

BOARD QUESTION PAPER 2014

Section A

Objective Type Questions

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

1 × 5 = 5

1. A two digit number x is the digit at units. place any y is the digit at tens place, then the number is :
(a) $10y + x$ (b) $10x + y$ (c) $10y - x$ (d) $10x - y$.
2. The mean proportional to 36 and 49 is :
(a) 49 (b) 42 (c) 40 (d) 36.
3. The maximum number of tangents which can be drawn from an external point to a circle are :
(a) 1 (b) 3 (c) Infinite (d) 2.
4. If the height of a tower and the length of its shadow is equal, then the value of the angle of elevation of the sun is :
(a) 30° (b) 60° (c) 90° (d) 45° .
5. The formula to find the volume of cone is :
(a) $\frac{4}{3}\pi r^2$ (b) $\pi r^2 h$ (c) $\frac{1}{3}\pi r^2 h$ (d) $4\pi r^2 h$.

Q. 2. Fill in the blanks :

1 × 5 = 5

1. The additive inverse of $x + \frac{1}{x}$ will be
2. $\log_e \left(\frac{m}{n} \right) = \dots\dots\dots$
3. triangles become always similar.
4. The longest chord of the circle is
5. Length of side of cube is $2a$, then the length of diagonal is

Ans. 1. $-x - \frac{1}{x}$, 2. $\log_e m - \log_e n$, 3. equilateral, 4. diameter, 5. $2a\sqrt{3}$.

Q. 3. Write True or False in the following :

1 × 5 = 5

1. The value of y in equation $x + 2y = 5$, if value of $x = 1$, will be 2.
2. Compound interest is less than simple interest.
3. In a right angled triangle, hypotenuse is a larger side.
4. Equal chords of a circle subtend equal angle on centre.
5. The probability of an event can be greater than one also.

Ans. 1. True, 2. False, 3. True, 4. True, 5. False.

Q. 4. Match the following :

1 × 5 = 5

- | Column 'A' | Column 'B' |
|--|-------------------|
| 1. $\operatorname{cosec}(90^\circ - \theta)$ | (a) $\sin \theta$ |
| 2. $\sqrt{1 - \cos^2 \theta}$ | (b) $\tan \theta$ |
| 3. $\operatorname{cosec}^2 \theta - 1$ | (c) $\cot \theta$ |

4. $\frac{1}{\cot \theta}$

(d) $\sec \theta$

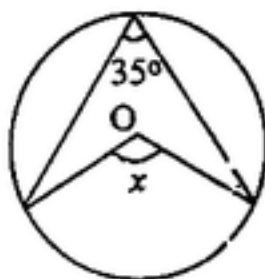
5. $\frac{\cos \theta}{\sin \theta}$

(e) $\cot^2 \theta$.

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

1 × 5 = 5

1. What will be the simplest form of the rational expression $\frac{x^2 - 4}{(x - 2)}$?
2. What will be the sum of roots of quadratic equation $2x^2 + 4x + 6 = 0$?
3. Write Hero's formula.
4. What is the value of x from the given figure?



5. What will be arithmetic mean of 2, 4, 6, 8, 10?

Ans. 1. $x + 2$, 2. -2 , 3. $\sqrt{s(s-a)(s-b)(s-c)}$, 4. 70° , 5. 6.

Q. 6. Write the conditions for the similarity of the triangles.

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Or, State Thales's theorem.

Q. 7. Show that in two triangles $\triangle ABC$ and $\triangle DEF$, whether in the following conditions they are similar or not. Why?

2

(i) $\angle A = 10^\circ$, $\angle B = 50^\circ$, $\angle C = 30^\circ$.

(ii) $\angle D = 50^\circ$, $\angle E = 30^\circ$, $\angle F = 80^\circ$.

Or, Write property of side-angle-side similarity and side-side-side similarity.

Q. 8. If $\triangle ABC \sim \triangle PQR$ and areas of two similar triangles are 64 sq. cm and 121 sq. cm respectively. If $QR = 15$ cm, then find the values of side BC .

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

Q. 9. The following are the speed in km/h of 10 motor cyclists :

51, 52, 53, 54, 55, 56, 57, 58, 59, 60.

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Find the mean.

Or, Write any two uses of cost of living index number.

Q. 10. Write any two merits of Arithmetic Mean.

2

Or, Find the probability that a number 9 turns up in a single throw of die.

Q. 11. Prove that there is a value of c for which the system

$$cx + 2y = c - 2$$

$$8x + cy = c.$$

has infinitely many solutions. Find this value.

