DO NOT OPEN THIS TEST BOOKLET UNTIL YOU ARE TOLD TO DO SO

T.B.C. : SRSU-T-EMT

Test Booklet Series

A

TEST BOOKLET

ELEMENTARY MATHEMATICS

Time Allowed : Two Hours ***Maximum Marks : 100***

INSTRUCTIONS

1. IMMEDIATELY AFTER THE COMMENCEMENT OF THE EXAMINATION, YOU SHOULD CHECK THAT THIS TEST BOOKLET DOES ***NOT*** HAVE ANY UNPRINTED OR TORN OR MISSING PAGES OR ITEMS, ETC. IF SO, GET IT REPLACED BY A COMPLETE TEST BOOKLET.
2. **Please note that it is the candidate's responsibility to encode and fill in the Roll Number and Test Booklet Series A, B, C or D carefully and without any omission or discrepancy at the appropriate places in the OMR Answer Sheet. Any omission/discrepancy will render the Answer Sheet liable for rejection.**
3. You have to enter your Roll Number on the Test Booklet in the Box provided alongside. ***DO NOT*** write ***anything else*** on the Test Booklet.
4. This Test Booklet contains **100** items (questions). Each item is printed both in ***Hindi*** and ***English***. Each item comprises four responses (answers). You will select the response which you want to mark on the Answer Sheet. In case you feel that there is more than one correct response, mark the response which you consider the best. In any case, choose ***ONLY ONE*** response for each item.
5. You have to mark all your responses ***ONLY*** on the separate Answer Sheet provided. See directions in the Answer Sheet.
6. ***All*** items carry equal marks.
7. Before you proceed to mark in the Answer Sheet the response to various items in the Test Booklet, you have to fill in some particulars in the Answer Sheet as per instructions sent to you with your Admission Certificate.
8. After you have completed filling in all your responses on the Answer Sheet and the examination has concluded, you should hand over to the Invigilator ***only the Answer Sheet***. You are permitted to take away with you the Test Booklet.
9. Sheets for rough work are appended in the Test Booklet at the end.
10. **Penalty for wrong answers :**

    THERE WILL BE PENALTY FOR WRONG ANSWERS MARKED BY A CANDIDATE IN THE OBJECTIVE TYPE QUESTION PAPERS.

    (i) There are four alternatives for the answer to every question. For each question for which a wrong answer has been given by the candidate, **one-third** of the marks assigned to that question will be deducted as penalty.

    (ii) If a candidate gives more than one answer, it will be treated as a **wrong answer** even if one of the given answers happens to be correct and there will be same penalty as above to that question.

    (iii) If a question is left blank, i.e., no answer is given by the candidate, there will be **no penalty** for that question.

DO NOT OPEN THIS TEST BOOKLET UNTIL YOU ARE TOLD TO DO SO

ध्यान दें : अनुदेशों का हिन्दी रूपान्तर इस पुस्तिका के मुख पृष्ठ पर छपा है ।

1. If $a : b : c : d = \sqrt{4} : \sqrt{3} : \sqrt{2} : \sqrt{1}$, then what is the value of $\frac{(-a^2 + b^2 + c^2 + d^2)}{(a^2 - b^2 + c^2 - d^2)}$?

(a) 1

(b) 2

(c) 3

(d) 6

2. The speeds of four cars are 2u, 3u, 4u and xu and the time taken by them to cover the same distance is xt, 4t, 3t and 2t respectively, where x, u, t are real numbers. What is the value of x ?

(a) 8

(b) 6

(c) 5

(d) 2

3. If $m : n = 1 : 2$ and $p : q = 3 : 4$, then what is $(2m + 4p) : (n + 3q)$ equal to ?

(a) 1 : 1

(b) 1 : 3

(c) 2 : 1

(d) 2 : 3

4. If the rate of interest is 5%, then what would be the difference between compound interest and simple interest received on ₹ 10,000 (each) after 3 years from now ?

(a) ₹ 175·25

(b) ₹ 152·25

(c) ₹ 76·25

(d) ₹ 24·25

5. A person bought a book at $3/4^{th}$ of its listed price and sold it at 50% more than its listed price. What is the percentage of gain in the transaction ?

(a) 20%

(b) 40%

(c) 75%

(d) 100%

6. If the difference between the interior and exterior angles of a regular polygon is 144°, then what is the number of sides of the polygon ?

