

# Sample Question Paper - 3



Time: 3 Hours

Maximum Marks: 80

MATHEMATICS (Standard)

## General Instructions:

1. This question paper contains two parts A and B.
2. Both Part A and Part B have internal choices.

### Part – A :

1. It consists two sections- I and II.
2. Section I has 16 questions of 1 mark each. Internal choice is provided in 5 questions.
3. Section II has 4 questions on case study. Each case study has 5 case-based sub-parts.

An examinee is to attempt any 4 out of 5 sub-parts.

### Part – B :

1. Section III, Question No 21 to 26 are Very short answer Type questions of 2 marks each,
2. Section IV, Question No 27 to 33 are Short Answer Type questions of 3 marks each
3. Section V, Question No 34 to 36 are Long Answer Type questions of 5 marks each.
4. Internal choice is provided in 2 questions of 2 marks, 2 questions of 3 marks and 1 question of 5 marks.

## PART - A

### Section-I

Section I has 16 questions of 1 mark each. Internal choice is provided in 5 questions.

1. Find the LCM of smallest three digit composite number and smallest two digit composite number.

OR

The decimal representation of  $\frac{11}{2^3 \times 5}$  will terminate after how many places?

# Sample Question Paper - 3



2. If the zeroes of the quadratic polynomial  $px^2 + qx + r$ ,  $p \neq 0$  are equal, then what are the signs of  $p$  and  $r$  ?

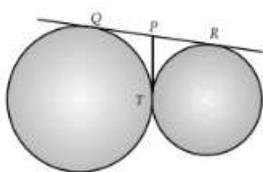
OR

Show that the sum of roots of quadratic equation  $-x^2 + 6x - 2.5 = 0$  is 6.

3. The point which divides the line segment joining the points  $(-8, 9)$  and  $(2, 3)$  in ratio  $1 : 2$  internally lies in which quadrant ?
4. At one end  $A$  of diameter  $AB$  of a circle of radius 6 cm, tangent  $XAY$  is drawn to the circle. Find the length of the chord  $CD$  which is at a distance 10 cm from  $A$  and parallel to  $XY$ .
5. Two lines are given to be parallel. The equation of one of the lines is  $4x - 5y = 18$ , then find the equation of a second line.
6. Find the area of a sector of angle  $p$  (in degrees) of a circle with radius  $R$ .
7. The probability expressed as a percentage of a particular occurrence can never be less than 0. Is the above statement true or false, justify.
8. If  $k - 2 = \sec^2(q)(1 + \sin q)(1 - \sin q)$ , then find the value of  $k$ .
9. A cylinder, a cone and a hemisphere have same base and same height. Find the ratio of their volumes.
10. A steel wire when bent in the form of a square encloses an area of  $144 \text{ cm}^2$ . If the same wire is bent in the form of a circle, then find the circumference of the circle.
11. Find the ratio in which the line segment joining the points  $(6, 4)$  and  $(1, -7)$  is divided by the  $x$ -axis. Find the coordinates of a point  $A$ , where  $AB$  is diameter of a circle whose centre is  $(2, -3)$  and  $B$  is the point  $(1, 4)$ .
12. If the angle between two tangents drawn from an external point ' $p$ ' to a circle of radius ' $r$ ' and centre  $O$  is  $60^\circ$ , then find the length of  $OP$ .

OR

In the figure,  $QR$  is a common tangent to a given circle which meet at  $T$ . Tangent at  $T$  meets  $QR$  at  $P$ . If  $QP = 3.8 \text{ cm}$ , then length of  $QR$ .



# Sample Question Paper - 3



13. If 8 times the 8th term of an A.P. is equal to 12 times its 12th term, then find its 16th term.
14. Find HCF of the number  $k$ ,  $2k$ ,  $3k$ ,  $5k$  and  $7k$  where  $k$  is a positive integer.
15. If in two triangle DEF and PQR, is true  $\angle D = \angle Q$  and  $\angle R = \angle E$ , then  $\frac{DE}{PQ} = \frac{EF}{RP}$  is true? Justify
16. Following distributing gives cumulative frequencies of 'more than type':

Marks obtained	More than or equal to 5	More than or equal to 10	More than or equal to 15	More than or equal to 20
Number of students (cumulative frequency)	30	23	8	2

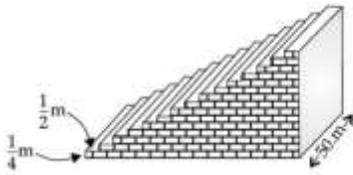
Change the above data to a continuous grouped frequency distribution.

## Section-II

Case study based questions are compulsory. Attempt any four sub parts of each question. Each subpart carries 1 mark

17. Case Study based-1 :

Small terrace at a football ground comprises of 15 steps each of which is 50 m long and built of solid concrete.



Each step has a rise of  $\frac{1}{4}$  m and a tread of  $\frac{1}{2}$  m. (see figure below)

(a) What is the volume of the required concrete for step 1?

