

**C/P/R EXAMS
2019
ELEMENTARY MATHEMATICS**

200089

Time : 2 hours]

[Full Marks : 50

Notes : (i) Answer **all** questions.

(ii) The figures in the right-hand margin indicate full marks for the questions.

1. Answer *all* questions :

1×10=10

(a) If $\sqrt{2^{x-7}} = 32$, find the value of x .(b) Find the values of k for which the system of equations $x + (k+1)y = 5$ and $(k+1)x + 9y = 8k - 1$ has no solution.(c) Rationalize the denominator of $\frac{1}{2-5\sqrt{2}}$.

(d) Find the HCF and LCM of 12, 15 and 21.

(e) Find the sum of all odd numbers lying between 50 and 100.

(f) If $P = \frac{x^2 - 36}{x^2 - 49}$ and $Q = \frac{x+6}{x+7}$, then find the value of $\frac{P}{Q}$.(g) Find the value of $2\sin^2 30^\circ - 3\cos^2 45^\circ + \tan^2 60^\circ$.

(h) Two dice are thrown. Find the probability of getting sum 7.

(i) Find the value of p , if $3x^2 + 4x + 5p = 0$ has equal real roots.(j) Find the value of p for which the points $(-1, 3)$, $(2, p)$ and $(5, -1)$ are collinear.**2.** Answer any *five* questions :

3×5=15

(a) A sector is cut from a circle of radius 21 cm. The angle of the sector is 150° . Find the length of the arc and the area of the sector.(b) The angle of elevation of the top of a tower at a distance of 150 m from its foot on a horizontal plane is found to be 60° . Find the height of the tower.

(c) The parallel sides of a trapezium are of the lengths 20 cm and 29 cm and non-parallel sides are of the lengths 12 cm and 15 cm. Find the area of the trapezium.

(d) The sum of the third and the seventh terms of an AP is 6 and their product is 8. Find the sum of the first sixteen terms of the AP.

(e) Factorize $x^9 - y^9$.

(f) Solve the following system of equations :

$$\frac{2}{x} + \frac{1}{y} = 3; \quad \frac{6}{x} - \frac{1}{y} = 5$$

(g) Show that

$$\left(\frac{x^a}{x^b}\right)^{1/ab} \cdot \left(\frac{x^b}{x^c}\right)^{1/bc} \cdot \left(\frac{x^c}{x^a}\right)^{1/ca} = 1$$

3. Answer any five of the following :

5×5=25

(a) The area of the base floor of a canonical tent is 154 m^2 and its volume is 1232 m^3 . Find the cost of the canvas required to make the tent at the rate of ₹ 24 per m^2 .

(b) Five years ago, a man was seven times as old as his son and five years hence the man's age will be three times his son's age. Find their present ages.

(c) A sells an article to B at a profit of 30% and B sells it to C at a loss of 20%. If C pays ₹ 520 for it, at what price did A buy the article?

(d) Two men and five women can do a piece of work in 4 days, while one man and one woman can finish it in 12 days. How long would it take one man to finish the work?

(e) Show that the points (7, 10), (-2, 5) and (3, -4) are vertices of an isosceles right triangle.

(f) Solve :

$$9^{x+2} - 6(3^{x+1}) + 1 = 0$$

(g) The mean of 200 items was found to be 25. If at the time of calculation, two items were wrongly taken as 32 and 50 in place of 42 and 15, find the correct mean.