(a) 12

(b) 16

(c) 18

(d) 20

7. If the sum and product of the roots of a quadratic equation are 2 and -100 respectively, then which one of the following is correct ?

(a) There are infinitely many such equations having different roots.

(b) There is only one such equation which is $x^2 + 2x - 100 = 0$.

(c) There is only one such equation which is $x^2 - 2x - 100 = 0$.

(d) There is no such equation.

8. If 2 is a zero of the polynomial $p(x) = x^3 + 3x^2 - 6x - a$, then what is the sum of the squares of the other zeros of the polynomial ?

(a) 10

(b) 17

(c) 21

(d) 37

9. If $t = \cos 79°$, then what is $\text{cosec } 79° (1 - \cos 79°)$ equal to ?

(a) $\sqrt{\frac{1+t}{1-t}}$

(b) $\frac{t}{\sqrt{1-t^2}}$

(c) $\frac{\sqrt{1-t^2}}{t}$

(d) $\sqrt{\frac{1-t}{1+t}}$

10. Suppose $p(x) = x^4 + a_3x^3 + a_2x^2 + a_1x + a_0$ and $q(x) = x^4 + b_3x^3 + b_2x^2 + b_1x + b_0$ are the polynomials. If $\alpha, \beta, \gamma, \delta$ are zeros of $p(x)$ and $\alpha, \beta, \gamma, \lambda$ are zeros of $q(x)$, then what is $\frac{p(x) - q(x)}{(x-\alpha)(x-\beta)(x-\gamma)}$ equal to ?

(a) $-\lambda + \delta$

(b) $\lambda - \delta$

(c) $\lambda + \delta$

(d) $-\lambda - \delta$

11. If the equation $x \cos \theta = x^2 + p$ has a real solution for every θ where $0 \leq \theta \leq \frac{\pi}{4}$, then which one of the following is correct ?

(a) $p = 1/8$

(b) $p \leq 1/8$

(c) $p \geq 1/8$

(d) $p \leq 1/4$

12. What is the difference between the greatest value and the least value of $\cos^2 \theta + 3 \sin^2 \theta + 2$?

(a) 4

(b) 3

(c) 2

(d) 1

13. ABC is a right-angled triangle, right-angled at B such that AB = 6 cm and BC = 8 cm. What is the perimeter of the square inscribed in the triangle ABC with maximum area ?

(a) 24/7 cm

(b) 96/7 cm

(c) 24 cm

(d) 32 cm

14. What is the greatest value of k for which $2x^2 - 4x + k = 0$ has real roots ?

(a) 1

(b) 2

(c) 3

(d) 4

15. Consider the following data :

110, 41, 43, 95, 127, 99, 61, 92, 71, 93, 110, 36.

If 93 is replaced by 94, then consider the following statements :

1. The difference between new median and old median is 1.
2. The difference between new mean and old mean is less than 0·1.
3. The difference between new mode and old mode is zero.

Which of the statements given above are correct ?

(a) 1 and 2 only

(b) 2 and 3 only

(c) 1 and 3 only

(d) 1, 2 and 3

16. What is the digit at the 100^{th} place of number $(225)^{40}$?

(a) 6

(b) 5

(c) 4

(d) 2

17. If a, b, c, d are natural numbers, then how many possible remainders are there when $1^a + 2^b + 3^c + 4^d$ is divided by 10 ?

(a) 3

(b) 4

(c) 5

(d) 6

18. If n is a natural number, then what is the sum of all distinct remainders of $4^n + 6^n + 9^n + 11^n$ when divided by 10 for various values of n ?

(a) 3

(b) 4

(c) 6

(d) 7

19. When the number (12345678910111213 ... 99100) is divided by 16, what will be the remainder ?

(a) 15

(b) 12

(c) 4

(d) 3

20. A, B, C, D can complete a work in 3, 6, 9, 12 hours respectively. Further, only one person can work at a time in each hour and nobody can work for two consecutive hours. It is not necessary to engage all. What is the minimum number of hours that they will take to finish the work ?

(a) 36/25

(b) 12/5

(c) 4

(d) 2

21. If $p = \sqrt[3]{\left(a+\sqrt{a^2+b^3}\right)} + \sqrt[3]{\left(a-\sqrt{a^2+b^3}\right)}$, then what is $p^3 + 3bp$ equal to ?

