I–3–A

Roll No.....

Total No. of Questions : **20**] [Total No. of Printed Pages : **7 + Graph**

SSEPKM16
8703–A
MATHEMATICS

Time : 3 Hours] **[Maximum Marks : 100**

Note :– (i) All questions are compulsory.

(ii) Diagrams, whenever necessary should be neat and accurate.

1. (i) L.C.M. of 6 and 20 is :

(a) 40 (b) 60

(c) 120 (d) 30

(ii) The common difference of an AP 10, 7, 4, ... is :

(a) 3 (b) –3

(c) 2 (d) None of these

(iii) The co-efficient of x^2 of a polynomial $x^2 - 2x - 8$ is :

(a) 1 (b) 2

(c) 8 (d) –2

(iv) The right bisector of on a line makes an angle of :

(a) 60° (b) 30°

(c) 45° (d) 90°

(v) The area of a square whose side is 4 cm :

(a) 8 cm^2 (b) 14 cm^2

(c) 16 cm^2 (d) 16 cm

(vi) One card is drawn from a well-shuffled pack of 52 cards. The probability of getting a king of red colour is :

(a) $\frac{1}{26}$ (b) $\frac{1}{4}$

(c) $\frac{1}{13}$ (d) None of these $1 \times 6 = 6$

2. Find the distance between the points (–5, 7) and (–1, 3). 2

3. A tangent PQ at a point P of a circle of radius 5 cm meets a line through the centre O at a point Q, so that OQ = 12 cm. Find the length of PQ. 2

4. Evaluate :

$$\frac{1 - \tan^2 45^\circ}{1 + \tan^2 45^\circ}$$

5. Use Euclids' division algorithm to find the HCF of 867 and 255. 4

6. In an AP where $a = 5$, $d = 3$ $a_n = 50$. Find n and S_n. 4

7. Solve the linear equation by the substituting method :

$$2x + 3y = 11$$

and $2x - 4y = -24$ 4

8. The difference between two numbers is 26 and one number is three times the other. Find them. 4

9. Divide $x^3 - 3x^2 + 5x - 3$ by $x^2 - 2$. 4

10. One card is drawn from a wall shuffled deck of 52 cards. Calculate the probability that the card will :

(i) be an ace

(ii) not be an ace 4

11. Find the roots of $2x^2 - 7x + 3 = 0$ by the method of completing the square.

Or

The diagonal of a rectangular field is 60 metres more than the shorter side. If the longer side is 30 metres more than the shorter side, find the sides. 6

12. Find the roots of $x^2 + x - 6 = 0$ by the method of factorisation.

Or

Rohan's mother is 26 years older than him. The product of their ages 3 years from now will be 360. Find Rohan's present age. 6

13. If a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points the other two sides are divided in the same ratio.

Or

The diagonals of a quadrilateral ABCD intersect each other at a point O, such that $\frac{AO}{BO} = \frac{CO}{DO}$, show that ABCD is trapezium. 6

14. ABD is a triangle right angled at A, C is a point on BD such that AC ⊥ BD. Show that $AC^2 = BC.DC$.

Or

ABC is an isosceles triangle with AC = BC. If $AB^2 = 2AC^2$, prove that ABC is a right triangle. 6

15. Find the area of a triangle whose vertices are (–5, –1), (3, –5) and (5, 2).

Or

Find the co-ordinates of the points of trisection of the line segment joining (4, –1) and (–2, –3). 6

16. If 3 cot A = 4, check whether

$$\frac{1-\tan^2 A}{1+\tan^2 A} = \cos^2 A - \sin^2 A \text{ or not.}$$

Or

Prove the identity

$$\frac{\cos A}{1+\sin A} + \frac{1+\sin A}{\cos A} = 2\sec A$$ 6

Turn Over

17. Prove that the tangents drawn at the ends of a diameter of a circle are parallel.

Or

If TP and TQ are the two tangents to a circle with centre O so that $\angle$ POQ = 110°, find $\angle$ PTQ. 7

18. From the top of a 7 m high building, the angle of elevation of the top of a cable tower is 60° and the angle of depression of its foot is 45°. Determine the height of the tower.

Or

Evaluate :

$$\frac{5\cos^2 60° + 4\sec^2 30° - \tan^2 45°}{\sin^2 30° + \cos^2 30°}$$ 7

19. Construct a triangle of sides 4 cm, 5 cm, and 6 cm and then a triangle similar to it whose sides are $\frac{2}{3}$ of the corresponding sides of the first triangle.

Or

Draw a line segment of 7·6 cm and divide it in the ratio of 5 : 8. Measure the two parts. (No steps of construction) 7

20. A 20 m deep well with diameter 7 m is dug and the earth from digging is evenly spread out to form a platform 22 m by 14 m. Find the height of the platform.

Or

A drinking glass is in the shape of a frustum of a cone of height 14 cm. The diameters of its two circular ends are 4 cm and 2 cm. Find the capacity of the glass. 7