## SAMPLE PAPER

**TIME : 3 HRS.**                                              **MAX. MARKS : 80**

*GENERAL INSTRUCTIONS :*

➤ **All questions are compulsory.**
➤ **The question paper contains two parts A and B.**
➤ **Both Part-A and Part-B have internal choices.**
➤ **Part-A consist of two Sections - (I) and (II).**

  **Section-(I) has 16 questions of 1 mark each. Internal choices is provided in 5 questions.**

  **Section-(II) has 4 questions on case study. Each case study has 5 case - based subparts out of which 4 has to be attempted carrying 1 mark for each subpart.**

➤ **Part-B consist of three Sections - (III), (IV) and (V).**

  **Section-(III) has 6 questions of 2 marks each. Internal choices is provided in 2 questions.**

  **Section-(IV) has 7 questions of 3 marks each. Internal choices is provided in 2 questions.**

  **Section-(V) has 3 questions of 5 marks each. Internal choices is provided in 1 question.**

## PART-A

## SECTION-I

**1.** Terminating decimal expansion of $\dfrac{51}{1500}$ is in the form of $\dfrac{17}{2^n \times 5^m}$ then find (m + n).

**2.** If f(x) = ax + b; then find the zero of f(x)

**OR**

If the product of zeroes of the polynomial $ax^2 - 6x - 6$ is 4, find the value of 'a'.

**3.** Find value(s) of k for which quadratic equation $kx^2 - kx + 2 = 0$ has equal roots.

**4.** Find the $21^{st}$ term of an AP whose first two terms are −3 and 4.

**5.** Find the distance of point P(2, 3) from X-axis.

**6.** In figure, QR is a common tangent to the given circles, touching externally at the point T. The tangent at T meets QR at P. If PT = 3.8 cm, then find the length of QR (in cm)
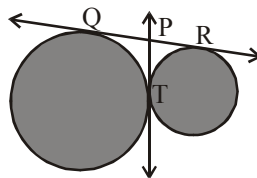


**7.** Find value of k if lines 3x + 2ky = 2 and 2x + 5y + 1 = 0 are parallel.

**8.** Find $25^{th}$ term of AP $-5, -\dfrac{5}{2}, 0 ; \dfrac{5}{2}$ ........

**9.** Find the number of cubes of side 2 cm which can be cut from a cube of side 4 cm.

**OR**

The surface area of a sphere is 616 sq cm. Find its radius $\left( \pi = \dfrac{22}{7} \right)$.

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MATHEMATICS

**10.** First and last term of an A.P. are 8 and 65 respectively and sum of all its terms is 730, find the number of terms.

**OR**

Find the tenth term of AP $\sqrt{2}, \sqrt{8}, \sqrt{18}$.....

**11.** Find the distance of point P(x,y) from origin.

**12.** Find the value of x, if the distance between the points $(x, -1)$ and $(3, 2)$ is 5.

**13.** For what value of k will $\dfrac{7}{3}$ be a root of $3x^2 - 13x - k = 0$.

**14.** If sum of the squares of zeroes of the quadratic polynomial $f(x) = x^2 - 8x + k$ is 40, find the value of k.

**15.** D and E are respectively the points on the sides AB and AC of a ΔABC such that AB = 5.6 cm, AD = 1.4 cm, AC = 7.2 cm and AE = 1.8 cm, show that DE ∥ BC.

**OR**

In given figure, if ΔADB ~ ΔADC, then find the value of p.
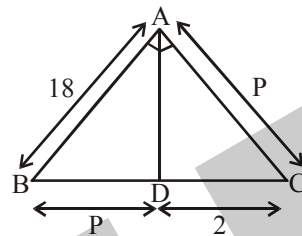


**16.** Which term of the sequence 4, 9, 14, 19, ..... is 124 ?

**OR**

If $n^{th}$ term of an A.P. is $(2n + 1)$, what is the sum of its first three terms?

# SECTION-II

**17. Case study Based -1**

In a court-piece game of playing cards, there are four players. Pair of two-two persons are made partners. In a deck of 52 – playing cards, cards are distributed around the table clockwise in batches of 5 – 4 – 4 cards.