(a) $-2a$

(b) a

(c) $2a$

(d) $3a$

22. A plank of wood 4·25 m long and 3·4 m wide is to be cut into square pieces of equal size. How many square pieces of largest size can be cut from the plank, if no wastage is allowed ?

(a) 45

(b) 90

(c) 400

(d) 500

23. What is the HCF of $x^4 - 13x^2y^2 - 300y^4$, $x^3 - 4x^2y - 4xy^2 - 5y^3$ and $x^3 - 125y^3$?

(a) $x - 5y$

(b) $x + 5y$

(c) $x^2 + 5xy + 25y^2$

(d) 1

24. If HCF of 768 and x^6y^2 is 32xy for natural numbers $x \geq 2$, $y \geq 2$, then what is the value of $(x + y)$?

(a) 5

(b) 7

(c) 9

(d) 11

25. What is the smallest natural number n such that $(n + 1) \times n \times (n - 1) \times (n - 2) \times \ldots 3 \times 2 \times 1$ is divisible by 910 ?

(a) 91

(b) 90

(c) 13

(d) 12

26. The expression $555^{777} + 777^{555}$ is divisible by which of the following ?

1. 2
2. 3
3. 37

Select the correct answer using the code given below :

(a) 1 and 2 only

(b) 2 and 3 only

(c) 1 and 3 only

(d) 1, 2 and 3

27. Consider the following statements :

1. If $(3m^3 + 2m^2 + 5m + n)/m$ is not an integer, where m and n are integers, then n is not divisible by m.
2. $5(8^m) + 2^{3m}$ is divisible by 48 for all whole numbers m.

Which of the statements given above is/are correct ?

(a) 1 only

(b) 2 only

(c) Both 1 and 2

(d) Neither 1 nor 2

28. The sum of two positive numbers is 40. If the GM of these two numbers is lower than their AM by 20%, then what is the difference between the two numbers ?

(a) 12

(b) 18

(c) 24

(d) 28

29. 50 men can complete a work in 40 days. They begin the work together but a batch of 5 men left after each period of 10 days. What is the time to complete the work ?

(a) 45 days

(b) 50 days

(c) 55 days

(d) 60 days

30. If $x = \cfrac{1}{2+\cfrac{3}{4+\cfrac{5}{6+\cfrac{7}{8+\cfrac{9}{10}}}}}$,

then which one of the following is correct ?

(a) $0 < x < 0{\cdot}5$

(b) $x = 0{\cdot}5$

(c) $0{\cdot}5 < x < 1{\cdot}0$

(d) $x > 1{\cdot}0$

31. A bottle contains spirit and water in the ratio 1 : 4 and another identical bottle contains spirit and water in the ratio 4 : 1. In what ratio should the mixtures in the two bottles be mixed to get a new mixture in which the ratio of spirit to water is 1 : 3 ?

(a) 5 : 1

(b) 6 : 1

(c) 10 : 1

(d) 11 : 1

32. If $3 \sin\theta + 5 \cos\theta = 5$, then what is the value of $5 \sin\theta - 3 \cos\theta$?

(a) -3

(b) -2

(c) 5

(d) 8

33. Consider the following in respect of the polynomial $x^{4k} + x^{4k+2} + x^{4k+4} + x^{4k+6}$:

1. The remainder is zero when the polynomial is divided by $x^2 + 1$.
2. The remainder is zero when the polynomial is divided by $x^4 + 1$.

Which of the statements given above is/are correct ?

(a) 1 only

(b) 2 only

(c) Both 1 and 2

(d) Neither 1 nor 2

34. What is the minimum value of $\frac{\sin^2 A + 5\sin A + 1}{\sin A}$ for $0 < A \leq \frac{\pi}{2}$?

(a) 3

(b) 5

(c) 7

(d) 9

35. What is $\frac{3}{1^2 \times 2^2} + \frac{5}{2^2 \times 3^2} + \frac{7}{3^2 \times 4^2} + \ldots$ equal to ?

(a) 1

(b) 4

(c) 7

(d) 9

36. If $\cfrac{1}{a + \cfrac{1}{b + \cfrac{1}{c + \cfrac{1}{d + \cfrac{1}{e}}}}} = \frac{421}{972}$,

then what is the value of $a \times b \times c \times d \times e$?

