

Preliminary Examination

Algebra

Time : 2½ Hrs.

(Pages 4)

Marks : 60

- NOTE :** 1. All questions are compulsory.
2. Use of calculators is not allowed.

Q.1. Attempt any six of the following subquestions :

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- (i) Find the sum of 7, 11, 15, 19, ... , up to 60 terms.
- (ii) What is the 5th term of an A.P. of whose first term is 10 and the common difference -2?
- (iii) Write the quadratic equation $\frac{x^2}{3} = -1$ in the standard form.
- (iv) Find the value of k , if $x = 1$ is one root of the equation $3x^2 - kx - 1 = 0$.
- (v) If $3x + 6y = 5$; $6x + 3y = 4$, find the value of $x + y$.
- (vi) If $P(A) = 0.025$, What is the probability of $P(A')$?
- (vii) Write the continuous classes for given classes.
36 - 40, 41 - 45, 46 - 50, 51 - 55.

Q.2. Attempt any five of the following subquestions :

10

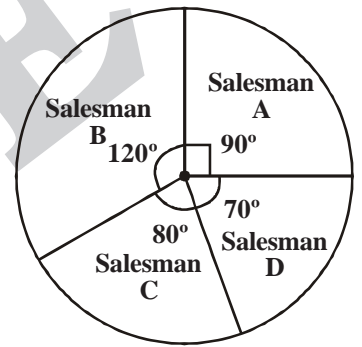
- (i) Find n if the n^{th} term of the following sequence is 68.
5, 8, 11, 14,
- (ii) Form the quadratic equation if its roots are 0 and -4
- (iii) Find the values of a , b , c for following quadratic equations by comparing with standard form. $x^2 - x - 3 = 0$

- (iv) Two coins are tossed simultaneously. What is the probability of not getting a head?
- (v) Below is given distribution of turnover (in lakhs of Rs) of 50 departmental stores in a year.

Turnover (in lakhs of ₹)	5 - 15	15 - 25	25 - 35	35 - 45	45 - 55
No. of stores	5	10	20	13	2

Find mean turnover of a store.

- (vi) The sales of salesman in a week are given below in pie diagram. Study the diagram and answer the following questions if the total sale due to salesman A is Rs. 18,000.



- Find the sales of each salesman
- Find the salesman with highest sale.

Q.3. Attempt any four of the following subquestions :

12

- The sum of the first 55 terms of an A.P. is 3300. Find the 28th term.
- Solve the following quadratic equations by completing square : $3y^2 + 7y + 1 = 0$.
- Find the value of k for which the given simultaneous equations have infinitely many solutions : $4x + y = 7$; $16x + ky = 28$.
- If $x = 5$ and $y = 3$ is the solution of $3x + ky = 3$, find k .
- In a class of 100 students, 60 students drink tea, 50 students drink coffee and 30 students drink both. A student from this class is selected at random, find the probability that student takes at least one of the two drinks (i.e. tea or coffee or both).

Q.4. Attempt any three of the following subquestions :

12

- Find three consecutive terms in an A.P. whose sum is -3 and the product of their cubes is 512.

- (ii) If the difference of the roots of the quadratic equation is 5 and the difference of their cubes is 215, find the quadratic equation.
- (iii) Without plotting the graphs, find the point of intersection of the lines :
 $2x + 5y = 13$ and $4x - 9y = 7$.
- (iv) Two fair dice are thrown, find the probability that sum of the points on their uppermost faces is :
- a perfect square or divisible by 4.
 - greater than 10 or an odd number.

Q.5. Attempt any four of the following subquestions :

20

- (i) If the arithmetic mean and the geometric mean of two numbers are in the ratio $5 : 4$ and the sum of the two numbers is 30 then find these numbers.
- (ii) Draw the graphs representing the equations $2x = y + 2$ and $4x + 3y = 24$ on the same graph paper. Find the area of the triangle formed by these lines and the X-axis.
- (iii) The weight of a bucket is 15kg, when it is filled with water upto $\frac{3}{5}$ of its capacity and the weight is 19kg, if it is filled with water upto $\frac{4}{5}$ of its capacity. Find the weight of bucket, if it is completely filled with water.
- (iv) Following table shows frequency distribution of duration (in seconds) of advertisements on T.V.

Duration (in sec.)	25-30	30-35	35-40	40-45	45-50	50-55
No. of advertisements	10	32	15	9	7	2

Obtain mean duration of advertisement on T.V. by shift of origin and scale method.

- (v) Draw a pie diagram to represent the world population given in the following table after determining the value of a .

Country	India	China	Russia	USA	Others	Total
Percentage of world population	15	20	a	a	25	100

SAMPLE