

Q-233 (H/E)

Mathematics - 2016

Time : 3 Hours]

Class : 10th

[M. M. : 100

Instructions- (i) All questions are compulsory. (ii) Read each question carefully. (iii) Q.Nos. 1 to 5 are objective type questions. Do as directed. (iv) Internal options are given in Q.Nos. 6 to 24. (v) Marks allotted to each question are mentioned against the each question. (vi) Draw the neat and clean diagram wherever required.

Q1. Choose the correct answer and write it in your answer book.

1×5= 5

(i) The system of equations $a_1x + b_1y = c_1$ and $a_2x + b_2y = c_2$ represents two parallel lines if,

(a) $\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$

(b) $\frac{a_1}{a_2} \neq \frac{b_1}{b_2}$

(c) $\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$

(d) $\frac{a_1}{a_2} \neq \frac{b_1}{b_2} = \frac{c_1}{c_2}$

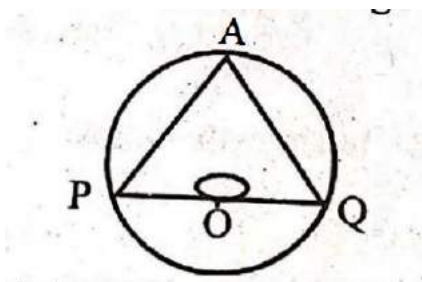
(ii) The third proportional to 9, 12 is

(a) $6\sqrt{3}$ (b) $3\sqrt{6}$ (c) $\frac{27}{4}$ (d) 16

(iii) The maximum degree of variable used in quadratic equation is.

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

(iv) The measure of $\angle PAQ$ in the figure given below is:



(a) 45° (b) 180° (c) 90° (d) 60°

- (v) From a point 30 m away from the foot of the building the angle of elevation of the top of the building is 45° . The height of the building will be

(a) 25m (b) 30m (c) $25\sqrt{2}$ m (d) $30\sqrt{2}$ m

Q2. Fill in the blanks:

$1 \times 5 = 5$

- (i) The zero of the linear polynomial $ax + b$ is _____
- (ii) The rate of the depreciation is _____
- (iii) If the sides of two triangles are proportional, then triangles will be _____
- (iv) The radius of a circle is 7cm, then the area will be _____
- (v) The length of the diagonal of a cube is $12\sqrt{3}$ cm. The length of the edge of the cube will be _____

Q3. Match the correct column

$1 \times 5 = 5$

Column- A

Column-B

- | | |
|---|------------------------------------|
| (i) $\sin^2 25^\circ + \cos^2 25^\circ$ | (a) $\cos\theta$ |
| (ii) $1 + \cot^2 \theta$ | (b) \perp |
| (iii) $\sin(90^\circ - \theta)$ | (c) $\operatorname{cosec}^2\theta$ |
| (iv) $\sec 60^\circ$ | (d) $\tan 41^\circ$ |
| (v) $\tan 49^\circ$ | (e) 2 |
| | (f) $\frac{1}{2}$ |
| | (g) $\cot 41^\circ$ |

Q4. Write true/ false in the following:

1×5= 5

- (i) $X + 2\sqrt{x}$ is not a polynomial.
- (ii) Income tax is a direct tax.
- (iii) Angles in the same segment of a circle are equal.
- (iv) The volume of hemisphere is $3\pi r^2$
- (v) The probability of definite event is always one.

Q5. Write the answer in one words/ sentence of each:

1×5= 5

- (i) In equation $x+2y=5$, if $y=0$ then write the value of x .
- (ii) Write the formula of Hero to find the area of a triangle.
- (iii) Write the statement of Pythagoras theorem.
- (iv) Write the number of circles passing through non-linear points.
- (v) Write the value of the mode of the following data:

2, 3, 4, 2, 12, 9, 7, 8, 9, 6, 9, 5, 9.

Q6. Write the statement of basic proportionality (Thales Theorem).

2

(OR) Write the property of angle- angle similarity.

Q7. The perimeters of two similar triangles are 30cm and 20cm respectively. If one side of one triangle is 12cm, find the corresponding side of other triangle.

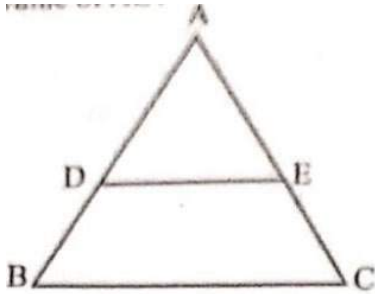
2

(OR) Triangle ACB is an isosceles triangle such that $AC=BC$. If $AB^2= 2AC^2$. Prove that ΔACB is a right angled triangle.

Q8. Triangle ABC and triangle PQR are two similar triangles. The areas of these are 64 cm^2 and 100 cm^2 , respectively. If $QR= 12\text{ cm}$. Then find the value of side BC.

2

(OR) In the figure given below $DE \parallel BC$, if $\frac{AD}{DB} = \frac{3}{5}$ and side $AC=6\text{cm}$. Then, find the value of AE .