(a) 720

(b) 480

(c) 360

(d) 60

37. A cube whose edge is 14 cm long has on each of its faces a circle of 7 cm radius painted yellow. What is the total area of unpainted surface ? (Take $\pi = \frac{22}{7}$)

(a) 126 square cm

(b) 189 square cm

(c) 252 square cm

(d) 315 square cm

38. From a circular metal plate of radius 7 cm and thickness 0·16 mm, a sector is cut off containing an angle 150°. The remaining piece is moulded into a spherical bead of radius r. What is the value of r in cm ?

(a) 0·35

(b) 0·7

(c) 1·05

(d) 1·4

39. The chord AB of a circle with centre at O is $2\sqrt{3}$ times the height of the minor segment. If P is the area of the sector OAB and Q is the area of the minor segment of the circle, then what is the approximate value of $\frac{P}{Q}$?

(Take $\sqrt{3} = 1{\cdot}7$ and $\pi = 3{\cdot}14$)

(a) 1·4

(b) 1·7

(c) 2·2

(d) 2·6

40. What is the area of the region between two concentric circles, if the length of a chord of the outer circle touching the inner circle at a particular point of its circumference is 14 cm ? (Take $\pi = \frac{22}{7}$)

(a) 154 square cm

(b) 144 square cm

(c) 132 square cm

(d) Cannot be determined due to insufficient data

41. In a right-angled triangle ABC, AB = 15 cm, BC = 20 cm and AC = 25 cm. Further, BP is the perpendicular on AC. What is the difference in the area of triangles PAB and PCB ?

(a) 40 square cm

(b) 42 square cm

(c) 45 square cm

(d) 48 square cm

42. Let the positive numbers $a_1, a_2, a_3, ..., a_{3n}$ be in GP. If P is the GM of $a_1, a_2, a_3, ..., a_n$ and Q is the GM of $a_{n+1}, a_{n+2}, a_{n+3}, ..., a_{3n}$, then what is the GM of 3n numbers ?

(a) P^2Q

(b) PQ^2

(c) $\sqrt{PQ}$

(d) $P^{1/3} Q^{2/3}$

43. The cost price of y articles is equal to selling price of z articles. If y : z = 5 : 4, what is the profit percentage ?

(a) 20%

(b) 25%

(c) 30%

(d) 40%

44. A sum of money invested at simple interest triples itself in 8 years and becomes n times in 20 years. What is the value of n ?

(a) 5

(b) 6

(c) 7·5

(d) 9

45. If the work done by x men in (x + 1) days is equal to the work done by (x + 5) men in (x – 2) days, then what is the value of x ?

(a) 5

(b) 6

(c) 7

(d) 8

46. If (a + b) : (b + c) : (c + a) = 5 : 7 : 6, then what is the value of (a – b + c) : (a + b – c) ?

(a) 1 : 1

(b) 2 : 3

(c) 3 : 1

(d) 4 : 3

47. Let x be the compound interest at the end of 3 years on a sum of ₹ 1000 at the rate of 10% compounded annually and y be the simple interest at the end of 3 years on a sum of ₹ 1000 at the annual rate of 11%. What is the difference between x and y ?

(a) ₹ 16

(b) ₹ 15

(c) ₹ 5

(d) ₹ 1

48. In a quadrilateral ABCD, AB = 6 cm, BC = 18 cm, CD = 6 cm and DA = 10 cm. If the diagonal BD = x, then which one of the following is correct ?

(a) $8 < x < 12$

(b) $12 < x < 16$

(c) $16 < x < 18$

(d) $18 < x < 20$

49. In a quarter circle of radius R, a circle of radius r is inscribed. What is the ratio of R to r ?

(a) $(\sqrt{2} + 1) : 1$

(b) $(\sqrt{3} + 1) : 1$

(c) 3 : 2

(d) 5 : 4

50. In a quadrilateral ABCD, AB = BC and CD = DA; AC and BD are diagonals such that AC = 6 cm and BD = 12 cm. What is the area of the quadrilateral ?