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Or, Five years ago age of Ankita was thrice the age of Ajita. After 10 years Ankita's age will be twice the age of Ajita. Find the present ages of Ankita and Ajita.

Q. 12. Solve the following system of equations of elimination by equating the coefficients method :

$$3x - 4y - 11 = 0, 5x - 7y + 4 = 0.$$

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Or, In $\triangle ABC$, $\angle C = 2\angle A$, $\angle B = \angle A + \angle C + 20^\circ$. Find all the angles of the triangle.

Q. 13 If $\frac{a}{y+z} = \frac{b}{z+x} = \frac{c}{x+y}$, then prove that :

$$\frac{a(b-c)}{y^2-z^2} = \frac{b(c-a)}{z^2-x^2} = \frac{c(a-b)}{x^2-y^2}. \quad 4$$

Or, A bag contains 3, 150 coins. There are 1 rupee coins, 2 rupee coins and 5 rupee coins in the bag. The ratio of each coin is 3 : 2 : 5 respectively. Then calculate the number of each coin.

Q. 14 Solve the equation $3x - \frac{3}{x} = -8$ by formula method. 4

Or, Construct the quadratic equation with given roots $\frac{7+\sqrt{5}}{7}, \frac{7-\sqrt{5}}{7}$.

Q. 15. The angle of elevation of the top of a rock, from the top and foot of a 100 m high tower are 30° and 45° respectively. Find the height of the rock. 4

Or, The top of the cliff is 200 m high. The angle of depression of the top and the bottom of a tower are 45° and 60° . Find the height of the tower.

Q. 16. Three solid spheres having the diameters 2 cm, 12 cm and 16 cm respectively are melted to form a sphere. Find semi-diameters of the sphere. 4

Or, The perimeter of floor of a room is 25 metres. If the cost of painting the walls of the room is Rs. 750 at the rate of Rs. 10 per sq. metre, then find the height of the room.

Q. 17. A quadrant shape flower bed is made of radius 14 metres in a square garden of side 100 metres in all the four corners. Find the area of the remaining of the square garden. 4

Or, The radii of cylinders are in the ratio 2 : 3 and their heights are in the ratio 5 : 3. Find the ratios of their lateral surface and volumes.

Q. 18. Factorize : $x(y^2 - z^2) + y(z^2 - x^2) + z(x^2 - y^2)$. 5

Or, Obtain all other zeroes of $f(x) = x^4 - 3x^3 - x^2 + 9x - 6$ if two of its zeroes are $\sqrt{-3}$ and $\sqrt{3}$.

Q. 19. A two digit number is such that the product of its digit is 30, when 9 is subtracted from the number, the digits interchange their places. Find the number. 5

Or, A passenger train takes two hours more for a journey of 300 km if its speed is decreased by 5 km/hr from its usual speed. Find the usual speed of the train.

Q. 20. Find the amount and compound interest for Rs. 1,200 for 4 years at the rate of 5 % per annum interest. 5

Or, A scooter is sold for Rs. 28,000 cash or for Rs. 7,400 cash down payment together with three equal monthly instalment of Rs. 7,000 each. Find the rate of interest charged under the instalment plan.

Q. 21. Construct a triangle whose sides are 4 cm, 6 cm, and 8 cm. Draw the circum-circle of the triangle. 5

Or, Construct a triangle ABC, in which $BC = 6.5$ cm, $\angle A = 45^\circ$ and altitude $AD = 5.5$ cm.

Q. 22. Prove the following identity :

$$\frac{\operatorname{cosec} A}{\operatorname{cosec} A - 1} + \frac{\operatorname{cosec} A}{\operatorname{cosec} A + 1} = 2 \sec^2 A. \quad 5$$

Or, Prove that : $\sec^2 \theta = 1 + \tan^2 \theta$.

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

Or, Two chords of lengths 30 cm and 16 cm are on the opposite side of the centre of the circle. If the radius of the circle is 17 cm, find the distance between the chords.

Q. 24. The mean of the following frequency table is 57.6. But the frequencies f_1 and f_2 are missing. Find the value of missing frequencies f_1 and f_2 : 6

Class Interval	Frequency
0 – 20	7
20 – 40	f_1
40 – 60	12
60 – 80	f_2
80 – 100	8
100 – 120	5
Total	50

Or, Calculate the cost of living index number of 1999, on the basis of 1995 from the following data :

Item	Quantity (in kg)	Cost (in Rs.) per kg.	
		(Year 1995)	(Year 1999)
A	20	12	15
B	10	07	08
C	12	15	20
D	15	35	40
E	05	15	30