(a) The probability that the card drawn is jack of red colour is

(i) $\dfrac{25}{26}$      (ii) $\dfrac{1}{13}$      (iii) $\dfrac{1}{26}$      (iv) $\dfrac{5}{26}$

(b) The probability that card drawn is a face card is

(i) $\dfrac{1}{13}$      (ii) $\dfrac{2}{13}$      (iii) $\dfrac{3}{13}$      (iv) $\dfrac{4}{13}$

(c) The probability of a red colour card is

(i) $\dfrac{1}{2}$         (ii) $\dfrac{1}{26}$         (iii) $\dfrac{1}{52}$         (iv) None of these

(d) The probability that card drawn is from suite of clubs is

(i) $\dfrac{1}{2}$         (ii) $\dfrac{1}{3}$         (iii) $\dfrac{1}{4}$         (iv) $\dfrac{3}{4}$

(e) The probability that card is either king or queen is

(i) $\dfrac{3}{26}$         (ii) $\dfrac{1}{26}$         (iii) $\dfrac{3}{13}$         (iv) $\dfrac{2}{13}$

**18.** **Case study Based -2**

Some students went on excursion to Agra to Visit Taj Mahal. After taking a close look at monument, one of them told others that this monument has combination of solid figures. The main structure has a big central hemispherical dome and four other smaller hemispherical domes called "Chattri" around the bigger dome. There are four cylindrical pillars called "Minarets" at four corners around main structures.



(a) Find curved surface area of four cylindrical Minarets if their height is 14 m and base radius 2 m each.

(i) 352 m²      (ii) 600 m²      (iii) 704 m²      (iv) None of these

(b) Find volume of air inside a Minaret of height 14 m and base radius 2 m.

(i) 176 m³      (ii) 100 m³      (iii) 208 m³      (iv) 352 m³

(c) What is the ratio of surface area of big central hemispherical dome of radius 21 m and sum of surface areas of four smaller hemispherical domes each of radius 7 m.

(i) 3 : 4      (ii) 3 : 2      (iii) 9 : 2      (iv) 9 : 4

(d) What will be the formula of total outer curved surface area of central dome if it has a cylindrical base of same radius 'r' and height 'h'.

(i) $2\pi rh$      (ii) $4\pi r^2 + 2\pi rh$      (iii) $2\pi r^2 + 2\pi rh$      (iv) None of these

(e) What is volume of air inside central dome along with cylindrical base. If common radius is 21 m and height of cylindrical portion is 3 m.

(i) 24000 m³      (ii) 23562 m³      (iii) 11781 m³      (iv) None of these

**19.** **Case study Based -3**

A house of cards or card castle is a structure created by stacking playing cards on top of each other, often in shape of pyramid. To build a tower of cards 2 cards are placed against each other in an upside down position forming a triangular shape. Another triangle next to it and so on. Same process is repeated in next row and so on. A man formed such a house of cards with 41 such triangular shape as base, 39 in the next, 37 in next and so on. He made 16 such rows in this manner one above another.



(a) Number of triangles in the top row is

    (i) 10         (ii) 11         (iii) 12         (iv) 9

(b) Difference of number of triangles in the 8th and 13th row from bottom is

    (i) 10         (ii) 12         (iii) 15         (iv) 20

(c) The number of triangles in the 11th row from the bottom is

    (i) 10         (ii) 20         (iii) 21         (iv) 25

(d) Number of deck of cards each having 52 playing cards used by him if total cards he used was 832 is

    (i) 5         (ii) 6         (iii) 8         (iv) 16

(e) The number of triangles in the 4th row from the top is

    (i) 15         (ii) 16         (iii) 17         (iv) 18

**20.** **Case study Based -4**

A light house is a tower, builiding designed to emit light from a system of lamps and lenses to serve as a navigation for ships.

As observed from top of a light house 300 m high, the angle of depression of two ships coming towards the base of light house as 30° and 60° respectively.
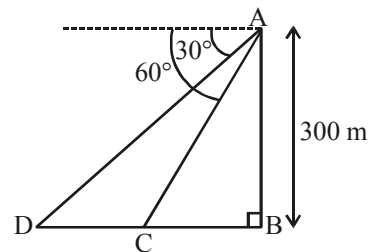


(a) Distance of farther ship from base of light house

    (i) $100\sqrt{3}$ m     (ii) $200\sqrt{3}$ m     (iii) $300\sqrt{3}$ m     (iv) 300 m

(b) Distance of nearer ship from base of light house

    (i) $100\sqrt{3}$ m     (ii) $200\sqrt{3}$ m     (iii) 300 m     (iv) None of these

