SUMMATIVE ASSESSMENT-II (2013-14)

CLASS-X

SUBJECT : MATHEMATICS

Time : 3 hrs. M.M.: 90

General Instructions :

(i)   *All questions are compulsory.*

(ii) *The question paper consists of 34 questions divided into four sections A, B, C and D. Section-A comprises of 8 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 10 questions of 4 marks each.*

(iii) *Question numbers 1 to 8 in Section-A are multiple choice questions where you are to select one correct option out of the given four.*

(iv) *There is no overall choice.*

(v)   *Use of calculator is not permitted.*

SECTION-A

Question numbers 1 to 8 carry one mark each. For each question, four alternative choices have been provided of which only one is correct. You have to select the correct choice.

Q1. The length (l) of a rectangle is 2m more than its breadth (b). The area of the rectangle is 25 m². Which equation could be used to find the dimensions of the rectangle?

(a) $b(b+2)=25$ (b) $b+b+2=25$

(c) $b(b-2)=25$ (d) $2b+4=25$

Q2. From a point P, which is at a distance of 13 cm from the centre O of a circle of radius 5 cm, a pair of tangents PQ and PR to the circle are drawn. The area of the quadrilateral PQOR is :

(a)   60 cm²   (b)   65 cm²

(c)   30 cm²   (d)   32.5 cm²

Q3. To construct a triangle similar to a given $\triangle ABC$ wth its sides $\dfrac{5}{3}$ of the corresponding sides of $\triangle ABC$, we draw a ray BX such that $\angle CBX$ is an acute angle and X lies on the opposite side of A with respect to BC. Five points B_1, B_2 ..... are located at equal distances on ray BX. The point to join C is :

(a) B_2 (b) B_3

(c) B_4 (d) B_5

Q4. The ratio of the lengths of a pole and its shadow is $1 : \sqrt{3}$. The angle of elevation of the sun is :

    (a) $30°$ (b) $45°$

    (c) $60°$ (d) $90°$

Q5. If a digit is chosen at random from the digits 1, 2, 3, 4, 5, 6, 7, 8, 9, then the probability that the digit is mutiple of 3 is :

    (a) $\dfrac{1}{3}$ (b) $\dfrac{2}{3}$

    (c) $\dfrac{1}{9}$ (d) $\dfrac{2}{9}$

Q6. A number is selected from numbers 1 to 25. The probability that it is a prime is :

    (a) $\dfrac{2}{3}$ (b) $\dfrac{16}{25}$

    (c) $\dfrac{9}{25}$ (d) $\dfrac{2}{5}$

Q7. A line segment is of length 5 cm. If the coodinates of its one end are (2, 2) and that of the other end are (–1, x), then x is :

    (a) -6 (b) -8

    (c) 6 (d) 8

Q8. If area of minor segment of a circle is π cm^2 and radius of the circle is 7 cm, then area of its major segment (in cm^2) is :

    (a) $21\,\pi$ (b) $4\,\pi$

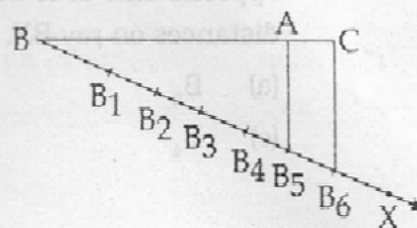   (c) $24\,\pi$ (d) $48\,\pi$

SECTION-B

Question numbers 9 to 14 carry two marks each.

Q9. The sum of 5th and 7th terms of an AP is 52 and the 10th term is 46. Find the common difference.

Q10. Find the roots of the following quadratic equation : $4x^2 - 4px + (p^2 - q^2) = 0$

Q11. In the figure, B_1, B_2, B_3 ..... are points on ray BX at equal distances and $B_5A \parallel B_6C$. Find the ratio in which A divides BC.

Q12. Draw a line segment PQ = 7 cm. Divide it in the ratio 5 : 2.

Q13. If a letter is chosen at random from the English alphabets find the probability that the letter is (a) A vowel (b) A consonant.

