) 0 (b) 4 (c) 8 (d) 16

95. How many smaller cubes have less than three surface painted ?

(a) 8 (b) 24 (c) 28 (d) 48

Directions (96 99)

Choose the Venn diagram which best illustrates the three given classes in each question



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

96. Science, Physics, Chemistry.

97. Atmosphere, Hydrogen, Oxygen.

98. Machine, Lathe, Mathematics.

99. Biology, Botany, Zoology.

100. Find the missing number in the following questions

6	8	?
9	3	13
10	14	1

(a) 11 (b) 9 (c) 7 (d) 5