

# BOARD QUESTION PAPER 2016

## Section A

**Q. 1. Choose the correct option and write it in your answer book :**

$1 \times 5 = 5$

- (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)  $6\sqrt{2}$

(b)  $3\sqrt{6}$

(c)  $\frac{27}{4}$

(d) 16.

- (iii) The minimum 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)  $45^\circ$

(b)  $180^\circ$

(c)  $90^\circ$

(d)  $60^\circ$ .

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

(a) 25 m

(b) 30 m

(c)  $25\sqrt{2}$  m

(d)  $30\sqrt{2}$

**Ans.** (i) (c), (ii) (d), (iii) (b), (iv) (c), (v) (b).

**Q. 2. Fill in the blanks :**

$1 \times 5 = 5$

- (i) The zero of the linear polynomial  $ax + b$  is .....  
 (ii) The rate of depreciation is .....  
 (iii) If the sides of two triangles are proportional, then triangles will be .....  
 (iv) The radius of a circle is 7 cm, then its 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 .....

**Ans.** (i)  $-\frac{b}{a}$ , (ii) negative, (iii) similar, (iv) 154 sq.cm, (v) 12 cm.

**Q. 3. Match the correct column :**

$1 \times 5 = 5$

‘A’

‘B’

(i)  $\sin^2 25^\circ + \cos^2 25^\circ$

(a)  $\cos \theta$

(ii)  $1 + \cot^2 \theta$

(b) 1

(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)  $\cot 41^\circ$

Ans. (i) (b), (ii) (c), (iii) (a), (iv) (e), (v) (g).

Q. 4. Write True/False in the following :

$1 \times 5 = 5$

- (i)  $X + 2\sqrt{x}$  is not 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.

Ans. (i) True, (ii) True, (iii) True, (iv) False, (v) True.

Q. 5. Write the answer in one word/sentence of each :

$1 \times 5 = 5$

- (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 three nonlinear 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.

Ans. (i) 5, (ii)  $\sqrt{s(s-a)(s-b)(s-c)}$ .

(iii) In a right angle triangle, the square of the hypotenuse is equal to the sum of the square of the other two sides.

(iv) one, (v) 9.

Q. 6. Write the statement of basic proportionality (Thales theorem).

2

Or, Write the property of angle-angle similarity.

Q. 7. The perimeters of two similar triangles are 30 cm and 20 cm respectively. If one side of one triangle is 12 cm, find the corresponding side of other triangle.

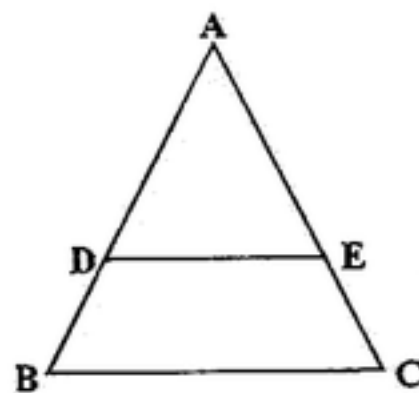
2

Or, Triangle  $ACB$  is an isosceles triangle such that  $AC = BC$ . If  $AB^2 = 2 \cdot AC^2$ . Prove that  $\triangle ACB$  is a right angled triangle.

Q. 8. Triangle  $ABC$  and triangle  $PQR$  are two similar triangles. The areas of these are  $64 \text{ cm}^2$  and  $100 \text{ cm}^2$  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  $AE$ .



Q. 9. 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.

Q. 10. 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.

Q. 11. Solve the following system of equation :

4

$$3x - 2y = 4$$

$$y + 2x = 5.$$

Or, Find those values of  $m$ , for which the system

$$2x + my - 4 = 0$$

$$3x - 7y - 10 = 0 \text{ has}$$

(i) a unique solution, (ii) no solution.

Q. 12. The sum of two number is 7. If the sum of these number is seven times of its difference. Find the number.

4

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

Q. 13. 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 ?

Q. 14. Solve the equation  $3x - \frac{1}{x} = 2$  using formula method.

4

Or, Find the nature of the roots of the following equation,

$$6x^2 - x - 2 = 0.$$

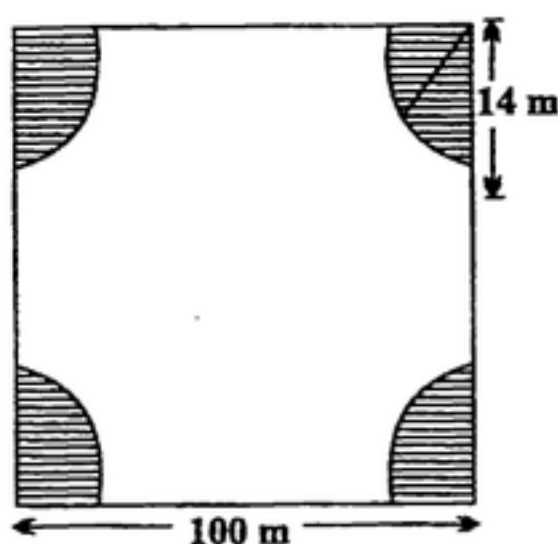
Q. 15. From the top of the hill, the angle of depression of the top and the bottom of 16 m high building is  $30^\circ$  and  $60^\circ$  respectively. Find the height of the hill.

4

Or, An aeroplane is flying at a height of 8,000 m. The angle of depression of control tower of airport from the aeroplane is  $30^\circ$ . Find the horizontal distance between control tower and aeroplane.

Q. 16. A quadrant shaped flower bed is made of radius 14 m. in a square garden of side 100 m 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 21 m. The height of cone is 8.4 m. Find the volume of the rocket.

Q. 17. The area of three adjacent faces of a cuboid are  $x$ ,  $y$  and  $z$ . If the volume of cuboid is  $V$ , then prove that  $V^2 = xyz$ .

4

Or, A iron sphere of radius 8 cm is melted then recasted into small spheres each of radius 1 cm. Find the number of small spheres.

Q. 18. Find cyclic factors :

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

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.

Q. 19. If  $\alpha, \beta$  are the roots of quadratic equation  $3x^2 - 5x - 7 = 0$ , then find the value of  $\frac{\alpha}{\beta} + \frac{\beta}{\alpha}$ . 5

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

Q. 20. Find the compound interest on Rs. 2,000 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.

Q. 21. The side of the triangle are 4 cm, 6 cm and 8 cm. Draw the circumcircle 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 of construction also.

Q. 22. Prove that:  $\sin^2 \theta + \cos^2 \theta = 1$ . 5

Or, Show that whether the following is identity or not :

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

Q. 23. Prove that the length of two tangents drawn from an external point to a circle are equal. 6

Or, Write the definition of cyclic quadrilateral. Prove that the sum of pairs of opposite angles of a cyclic quadrilateral is  $180^\circ$ .

Q. 24. 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 1996 of a medium family from the following information.

| Items | Quantity<br>(units) | Price in 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        |