(c) Distance between the two ships

(i) 100 m      (ii) 200 m      (iii) $200\sqrt{3}$ m      (iv) $100\sqrt{3}$ m

(d) Distance of farther ship from top of light house

(i) 100 m      (ii) 300 m      (iii) 400 m      (iv) 600 m

(e) If speed of both ships are equal and nearer ship take 10 min to reach base of light house, in how many minutes farther ship reach base of light house

(i) 20 min      (ii) 30 min      (iii) 40 min      (iv) 60 min

## PART-B

## SECTION-III

**21.** The length of the minute hand of a clock is 14 cm. Find the area swept by the minute hand in 5 minutes.

**22.** It is known that a box of 600 electric bulbs contains 12 defective bulbs. One bulb is taken out at random from this box. What is the probability that it is a non-defective bulb ?

**23.** Prove that $3 + 2\sqrt{5}$ is irrational, given that $\sqrt{5}$ is irrational.

**OR**

The length, breadth and height of a room are 8 m 50 cm, 6 m 25 cm and 4 m 75 cm respectively. Find the length of the longest rod that can measure the dimensions of the room exactly.

**24.** Is the following pair of linear equations consistent ? Justify your answer.

$2ax + by = a$, $4ax + 2by - 2a = 0$; $a$ , $b \neq 0$.

**25.** A die is thrown once. Find the probability of getting :

(i) a prime number

(ii) a number lying between 2 and 6

**26.** In an A.P, if $S_5 + S_7 = 167$ and $S_{10} = 235$, then find the A.P., where $S_n$ denotes the sum of first n terms.

**OR**

How many terms of the A.P. 27, 24, 21, .... should be taken so that their sum is zero?

## SECTION-IV

**27.** Prove that : $\sqrt{\dfrac{1+\sin\theta}{1-\sin\theta}} + \sqrt{\dfrac{1-\sin\theta}{1+\sin\theta}} = 2\sec\theta$

**OR**

Prove that $\dfrac{\cos^2\theta}{1-\tan\theta} + \dfrac{\sin^3\theta}{\sin\theta-\cos\theta} = 1 + \sin\theta\,\cos\theta$

**28.** In what ratio does the point $\left(\dfrac{24}{11}; y\right)$ divide the line segment joining the points P(2, –2) and Q(3, 7).

Also find y.

**29.** For which values of a and b does the following pair of linear equations have an infinite number of solutions ?
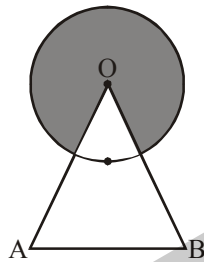
$2x + 3y = 7$

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

**OR**

Solve for x and y : $\dfrac{2}{x} + \dfrac{3}{y} = 13$ ; $\dfrac{5}{x} - \dfrac{4}{y} = -2$ ; $x, y \neq 0$

**30.** Find the area of shaded region shown in the given figure where a circular arc of radius 6 cm has been drawn with vertex O of an equilateral triangle OAB of side 12 cm as centre.



**31.** Show that $\sqrt{2}$ is an irrational number.

**32.** For the following grouped frequency distribution find the mode :

| Class | 3 – 6 | 6 – 9 | 9 – 12 | 12 – 15 | 15 – 18 | 18 – 21 | 21 – 24 |
|---|---|---|---|---|---|---|---|
| Frequency | 2 | 5 | 10 | 23 | 21 | 12 | 3 |

**33.** ABC is a triangle in which AB = AC and D is any point in BC. Prove that $AB^2 - AD^2 = BD \cdot CD$.

## SECTION-V

**34.** Prove that : $\dfrac{\tan A}{1 - \cot A} + \dfrac{\cot A}{1 - \tan A}$ = $1 + \tan A + \cot A = 1 + \sec A \csc A$.

**OR**

If $\tan\theta + \sin\theta = m$ and $\tan\theta - \sin\theta = n$, prove that $(m^2 - n^2)^2 = 16\ mn$

**35.** ABC is a right triangle, right angled at B. AD and CE are two medians drawn from A and C respectively.

If AC = 5 cm and AD = $\dfrac{3\sqrt{5}}{2}$ cm. Find the length of CE.

**36.** PQ is chord of length 16 cm, of a circle a radius 10 cm. The tangents at P and Q intertsect at a point T. Find the length of TP.