(a) 24 square cm

(b) 30 square cm

(c) 36 square cm

(d) 40 square cm

51. If $\tan(3A) = \cot(A - 22°)$, where 3A is an acute angle, then what is the value of A ?

(a) 25°

(b) 27°

(c) 28°

(d) 30°

52. If $\frac{\sin\theta - \cos\theta + 1}{\sin\theta + \cos\theta - 1} = p \sec\theta + q \tan\theta$, where $0 < \theta < \frac{\pi}{2}$, then what is p + q equal to ?

(a) 0

(b) 1

(c) 2

(d) 4

53. The angles of elevation of the top of a tower from two points A and B at a distance of x m and (x + 5) m from the base of the tower of height 6 m and in the same straight line with it are complementary. What is the value of x ?

(a) 4 m

(b) 5 m

(c) 6 m

(d) 9 m

54. Consider the following statements :

1. In a triangle ABC, if $\sin A + \sin B + \sin C = \frac{3\sqrt{3}}{2}$, then the triangle can be equilateral.
2. In a triangle ABC, if $\cos A + \cos B + \cos C = \frac{3}{2}$, then the triangle can be equilateral.

Which of the statements given above is/are correct ?

(a) 1 only

(b) 2 only

(c) Both 1 and 2

(d) Neither 1 nor 2

55. Two trains A and B leave Delhi for Hyderabad at 7:00 a.m. and 7:50 a.m. on the same day and travel at 80 kmph and 100 kmph respectively. After how many kilometers from Delhi will the two trains be together ?

(a) $\frac{200}{3}$ km

(b) 100 km

(c) $\frac{400}{3}$ km

(d) $\frac{1000}{3}$ km

56. The length, breadth and height of a cuboid are increased by 10%, 20% and 50% respectively. What is the percentage increase in volume of the cuboid ?

(a) 100%

(b) 99%

(c) 98%

(d) 50%

57. ₹ 9400 is distributed among P, Q, R in such a way that if ₹ 93, ₹ 24, ₹ 55 are deducted from their respective shares, then they have money in the ratio 3 : 4 : 5. What is the share of P ?

(a) ₹ 2307

(b) ₹ 2376

(c) ₹ 2508

(d) ₹ 2896

58. If P^2 varies as R and Q^2 varies as R, $(P \neq Q)$, then which of the following are correct ?

1. $P^2 + Q^2$ varies as R.
2. PQ varies as R.
3. $P^2 - Q^2$ varies as R.

Select the correct answer using the code given below :

(a) 1 and 2 only

(b) 2 and 3 only

(c) 1 and 3 only

(d) 1, 2 and 3

59. p number of men can finish a piece of work in q days. If there are 50% more men, then the work will be finished 12 days earlier. What is the value of q ?

(a) 48

(b) 40

(c) 36

(d) Cannot be determined due to insufficient data

60. What is the minimum value of $\left(\frac{a^2+3a+1}{a}\right)\left(\frac{b^2+3b+1}{b}\right)$ for a, b > 0 ?

(a) 1

(b) 9

(c) 16

(d) 25

Consider the following for the next ***ten (10)*** *items that follow :*

Each item contains a Question followed by two Statements. Answer each item using the following instructions :

Choose option

(a) If the Question can be answered by one of the Statements alone, but not by the other.

(b) If the Question can be answered by either Statement alone.

(c) If the Question can be answered by using both the Statements together, but cannot be answered by using either Statement alone.

(d) If the Question cannot be answered even by using both Statements together.

61. Let a, b, c and d be positive integers.

Question : Which one of a, b, c, d is closest to the product abcd ?

Statement-I : $a > b > c$

Statement-II : c is not the smallest.

62. Let mn = k, where m and n are prime numbers and k is an even number.

Question : What is the value of $mn - n + 1$?

Statement-I : $m > n$

Statement-II : One of the numbers is 2.

63. *Question :* If p is a positive integer, then what is the remainder when p^n is divided by $p + 1$?

Statement-I : n is even.

Statement-II : p is even.

64. *Question :* Is xy positive ?

Statement-I : $x = \sqrt[3]{-0{\cdot}19683}$

Statement-II : $y = \sqrt[3]{x}$

65. Let a, b and c be the sides of a triangle ABC.

Question : Is the triangle equilateral ?

Statement-I : $a^2 + b^2 + c^2 = (ab + bc + ca)$

Statement-II : $3a^2 + 3b^2 + 4c^2 = 2ab + 4bc + 4ca$

66. Area of a rectangle with length x and breadth y is P and area of a parallelogram (which is strictly not a rectangle) with adjacent sides of length x and y is Q.