Q9. Write any two properties of Arithmetic Mean. 2

(OR) Find the Median of the following values:

5, 10, 3, 7, 1, 9, 6, 2, 11

Q10. Write the probability of getting an odd number in a single throw of die. 2

(OR) If two coins are tossed simultaneously, find the probability of getting two heads.

Q11. Solve the following system of equation 4

$$\begin{aligned} 3x - 2y &= 4 \\ y + 2x &= 5 \end{aligned}$$

(OR) Find the value of m , for which the system

$$\begin{aligned} 2x + my - 4 &= 0 \\ 3x - 7y - 10 &= 0 \end{aligned}$$

(i) a unique solution (ii) no solution

Q12. The sum of two numbers is 7. If the sum of these number is seven times of its difference. Find the number. 4

(OR) If in $\triangle ABC$ $\angle C = 2 \angle B = \angle A + \angle B + 20^\circ$, then find all the three angles of triangle.

Q13. If $\frac{x}{b+c} = \frac{y}{c+a} = \frac{z}{a+b}$, then prove that $(b-c)x + (c-a)y + (a-b)z = 0$. 4

(OR) What should be subtracted from 11, 20, 26 and 50 so that the remaining numbers are in proportion?

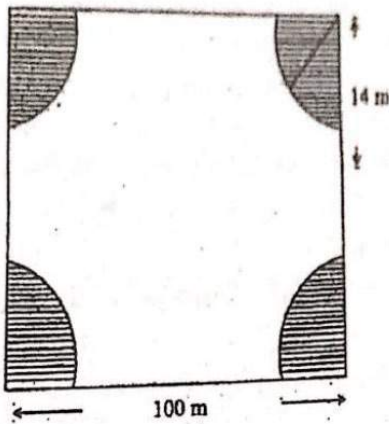
Q14. Solve the equation $3x - \frac{1}{x} = 2$ using formula method. 4

(OR) Find the nature of the roots of the following equation, $6x^2 - x - 2 = 0$.

Q15. From the top of the hill, the angle of depression of the top and the bottom of 16m high building is 30° and 60° respectively. Find the height of the hill. 4

(OR) An aeroplane is flying at a height of 8,000m. The angle of depression of control tower of airport from the aeroplane is 30° . Find the horizontal distance between control tower and aeroplane.

Q16. A quadrants shaped flower bed is made of radius 14m in a square garden of side 100m, in all the four corners. Find the area of the remaining part of the square garden. 4



(OR) A rocket is in the form of closed cylinder from below, and upper part surmounted by cone of equal radius. The radius of cylinder is 2 m and height is 21 m. The height of the cone is 8.4m. Find the volume of the rocket.

Q17. The area of three adjacent faces of cuboid are x , y and z . If the volume of the cuboid is V , then prove that $V^2 = xyz$. 4

(OR) An iron sphere of radius 8 cm is melted then recasted into small spheres each of radius 1 cm. Find the number of small spheres.

Q18. Find cyclic factors

$$ab(a-b) + bc(b-c) + ca(c-a). \quad 5$$

(OR) Multiply the rational expressions $\frac{x^2-7x+10}{(x-4)^2}$ and $\frac{x^2-7x+12}{x-5}$ and express the product in its lowest terms.

Q19. If α and β are the roots of quadratic equations $3x^2 - 5x - 7 = 0$, then find the value of $\frac{\alpha}{\beta} + \frac{\beta}{\alpha}$ 5

(OR) The length of the side forming right angle of a right angled triangle are x cm and $(x+1)$ cm. \ If the area of the triangle is 10cm^2 , then find the sides of the triangle.

Q20. Find the compound interest on Rs, 2000 at the rate of interest 4% per annum for 2 years. 5

(OR) A sewing machine is available for Rs, 1,600 Cash or for Rs, 1,200 cash down payment and Rs, 460 to be paid after 6 months. Find the rate of interest charged under the instalment plan.

Q21. The side of the triangle are 4cm, 6cm and 8cm. Draw the circum-circle of the triangle and write the steps of construction. 5

(OR) Construct a cyclic quadrilateral in which $AC = 6\text{cm}$, $\angle B = 90^\circ$, $AB = 3\text{cm}$ and $AD = 4\text{cm}$. Write the steps for construction also.

Q22. Prove that $\sin^2\theta + \cos^2\theta = 1$. 5

(OR) Show that whether the following is identity or not:

$$\frac{\tan\theta + \sin\theta}{\tan\theta - \sin\theta} = \frac{\sec\theta + 1}{\sec\theta - 1}$$

Q23. Prove that the length of two tangents drawn from an external point to a circle are equal. 6

(OR) Write the definition of a cyclic quadrilateral. Prove that the sum of pairs of opposite angles of a cyclic quadrilateral is 180° .

Q24. Compute the mean by short cut method of the following frequency distribution:

6

Marks Obtained	10-20	20-30	30-40	40-50	50-60	60-70	70-80
Number of Students	6	8	13	7	3	2	1

(OR) Calculate the cost of living index number for the year 1999 on the basis of the 1996 of a medium family from the following information.

Items	Quantity (units)	Price (in Rs) Per Unit	
		Year 1996	Year 1999
A	8	22	25
B	12	35	40
C	5	25	30
D	15	20	25
E	10	15	20