NXUZE5B

SHIVALIK PUBLIC SCHOOL (C)
SUMMATIVE ASSESSMENT – II, 2016-17
MATHEMATICS
Class – X

Time Allowed: 3 hours   Maximum Marks: 90

General Instructions:

1. All questions are **compulsory**.
2. The question paper consists of 31 questions divided into four sections A, B, C and D. Section-A comprises of 4 questions of 1 mark each; Section-B comprises of 6 questions of 2 marks each; Section-C comprises of 10 questions of 3 marks each and Section-D comprises of 11 questions of 4 marks each.
3. There is no overall choice in this question paper.
4. Use of calculator is not permitted.

SECTION-A

Question numbers **1** to **4** carry one mark each

1. If $x=1$ is a common root of quadratic equations $ax^2+ax+3=0$ and $x^2+x+b=0$, then find ab.   1

2. What is the angle of elevation of a 15 meter high tower from a point 15 metres away from its foot ?   1

3. A die is thrown once. Find the probability of getting a non negative integer.   1

4. If P (0, 0), Q (2, b), R (a, 4) and S (4, 4) are vertices of a parallelogram PQRS, Find the value of a and b.   1

SECTION-B

Question numbers **5** to **10** carry two marks each.

5. Find the 20th term from the last term of the A.P. : 3, 8, 13, ..., 253.   2

6. If the quadratic equation $x^2+4x+k=0$, has real and distinct roots, find the value of k.   2

7. If TP and TQ are two tangents to a circle with centre O so that $\angle POQ=110°$. Find $\angle PTQ$.   2

8. Divide a line segment AB of length 9.2 cm in the ratio 1 : 3 by bisecting it twice. Find the measures of the two parts.   2

9.   2

PQ is the common tangent to the two circles. SR and PT are tangents to smaller and larger circle respectively. If SR = 4cm and PT = 7cm, find RP.

10. A pendulum is swinging through an angle of 30° and describing an arc of length 8.8 cm. Find the length of the pendulum. (Use $\pi = \dfrac{22}{7}$)   2

SECTION-C

Question numbers **11** to **20** carry three marks each.

11. Solve the equation : $1 + 4 + 7 + 10 + ... + x = 287$ 3

12. If $(x^2 + y^2)(a^2 + b^2) = (ax + by)^2$, prove that, $\dfrac{x}{a} = \dfrac{y}{b}$.   3

13. Draw a pair of tangents to a circle which are inclinded to each other at an angle of 100°.   3

14. The angles of elevation of the top of a tower from two points at distances 10 metres and 5 metres from the base of the tower and in the same straight line with it are complementary. Find the height of the tower.   3

15. Two coins are tossed simultaneously. Find the probability of getting :   3
    (A)   Atleast one head   (B)   Atmost two tails

16. The length of a line segment is $\sqrt{10}$ units. If one end is at $(2, -3)$ and the abscissa of the second end is 5, show that its ordinate is either -2 or -4.   3

17. Find the coordinates of the points which trisect the line segment joining the points $(12, 10)$ and $(-6, 7)$.   3

18. The radius of wire is decreased to one - third. If volume remains the same, then the original length will become what fraction of the new length.   3

19. A sector of central angle 150° is cut-out from a circle of radius 21 cm. If the area of the sector is 577.5 cm^2, find the length of the arc of the sector.   3

20. A right circular cone made of iron is of 8 cm height and has base radius 2 cm. It is melted and recast into a sphere. Determine the radius of the sphere.   3

SECTION-D
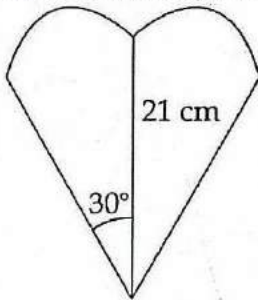
Question numbers **21** to **31** carry four marks each.

21. Find the value of x if 12th term of the A.P. :   4
    $x - 7, x - 2, x + 3, ...$ is 81. Find S_{12} also.

22. Two taps running together can fill a cistern in $3\dfrac{1}{13}$ minutes. If one tap alone takes 3 minutes more than the other to fill it, find the time in which each tap would fill the cistern.   4

23. The sum of 4th and 8th terms of an AP is 24 and the sum of the 6th and 10th terms is 34. Find the 20th term.   4

24. TP and TQ are two tangents drawn to a circle with centre O from an external point T. Prove that $\angle PTQ = 2 \angle OPQ$.   4

25. Construct △DEF ~△ABC in which AB=5.2 cm ∠B=45° and BC=6 cm, using scale factor 1 : 2. 4

26. From a point on the ground, the angles of elevation of the bottom and top of a water tank, kept at the top of 20 m high tower, are 45° and 60° respectively. Find the height of the water tank. Also, find the distance between the observation point on the ground and the base of the building. 4

27. One card is drawn from a well-shuffled deck of 52 playing cards. Find the probability of drawing: 4
    (A) a jack. (B) an ace.
    (C) neither a club nor a king. (D) a black king.

28. If D, E, and F are mid-points of sides BC, AC and AB of △ABC respectively, where the coordinates of A, B and C are respectively (6, −2), (0, −6) and (4, 8), then using coordinate geometry, prove that area of △ABC = 4 area of △DEF. 4

29. A truck has front wheels of radius 0.7 m and its rear wheels have radius 1.4 m. If the rear wheel takes 500 revolutions to travel a certain distance, how many revolutions must the front wheel had taken to cover the same distance ? Also, find the difference in their areas. (Use $\pi = \frac{22}{7}$) 4

30. A solid is in the form of a right circular cone mounted on a hemisphere. The radius of the hemisphere is 4.2 cm and height of the cone is 8 cm. The solid is placed in a cylindrical tub, full of water to submerge the whole solid in water. If the radius of cylinder is 10 cm and its height is 19.6 cm, find the volume of water left in the cylindrical tub. (Use $\pi = \frac{22}{7}$) 4

31. Geeta's mother bakes a heart shaped cake. Geeta gives half of it to her friend Sita. Sita observes that the piece of cake she received looks like a sector of a circle whose radius is 21 cm and sector angle is 30°. She calculates the area occupied by it. What will be her answer if she calculates it correctly ? What value is depicted by Geeta ? 4

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