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Preparatory Examination, January 2015

Class: X Standrd Sub: Mathematics Mx.Marks:90

Note: This paper consists of four sections A,B,C and D. Questionsin Section A carry 1 mark each, Section B carr 2 marks each, Section C carry 3 marks each and Section D carry 4 marks each. All quetions are compulsory.

SECTION-A

1.First term of an AP is -5 and last term is 45. If sum of these terms is 120 find the number of terms.

2.A sphere and a cube have same surface area. Find the ratio of diameter of sphere to the edge of the cube.

3.The distance between (p,-5) and (2,7) is 13 units. Find the value of 'p'.

4.AB and CD are tangents to the inner circle of two concentric circles. If AB= 8 cm. find the lngth of CD.

SECTION-B

5.Solve for 'x': 6a^2x^2-7abx-b^2 = 0

6. A quadrilateral PQRS is such that it circuscribes a circle. Show that PQ + RS = PS +QR.

7.Show that the points (7,10), (3,-4) and (-2,5) are vertice of an isosceles triangle.

8.Find a relation between 'x' and 'y' if P(x,y) is equidistant from A(-3,7) and B(2,5).

9.A bag containscrds numbered 1,2,3,.....20. acard isdrawn at random. What is the probability that the drawn card is bearing prime number.?

10.A lettter is chosen from the word 'MATHEMATICS'. What is the probability that the chosen letter is a vowel?

SECTION-C

11.Sum of'n' terms of an AP is 4n^2 + 5n. Find its 'n' th term.

12. If the equation (b-c)x^2 + (c-a)x + (a-b) = 0 has equal roots show that 2b = a+ C.

13.Prove that the intercept tangent of a pair of parallel tangents to a circle subtends a right angle at the centre.

14.Two hemispheres are scooped out from the ends of solid cylider of radius 3.5 cm and height 10 cm.Find the surface area of the remaining solid.

15.Sum of first 8 terms of n A.P. is 140 and the sum of next 16 terms is 856. find the A.P.

16. A boat takes two hrs more to cover a distance of 72 km upstream than to return. If the speed of stream is 3 km/h find the speed of boat in still water.

17. Find the difference between the area of sector 120^o and major segment given the radius is 4.2 cm.

18.Find the area of a quadrlateral whose vertices are A(1,1), B(7,-3), C (12, 2) and D(7,21).

19. If the point (x,y) is equidistant fom (a+b, b-a) and (a-b, a+b) show that ax = by.

20. Draw a circle of radius 2 cm and construct tangents to it from a point P 4 cm away from the centre.

SECTION-D

21.A bag contains 18 balls of which some are blue and the rest are red. By adding 6 more blue balls the probability of drawing blue balls increases by 5/24. Find the number of balls of each kind.

22. Amit distributes Rs. 3000 to the children of an orphanage. Had there been 5 children less each would have got Rs.20 more. How many children were there in the orphanage? What value is depicted by Amit?

23.An open metallic bucket is in the shape of a frustum mounted on a hollow cylindrical base. If the diameters of the circular ends of the bucket are 45 cm and 25 cm and height of the bucket is 30 cm and that of the cylindrical portion is 6 cm find the area of the metallic sheet used to make the bucket. Also find the volume of the bucket.

24. At the foot of a hill the angle of elevation of the summit is 45^o. After acsending 1000m towards the hill up a slope of 30^o inclination the angle of elevation was found to be 60^o.Find the height of the hill.

25. Angle of elevation of an aeroplane flying at a height of 3000 m, from apoint on the ground is 45^o. After a flight of 15 seconds the angle ofelevation changes to 60^o. Find he speedof theaeroplane.

26. Construct a triangle ABC such that AB = 4 cm, BC = 5 cm and AC = 6 cm and contruct a triangle similar to it such that each each side is 5/4 of the original triangle.

27.A Person borrows Rs.60,000 to be paid in 40 instalments that form n A.P. After paying 25 instalments the person dies leaving 40% of the loan unpaid. Find the value of the first instalment.

28. The incircle of the triangle ABC has radius 4 cm. The radius at the point ofontact divides side BC into two parts of 6 cm and 8 cm. Find the length of sides AB and AC.

29. The interior of the building is in the form of a cylinder of diameter 4.2 m and height 4 m surmounted by a cone of height 2.1 m. Find the surface area and volume of the building.

30. Water flows at a speed of 20m/ sec. through a pipe of diameter 3.5 cm into a cylindrical tank of diameter 3.5 m. What will be the level of water after 30 minutes.

31. Earth dug from a well of 3 m diameter and depth 21m is spread all around it to a width of 2 m to form an embankment. Find the height of the embankment.