- (i)  $25/4$                       (ii)  $50/4$                       (iii)  $75/4$                       (iv)  $150/4$

(b) What is the volume of the required concrete for step 2?

- (i)  $25/4$                       (ii)  $50/4$                       (iii)  $75/4$                       (iv)  $150/4$

(c) What is the volume of the required concrete for step 3?

- (i)  $25/4$                       (ii)  $50/4$                       (iii)  $75/4$                       (iv)  $150/4$

(d) The given problem is based on which mathematical concept?

- (i) AP                                      (ii) surface areas and volumes  
(iii) Height and Distances                      (iv) None of these

# Sample Question Paper - 3

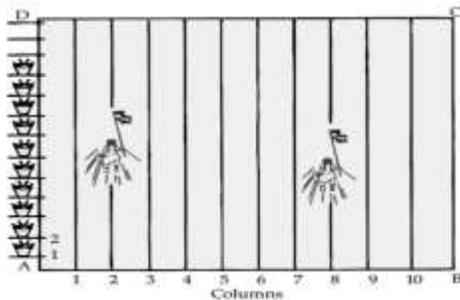


(e) What is the total volume of concrete to build the terrace?

- (i) 750 cubic m    (ii) 500 cubic m    (iii) 570 cubic m    (iv) 1000 cubic m

**18. Case Study based-2 :**

To conduct a Sports Day activities, in your rectangular shaped school ground ABCD, lines have been drawn with chalk powder at a distance of 1 m each. 100 flower pots have been placed at a distance of 1 m from each other along AD, as shown in Figure. Niharika runs  $\frac{1}{2}$ nd the distance AD on the second line and posts a green flag. Preet runs  $\frac{1}{5}$ th the distance AD on the eighth line and posts a red flag.



(a) At what distance Niharika posted the green flag from the starting point of second line?

- (i) 20 m            (ii) 25 m            (iii) 100 m            (iv) 50 m

(b) At what distance Preet posted the green flag from the starting point of eighth line?

- (i) 20 m            (ii) 25 m            (iii) 100 m            (iv) 50 m

(c) What is the distance between both the flags?

- (i)  $(936)\frac{1}{2}$             (ii)  $(101)\frac{1}{2}$  m            (iii)  $(51)\frac{1}{2}$ m            (iv)  $(11)\frac{1}{2}$ m

(d) If Rashmi has to post a blue flag exactly halfway between the line segments joining the two flags, where should she post her flag ?

- (i) (5, 37.5)            (ii) (37.5, 5)            (iii) (5, 5)            (iv) none of these

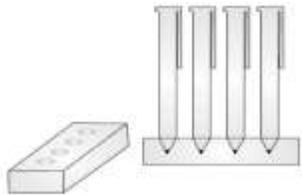
(e) The given problem is based on which mathematical concept?

- (i) Lines            (ii) surface areas and volumes  
(iii) Triangles            (iv) None of these

**19. Case Study based-3 :**

A carpenter made a wooden pen stand. It is in the shape of cuboid with four conical depressions to hold pens. The dimensions of the cuboid are 10 cm by 5 cm by 2.5 cm. The radius of each of the depressions is 0.5 cm and the depth is 1.4 cm. (See Figure).

# Sample Question Paper - 3



(a) What is the volume of cuboid?

- (i)  $225 \text{ cm}^3$       (ii)  $125 \text{ cm}^3$       (iii)  $552 \text{ cm}^3$       (iv)  $255 \text{ cm}^3$

(b) What is the volume of cone?

- (i)  $11/3 \text{ cm}^3$       (ii)  $11/30 \text{ cm}^3$       (iii)  $3/11 \text{ cm}^3$       (iv)  $30/11 \text{ cm}^3$

(c) What is the total volume of conical depressions?

- (i)  $1.74 \text{ cm}^3$       (ii)  $1.44 \text{ cm}^3$       (iii)  $1.47 \text{ cm}^3$       (iv)  $1.77 \text{ cm}^3$

(d) What is the volume of wood in the entire stand?

- (i)  $123.53 \text{ cm}^3$       (ii)  $125.3 \text{ cm}^3$       (iii)  $127.5 \text{ cm}^3$       (iv)  $120.33 \text{ cm}^3$

(e) The given problem is based on which mathematical concept?

- (i) Triangle      (ii) Lines  
(iii) Height and Distances      (iv) None of these

**20. Case Study based-4 :**

The maximum bowling speeds, in km per hour, of 33 players at a cricket coach centre are given as follows.

Speed (in km/h)	85-100	100-115	115-130	130-145
Number of players	11	9	8	5

(a) What is the modal class of the given data?

- (i) 85-100      (ii) 100-115      (iii) 115-130      (iv) 130-145

(b) What is the value of class interval for the given data set?

- (i) 10      (ii) 15      (iii) 5      (iv) 20

(c) What is the median class of the given data?

