Third Periodic Test – December 2019
Mathematics (Set B)

Class: X
Date:08-12-2019

Time Allowed : 3 Hrs
Maximum Marks: 80

General Instructions:

1. The question paper consists of 40 questions into four sections A,B, C and D.
   Section-A comprises of 20 questions of 1 mark each;
   Section-B comprises of 6 questions of 2 marks each;
   Section-C comprises of 8 questions of 3 marks each;
   Section-D comprises of 6 questions of 4 marks each.
2. Internal choices are given.
3. Use of calculator is not permitted.

SECTION -A

(Q1 - Q10) multiple choice questions

1) The distance of the point P(-5, -4) from the x-axis is:
$a)\ 5\ units$
$b)\ -5\ units$
$c)\ 4\ units$
$d)\ -4\ units$

2) If two solid hemispheres of same radius are joined together along their flat surfaces, then Curved surface area of the new solid is:
a) $4\pi r^2$
b) $6\pi r^2$
c) $3\pi r^2$
d) $8\pi r^2$

3) Probability can never be expressed as:
$a)\ 0$
$b)\ 1$
$c)\ -3$
$d)\ 2/3$

4) If Δ ABC is right angled at C, then the value of Cosec(A+B) is:
a) 0
b) 1
c) not defined
d) $\frac{1}{2}$

5) If $\Delta ABC \sim \Delta PQR$ such that AB=15cm and PQ=18cm.then, the ratio of the areas of ΔABC to ΔPQR is :
a) 5:6
b) 6:5
c) 25:36
d) 36:25

6) The centroid of the triangle whose vertices are (3,-7), (3,3) and (3,10) is:
a) (0,3)
b) (3,2)
c) (3,3)
d) (2,2)

7) The value of k, if -1 is a zero of the polynomial p(x)= $kx^2 - 4x + k$ is:
$a)\ 2$
$b)\ -2$
$c)\ 4$
$d)\ -4$

8) The probability of 53 Sundays in a non leap year is:
a) 1/7
b) 2/7
c) 5/7
d) none of these

9) Sum of the roots of the equation $3x^2 + 6x - 3 = 0$ is:
$a)\ 2$
$b)\ -2$
$c)\ 3$
$d)\ -3$

10) The pair of equation $x + 2y + 5 = 0\ and - 3x + 6y + 1 = 0$ has
a) a unique solution
b) exactly two solutions
c) infinitely many solutions
d) no solution

(Q11 - Q15) fill in the blanks.

11) If the coordinates of the points P, Q, R and S are such that $PQ = QR = RS = SP$ and PQ=QS, then quadrilateral PQRS is a ___________.

12) Area of the largest triangle that can be inscribed in a semicircle of radius 'r' units is __________.

13) If a and b are the roots of $x^2 + x + 1 = 0$, then a^2+b^2= ______________.

14) A rectangular sheet of paper 40cm X 20cm is rolled to form hollow cylinder of height 40 cm, then the radius of the base is ___________.

15) If $x = a, y = b$, is the solution of the equation $x - y = 2\ and\ x + y = 4$, then the value of a is _________.

(Q16 – Q20) Answer the following.

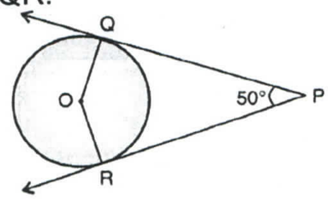
16) If $2cos2\theta = \sqrt{3}$, find the value of θ.

17) Two coins are tossed together. Find the probability of getting a doublet.

OR

A die is thrown once. find the probability of getting a prime number.

18) PQ and PR are tangents to the circle with centre O such that ∠ QPR =50°, then find ∠ OQR.



19) If Δ ABC is similar to Δ DEF such that 2AB=DE and BC=8cm, then find EF.

20) What is the 21st term of the A.P., whose first term is -3 and second term is 4.

OR

If the common difference of an A.P. is 5, then find a_{18}-a_{14}.

SECTION B

21) A paper is in the form of a rectangle ABCD in which AB=20cm and BC =14cm. A semi- circular portion with BC as diameter is cut off. Find the area of the remaining part.

OR

What is the perimeter of the sector with radius 10.5cm and angle of the sector is $60°$.

