

SUMMATIVE ASSESSMENT-II [2013]

MATHEMATICS

Time allowed: 3 hours]

[Maximum marks :90

General Instructions:

- (i) All questions are compulsory.
- (ii) The question paper consists of **34** questions divided into four section A, B, C and D.
- (iii) Section A contains **8** questions of **one** marks each, which are multiple choice type questions, Section B contains **6** questions of **two** marks each, Section C contains **10** questions of **three** marks each , and Section D contains **10** questions of **four** marks each.
- (iv) Use of calculators is not permitted.

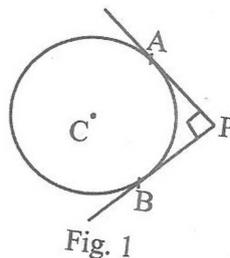
SECTION A

Question numbers 1to 8 carry **one** mark each. In each of these questions, four alternative choices have been provided of which only one is correct. Select the correct choice.

1. The common difference of the AP $\frac{1}{p}, \frac{1-p}{p}, \frac{1-2p}{p}, \dots$ is :

- (A) P
- (B) -p
- (C) -1
- (D) 1

2. In fig. 1, PA and PB are two tangents drawn from an external point P to a circle with centre C and radius 4cm. If $PA \perp PB$, then the length of each tangent is:



- (A) 3cm
- (B) 4cm
- (c) 5cm
- (D)6cm

3. In fig. 2, a circle with centre O is inscribed in a quadrilateral ABCD such that, it touches the sides BC, AB, AD and CD at points P, Q, R and S respectively. If $AB=29\text{cm}$, $AD=23$, $\angle B = 90^\circ$ and $DS=5\text{cm}$, then the radius of the circle (in cm.) is:

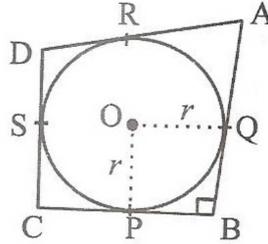
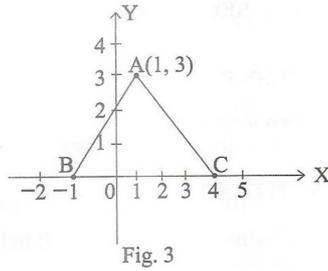


Fig. 2

- (A) 11 (C) 6
 (B) 18 (D) 15
4. The angle of depression of a car, standing on the ground, from the top of a 75m high tower, is 30° . The distance of the car from the base of the tower (in m.) is:
- (A) $25\sqrt{3}$ (C) $75\sqrt{3}$
 (B) $50\sqrt{3}$ (D) 150
5. The probability of getting an even number, when a die is thrown once, is:
- (A) $\frac{1}{2}$ (C) $\frac{1}{6}$
 (B) $\frac{1}{3}$ (D) $\frac{5}{6}$
6. A box contains 90 discs, numbered from 1 to 90. If one disc is drawn at random from the box, the probability that it bears a prime number less than 23, is:
- (A) $\frac{7}{20}$ (C) $\frac{4}{45}$
 (B) $\frac{10}{90}$ (D) $\frac{9}{89}$

7. In fig. 3, the area of triangle ABC (in sq. units) is :

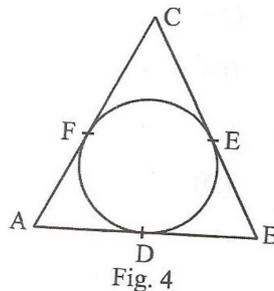


- (A) 15 (C) 7.5
(B) 10 (D) 2.5
8. If the difference between the circumference and the radius of a circle is 37cm, then using $\pi = \frac{22}{7}$, the circumference (in cm) of the circle is:

- (A) 154 (C) 44
(B) 14 (D) 7

SECTION B

9. Solve the following quadratic equation for x : $4\sqrt{3}x^2 + 5x - 2\sqrt{3} = 0$
10. How many three-digit natural numbers are divisible by 7?
11. In fig. 4, a circle inscribed in triangle ABC touches its sides AB, BC and AC at points D, E and F respectively. If $AB = 12\text{cm}$, $BC = 8\text{cm}$ and $AC = 10\text{cm}$, then find the length of AD, BE and CF.



