Roll No.....

I–3–C

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

SSEPKM16
8703–C
MATHEMATICS

Time : 3 Hours] [Maximum Marks : 100

Note :- (i) All questions are compulsory.

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

1. (i) Prime factors as a product of 140 is :

(a) $2 \times 2 \times 5 \times 7$ (b) $2 \times 7 \times 10$

(c) $2 \times 3 \times 5 \times 7$ (d) None of these

(ii) The nth term of an AP is $3n + 4$, then the 8th term is :

(a) 35 (b) 28

(c) 25 (d) None of these

(iii) The constant term of a polynomial $6x^2 - 3 - 7x$ is :

(a) 6 (b) -3

(c) -7 (d) None of these

(iv) The bisector of an $\angle$ 60° is :

(a) 30° (b) 20°

(c) 40° (d) None of these

(v) If length is 3 cm, breadth is 2 cm, then perimeter of a rectangle is :

(a) 9 cm (b) 10 cm

(c) 12 cm (d) 5 cm

(vi) If a die is thrown once, then the propability of getting even number is :

(a) $\frac{1}{3}$ (b) $\frac{1}{4}$

(c) $\frac{1}{2}$ (d) $\frac{1}{6}$ 1×6=6

2. Find the distance between the points (2, 3) and (4, 1). 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 :

$$\frac{\sin 80^\circ}{\cos 72^\circ} \cdot$$ 2

5. Use Euclids' division algorithm to find the HCF of 135 and 225. 4

6. In an AP where $a_{12} = 37$, $d = 3$. Find a and s_{12} 4

7. Solve the linear equation by the substituting method

$$2x + 3y = 13$$

and

$$4x + 5y = 23$$ 4

8. The larger of two supplementary angles exceeds the smaller by 18 degrees. Find them. 4

9. Divide $3x^4 + 5x^3 - 7x^2 + 2x + 2$ by $x^2 + 3x + 1$. 4

10. One card is drawn from a well shuffled deck of 52 cards. Find 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 $2x^2 + x - 6 = 0$ 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 a trapezium. 6

14. ABD is a triangle right angled at A. C is a point on BD such that $AC \perp BD$ show that $AC^2 = BC \cdot DC$.

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

17. Prove that the tangents drawn at the ends of 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