22) Two concentric circles are of radii 10 cm and 8 cm. Find the length of the chord of larger circle which touches the smaller circle.

23) The sum of first 'n' terms of an A.P is given by $S_n = 5n - n^2$. find the sixteenth term of an A.P.

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

OR

If $tan(A + B) = \sqrt{3}$ and $tan\ (A - B) = \frac{1}{\sqrt{3}}$; $0° < A + B \leq 90°;\ A > B,$ find A and B.

25) Find the volume of the largest solid right circular cone that can be scooped out of a solid cube of side 14 cm.

26) If $P(x, y)$ is equidistant from $A(6,2)$ and $B(-2,6)$, prove that $y = 2x$.

SECTION C

27) The king and jack of clubs are removed from a deck of 52 playing cards . One card is selected from the remaining cards. Find the probability of getting

i)The king of clubs ii) a queen of hearts iii) A Face card

28) Solve: 49x + 51y =499

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29) Prove that: $(Sin\theta + Cosec\theta)^2 + (Cos\theta + Sec\theta)^2 = 7 + tan^2\theta + cot^2\theta$

OR

If $x = rsinAcosC, y = rsinAsinC \text{ and } z = rcosA$ then prove that $x^2 + y^2 + z^2 = r^2$

30) Draw a line segment AB of length 7 cm. Taking A as centre, draw a circle of radius 3 cm and taking B as centre, draw another circle of radius 2 cm. Construct tangents to each circle from the centre of the other circle.

31) Find the ratio in which the line segment joining the points A $(1, -5)$ and $B\ (-4, 5)$ is divided by x axis. Also find the co-ordinates of point of division.

OR

Find the value of k for which the points $A\ (7, -2),\ B(5,1),\ C(3, k)$ are collinear points.

32) Evaluate: $\frac{\sec 39°}{cosec 51°} + 2\cot 9°\cot 18°\cot 45°\cot 72°\cot 81°$

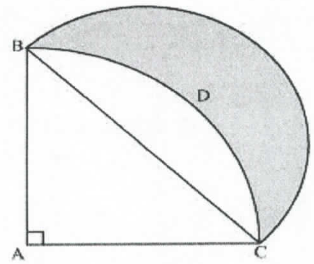
33) Prove that the opposite sides of the quadrilateral circumscribing a circle subtend supplementary angles at the centre of the circle.

34) A chord of a circle of radius 15 cm subtends an angle of 120° at the centre. Find the area of the corresponding minor segment of the circle.

[use π = 3.14, √3 = 1.73]

OR

In given figure ABDC is a quadrant of a circle of radius 14 cm and a semicircle is drawn with BC as diameter. Find the area of the shaded region



SECTION D

35) The sum of first 20 terms of an A.P is 400 and sum of first 40 terms is 1600.find the sum of its first 10 terms.

OR

If s_n denotes the sum of first n terms of an A.P., prove that, $s_{30} = 3(s_{20} - s_{10})$

36) Water in a canal 6m wide and 1.5m deep is flowing with a speed of 10km/h. How much area will it irrigate in 30 minutes if 8cm of standing water is needed.

OR

If a cone is cut by a horizontal plane parallel to the base and the upper part is removed. If the curved surface area of the upper cone is $\frac{1}{9}$ times the curved surface area of the original cone. find the ratio of the line segment to which the height of the cone is divided by the plane.

37) State and prove basic proportionality theorem.

38) An express train takes 1 hr less than a passenger train to travel 360 km. If the speed of the express train is 5 km/h more than that of the passenger train, find the speed of the two trains.

39) Find all the zeroes of the polynomial $(2x^4 - 9x^3 + 5x^2 + 3x - 1)$ if two of its zeroes are $(2 + \sqrt{3})$ and $(2 - \sqrt{3})$.

40) Two poles of equal heights are standing opposite to each other on either side of the road which is 80 m wide. From a point P between them on the road, the angles of elevation of their top are 30° and 60°. Find the height of the poles and the distances of the point P from the poles.

OR

A straight highway leads to the foot of a tower. A man standing at the top of the tower observes a car at an angle of depression of $30°$, which is approaching the foot of the tower with a uniform speed. Six seconds later the angle of depression of the car is found to be $60°$. Find the time taken by the car to reach the foot of the tower from this point.

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