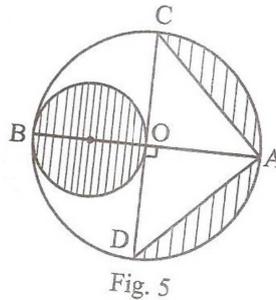
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12. Prove that the parallelogram circumscribing a circle is a rhombus.
 13. A card is drawn at random from a well shuffled pack of 52 playing cards. Find the probability that the drawn card is neither a king nor a queen.
 14. Two circular pieces of equal radii and maximum area, touch each other and are cut from a rectangular card board of dimensions $14\text{cm} \times 7\text{cm}$. Find the area of the remaining card board. [use $\pi = \frac{22}{7}$]

SECTION C

Question Number 15 to 24 carry **three** marks each.

15. For what value of k , are the roots of the quadratic equation $kx(x-2)+6=0$ equal?
 16. Find the number of terms of the AP $18, 15\frac{1}{2}, 13, \dots, -49\frac{1}{2}$ and find the sum of all its terms.
 17. Construct a triangle with sides 5cm, 4cm and 6cm. Then construct another triangle whose sides are $\frac{2}{3}$ times the corresponding sides of first triangle.
 18. The horizontal distance between two poles is 15m. The angle of depression of the top of first pole as seen from the top of second pole is 30° . If the height of the second pole is 24m, find the height of the first pole. [use $\sqrt{3} = 1.732$]
 19. Prove that the points (7, 10), (-2, 5) and (3, -4) are the vertices of an isosceles right triangle.
 20. Find the ratio in which the y-axis divides the line segment joining the points (-4, -6) and (10, 12). Also find the coordinates of the point of division.
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21. In fig. 5, AB and CD are two diameters of a circle with centre O, which are perpendicular to each other. OB is the diameter of the smaller circle. If OA=7cm, find the area of the shaded region. [use $\pi = \frac{22}{7}$]



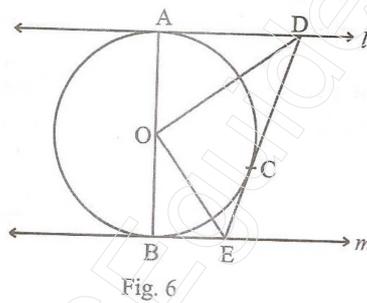
22. A vessel is in the form of a hemispherical bowl surmounted by a hollow cylinder of same diameter. The diameter of the hemispherical bowl is 14cm and the total height of the vessel is 13cm. Find the total surface area of the vessel. [use $\pi = \frac{22}{7}$]
23. A wooden toy was made by scooping out a hemisphere of same radius from each end of a solid cylinder. If the height of the cylinder is 10cm, and its base is of radius 3.5cm, find the volume of wood in the toy. [use $\pi = \frac{22}{7}$]
24. In a circle of radius 21cm, an arc subtends an angle of 60° at the centre. Find :
- (i) The length of the arc (ii) area of the sector formed by the arc.
- [use $\pi = \frac{22}{7}$]

SECTION D

Question Number 25 to 34 carry **four** marks each.

25. Solve the following for x : $\frac{1}{2a+b+2x} = \frac{1}{2a} + \frac{1}{b} + \frac{1}{2x}$

26. The sum of the areas of two squares is 400 cm^2 . If the diameter of their perimeters is 16cm, find the sides of the two squares.
27. If the sum of first 7 terms of an AP is 49 and that of first 17 terms is 289, find the sum of its first n terms.
28. Prove the tangent at any point of a circle is perpendicular to the radius through the point of contact.
29. In fig.6, l and m are parallel tangents to a circle with centre O, touching the circle at A and B respectively. Another tangent at C intersects the line l at D and m at E. Prove that $\angle DOE = 90^\circ$



30. The angle of elevation of the top of a building from the foot of the tower is 30° and the angle of elevation of the top of the tower from the foot of the building is 60° . If the tower is 60m high, find the height of the building.
31. A group consists of 12 persons, of which 3 are extremely patient, other 6 are extremely honest and rest are extremely kind. A person from the group is selected at random. Assuming that each person is equally likely to be selected, find the probability of selecting a person who is
- (i) Extremely patient (ii) extremely kind or honest.
- Which of the above values you prefer more.

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32. The three vertices of a parallelogram ABCD are A(3, -4), B(-1, -3) and C(-6, 2). Find the coordinates of vertex D and find the area of ABCD.
33. Water is flowing through a cylindrical pipe, of internal diameter 2cm, into a cylindrical tank of base radius 40cm, at the rate of 0.4m/s. Determine the rise in level of water in the tank in half an hour.
34. A bucket open at the top and made up of a metal sheet is in the form of a frustum of a cone. The depth of the bucket is 24cm and the diameter of its upper and lower circular ends are 30cm and 10cm respectively. Find the cost of metal sheet used in it at the rate of Rs 10 per 100 cm^2 . [use $\pi = 3.14$]

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