Q14. Three spherical chocolate balls, of which two have radii 6 cm and 8 cm are melted to form another chocolate ball of radius 12 cm. Find the radius of the third chocolate sphere.
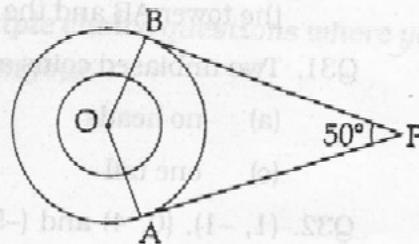
SECTION-C

Question numbers 15 to 24 carry three marks each.

Q15. A natural number, when increased by 3, equals 70 times its reciprocal. Find the number.

Q16. Find the sum of all odd numbers upto 85.

Q17. In the figure, PA and PB are the two tangents to the circle with centre O. Prove that ∠AOB and ∠APB are supplementary. If ∠APB = 50°, find ∠AOB.

Q18. If from a point 100 metres above the ground, the angles of depression of two objects due south on the ground are 60° and 45°, then find the distance between the objects.

Q19. The vertices of a triangle are A (3, $\sqrt{3}$), B (3, $-\sqrt{3}$) and C (0, 0). Find its perimeter.

Q20. If (1, 5), (p, 1) and (4, 11) are collinear, find the value of p.

Q21. A horse is tied to a peg P at the middle of the side AB of square shaped grass field ABCD of side 50 m by means of a 7 m long rope. Find the increase in grazing area, if the rope were 10.5 m long instead of 7 m.

Q22. A vessel is in the form of a hemispherical bowl mounted by a hollow cylinder. The diameter of the sphere is 14 cm and the total height of the vessel is 13 cm. Find its capacity.

Q23. A rectangle of sides 8 cm and 6 cm is inscribed inside the circle. Find the remaining area of the circle.

Q24. Find the area of segment bounded by the chord AB and the arc ACB of the circle with centre O having radius 7 cm and sector angle equal to 90°, as shown in the given figure.
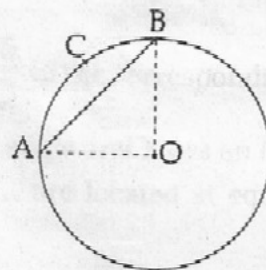
SECTION-D

Question numbers 25 to 34 carry four marks each.

Q25. The sum of first n terms of an AP is $3n^2 + 4n$. Find its nth term and the AP.

(E-3)

Q26. If the roots of the equation $(a - b) x^2 + (b - c) x + (c - a) = 0$ are equal, prove that $2a = b + c$.

Q27. Find the sum of the AP : 2, 5, 8 ...., 182.

Q28. Draw a pair of tangents to a circle of radius 5 cm which are inclined to each other at an angle of 60°.

Q29. l and m are two parallel tangents to a circle with centre O. Another tangent AB, with point of contact C, intersects l at A and m at B. Prove that the tangent AB subtends a right angle at O.

Q30. The angle of elevation of the top B of a tower AB from a point X on the ground is 60°. At a point Y, 40 m vertically above X, the angle of elevation is 45°. Find the height of the tower AB and the distance XB.

Q31. Two unbiased coins are tossed simultaneously. Find the probability of getting :

    (a)   no heads   (b)   atmost one tail

    (c)   one tail   (d)   one head and one tail

Q32. $(1, -1)$, $(0, 4)$ and $(-5, 3)$ are vertices of a triangle. Check whether it is a scalene triangle, isosceles triangle or an equilateral triangle. Also, find the length of its median joining the vertex $(1, -1)$ to the mid-point of the opposite side.

Q33. A square park has each side of 100 m. At each corner, residents made a flower bed in the form of a quadrant of a circle of radius 14 m. Find the area of the remaining portion of the park. What value is depicted by them?

Q34. A container opened from the top and made up of a metal sheet is in the form of a frustum of a cone of height 16 cm with radii of its lower and upper ends as 8 cm and 20 cm respectively. Find the cost of milk which can completely fill the container at the rate of Rs. 20 per litre.