- (i) 85-100      (ii) 100-115      (iii) 115-130      (iv) 130-145

(d) What is the median bowling speed?

- (i) 109.17 km/hr      (ii) 109.71 km/hr  
(iii) 107.17 km/hr      (iv) 109.19 km/hr

(e) What is the sum of lower limit of modal class and upper limit of median class?

- (i) 100      (ii) 200      (iii) 300      (iv) 400

## PART - B

### Section-III

All questions are compulsory. In case of internal choices, attempt any one.

21. Given that root  $\sqrt{3}$  is irrational, prove that  $\sqrt{5} - \text{root } 3$  is an irrational number.
22. In an equilateral triangle, prove that three times the square of one side is equal to four times the square of one of its altitudes.
23. Find the value of :  $\sin 30^\circ \cdot \tan 45^\circ \cdot \cos 60^\circ + \cos 30^\circ \cdot \cot 45^\circ \cdot \sin 60^\circ$  is it equal to  $\sin 90^\circ$  or  $\cos 90^\circ$  ?

OR

Prove that :  $\sqrt{\frac{1-\cos A}{1+\cos A}} = \text{cosec } A - \cot A$

24. A tree breaks due to storm and the broken part bends so that the top of the tree touches the ground making an angle of  $45^\circ$  with it. The distance between the foot of the tree to the point where the top touches the ground is 8 m. Find the height of the tree
25. Find the mean of first six even multiples of 5.

OR

Find the mean of first five odd multiples of 7.

26. A paper is in the form of a rectangle ABCD in which  $AB = 20$  cm and  $BC = 14$  cm. A semi-circular portion with BC as diameter is cut off. Find the area of the remaining part.  
(Use  $\pi = \frac{22}{7}$ )

OR

If the perimeter of a protractor is 70 cm, calculate its area (Use  $\pi = \frac{22}{7}$ )

### Section - IV

All questions are compulsory. In case of internal choices, attempt any one.

27. Find the zeroes of the following polynomial:

OR

Find the zeroes of the quadratic  $7y^2 - \frac{11}{3}y - \frac{2}{3}$  polynomial and verify the relationship between the zeroes and the coefficients.

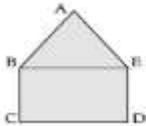
# Sample Question Paper - 3



28. Represent the following pair of linear equations graphically and hence comment on the condition of consistency of this pair.  $x - 4y = 3$ ,  $2x - 10y = 16$ .

OR

In the figure, ABCDE is a pentagon with  $BE \parallel CD$  and  $BC \parallel DE$ . BC is perpendicular to CD.  $AB = 5$  cm,  $BE = 7$  cm,  $BC = x - y$  and  $CD = x + y$ . If the perimeter of ABCDE is 19 cm. find the value of  $x$  and  $y$ , given  $x, y \neq 0$ .

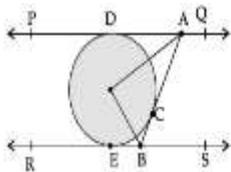


29.  $ad \neq bc$ , then prove that the equations.  $(a^2 + b^2)x^2 + 2(ac + bd)x + (c^2 + d^2) = 0$

has no real roots then prove that the equation has no real roots.

30. If the sum of the first 14 terms of an A.P. is 1057 and its first term is 10, find its 10th term.

31. In Figure PQ and RS are two parallel tangents to a circle with centre O and another tangent AB with point of contact C intersecting PQ at A and RS at B. Prove that angle AOB =  $90^\circ$ .



32.  $\sin \theta + \cos \theta = \sqrt{3}$ , then prove that  $\tan \theta + \cot \theta = 1$

33. A box consists of 100 t-shirts of which 70 are good, 10 have minor defects and 5 have major defects. Ramesh, a shopkeeper will buy only those t-shirts which are good but 'Kewal' another shopkeeper will not buy t-shirts with major defects. A t-shirt is taken out of the box at random. What is the probability that :

(i) Ramesh will buy the selected t-shirt ?

(ii) 'Kewal' will buy the selected t-shirt ?

## Section-V

34. A hemispherical portion is cut from one face of a cubical block, such that diameter 'd' of hemisphere is equal to the edge of cube. Find the surface area of the remaining solid.

35. The angle of depression of two ships from an aeroplane flying at the height of 8000 m are  $45^\circ$  and  $60^\circ$ . If both the ships are in the same line that one ship is exactly behind the other, find the side such distance between the ships.

OR

Rahul, standing on a horizontal plane, find a bird flying at a distance of 260 m from him at an elevation of  $30^\circ$ . Deepak standing on the roof of a 50 m high building, find the angle of elevation of the same bird to be  $45^\circ$ . Rahul and Deepak are on opposite sides of the bird. Find the distance of the bird from Deepak.

36. Given, Solve for x:  $\left(\frac{2x}{x-5}\right)^2 + 5\left(\frac{2x}{x-5}\right) - 24 = 0, x \neq 5$