Roll No.:

Total No. of Questions : 20

Total No. of Printed Pages : 8

XRKN15

G-4
S-2

6303–B

MATHEMATICS

Annual Class – 10th

Session – November, 2015

Time : 3 hours **Maximum Marks : 100**

1. Do as directed :

(i) The Probability of an event cannot be less than

(a) 1

(b) 0.3

(c) -1

(d) None of these.

(Choose the correct one)

(ii) Define an Odd number. V

(iii) If the radius of a hemisphere is 2 cm, its curved surface area will be

(a) 2π cm^2

(b) 4π cm^2

(c) 8π cm^2

(d) None of these.

(Choose the correct one)

(iv) A polynomial of degree 3 is called a

(a) Cubic polynomial

(b) Zero polynomial

(c) Quadratic polynomial

(d) None of these.

(Choose the correct one)

(v) The next term of – 3.2, - 5.2, - 7.2 is

(a) 9.2

(b) – 9.24

(c) 11.2

(d) None of these.

(Choose the correct one)

(vi) Bisect a line segment of length 5 cm.

2. 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 PQ = 12 cm. Find OQ.

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

4. If sec 4A = cosec (A - 20°), where 4A is an acute angle, find the value of A.

5. Find the HCF and LCM of 6, 72 and 120, using the prime factorization method.

6. Find the zeroes of the Polynomial $4S^2 – 4S+1$.

7. Find the sum of the first 1000 positive integers.

8. If we add 1 to the numerator and subtract 1 from the denominator, a fraction reduces to 1. It becomes 1/2 if we only add 1 to the denominator. What is the fraction ?

9. Solve the following pair of equations by substitution method :

$3x – y = 3$

$9x – 3y = 9$.

10. Eleven bags of wheat flour, each marked 5 kg, actually contained the following weights of flour (in kg) :

4.97, 5.05, 5.08, 5.03, 5.00, 5.06, 5.08, 4.98, 5.04, 5.07, 5.00.

Find the probability that any of these bags chosen at random contain more than 5 kg of flour.

11. Two water taps together can fill a tank in $9\frac{3}{8}$ hours. The tap of larger diameter takes 10 hours less than the smaller one to fill the tank separately. Find the time in which each tap can separately fill in the tank.

Or

Find the roots of the quadratic equation $2x^2 - 7x+3 = 0$ by applying the quadratic formula.

12. Find the roots of the equation $5x^2 - 6x + 2 = 0$ by the method of completing the square.

OR

Find the roots of the quadratic equation $2x^2 - x + \frac{1}{8} = 0$ by factorization.

13. If AD and PM are medians of triangle ABC and PQR, respectively where Δ ABC~ ΔPQR, prove that $\frac{AB}{PQ} = \frac{AD}{PM}$.

OR

If a line divides any two sides of a triangle in the same ratio, then the line is parallel to the third side. Prove it.

14. In an equilateral triangle ABC, D is a point on side BC such that BD =1/3 BC. Prove that $9AD^2 = 7AB^2$.

OR

A ladder is placed against a wall such that its foot is at a distance of 2.5 m from the wall and its top reaches a window 6 m above the ground. Find the length of the ladder.

15. Find a relation between x and y such that the point (x, y) is equidistant from the points (7, 1) and (3,5).

OR

Find the co-ordinates of the point which divides the join of (-1, 7) and (4, -3) in the ratio 2 : 3.

16. If $\cot\theta = \frac{7}{8}$, evaluate

$$\frac{(1+\sin\theta)\,(1-\sin\theta)}{(1+\cos\theta)\,(1-\cos\theta)}$$

Or

Prove the identity :

$$\frac{\sin\theta - 2\sin^3\theta}{2\cos^3\theta - \cos\theta)} = tan\theta$$

17. From a point on a bridge across a river, the angles of depression of the banks on opposite sides of the river are 30° and 45°, respectively. If the bridge is at a height of 3 m from the banks, find the width of the river.

Or

From a point on the ground, the angles of elevation of the bottom and the top of a transmission tower fixed at the top of a 20 m high building are 45º and 60° respectively. Find the height of the tower.

18. Prove that the tangent at any point of a circle is perpendicular to the radius through the point of contact.

OR

Two concentric circles are of radii 5 cm and 3 cm. Find the length of the Chord of the larger circle which touches the smaller circle.

19. Construct a triangle with sides 5 cm, 6 cm and 7 cm and then another triangle whose sides are 7/5 of the corresponding sides of the first triangle.

OR

Draw a circle of radius 6 cm. From a point 10 cm away from its centre, construct the pair of tangents to the circle.

20. A fez, the cap used by the Turks, is shaped like the frustum of a cone. If its radius on the open side is 10 cm, radius at the upper base is 4 cm and its slant height is 15 cm, find the area of material used for making it.

Or

A metallic sphere of radius 4.2 cm is mud and recast into the shape of a cylinder of radius 6 cm. Find the height of the cylinder.