Question : Is $P > Q$?

Statement-I : $x : y = 2 : 1$

Statement-II : The angle between the two adjacent sides of the parallelogram is 60°.

67. A circle touches all the four sides AB, BC, CD, DA of a quadrilateral ABCD.

Question : What is the perimeter of the quadrilateral ?

Statement-I : AB + DC = 10 cm

Statement-II : AD + BC = 10 cm

68. *Question :* What is the ratio of the lengths of diagonals of a rhombus ?

Statement-I : One diagonal of the rhombus is equal to its side.

Statement-II : The longer diagonal of the rhombus is equal to $\sqrt{3}$ times its side.

69. The chord of a circle of radius R touches at a point on the circumference of a concentric circle of radius r. The length of the chord is 24 units.

Question : What are the values of r and R ?

Statement-I : r is an integer.

Statement-II : R is an integer.

70. P, Q, R, S are the mid-points of sides AB, BC, CD, DA respectively of a quadrilateral ABCD.

Question : What is the difference in the area of the quadrilateral ABCD and the area of the quadrilateral PQRS ?

Statement-I : Area of the quadrilateral ABCD is 100 square unit.

Statement-II : Area of the quadrilateral PQRS is 50 square unit.

Consider the following for the next ***two (02)*** *items that follow :*

In a pie-diagram (with radius 7 cm), the central angles of the sectors are in the ratio 2 : 3 : 7 : 5 : 1. (Take $\pi = \frac{22}{7}$)

71. If P is the area of the smallest sector and Q is the area of the largest sector, then what is P + Q equal to ?

(a) $\frac{88}{3}$ square cm

(b) $\frac{77}{3}$ square cm

(c) $\frac{149}{6}$ square cm

(d) $\frac{616}{9}$ square cm

72. If p is the perimeter of the smallest sector, then what is the value of 9p ?

(a) 142 cm

(b) 148 cm

(c) 156 cm

(d) 221 cm

Consider the following for the next ***three (03)*** *items that follow :*

Two trains A and B started from stations P and Q respectively towards each other. Train A started at 7 p.m. at a speed of 60 km/hr and train B started at 4 a.m. (next day) at a speed of 90 km/hr. The distance between the two stations P and Q is 800 km.

73. How far from station Q will the two trains meet ?

(a) 104 km

(b) 144 km

(c) 156 km

(d) 504 km

74. At what time will the two trains meet ?

(a) 5:28 a.m.

(b) 5:44 a.m.

(c) 4:56 a.m.

(d) 6:24 a.m.

75. If the lengths of the two trains A and B are 400 m and 500 m respectively, then what is the time taken by them to cross each other ?

(a) 21·6 seconds

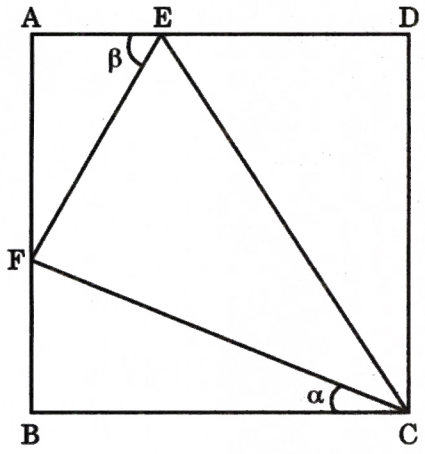
(b) 18·2 seconds

(c) 17·4 seconds

(d) 15·4 seconds

*Consider the following for the next **three (03)** items that follow :*

A triangle CEF is drawn inside a square ABCD as shown in the figure given below. Given : CF = 8 cm, EF = 6 cm and CE = 10 cm.



76. What is the area of the square ?

(a) $\frac{512}{17}$ square cm

(b) $\frac{625}{13}$ square cm

(c) $\frac{1024}{17}$ square cm

(d) $\frac{1296}{13}$ square cm

77. What is $\tan\alpha + \tan\beta$ equal to ?

(a) $\frac{13}{16}$

(b) $\frac{15}{16}$

(c) $\frac{17}{16}$

(d) $\frac{17}{4}$

78. What is the area of triangle CDE ?

(a) $\frac{416}{17}$ square cm

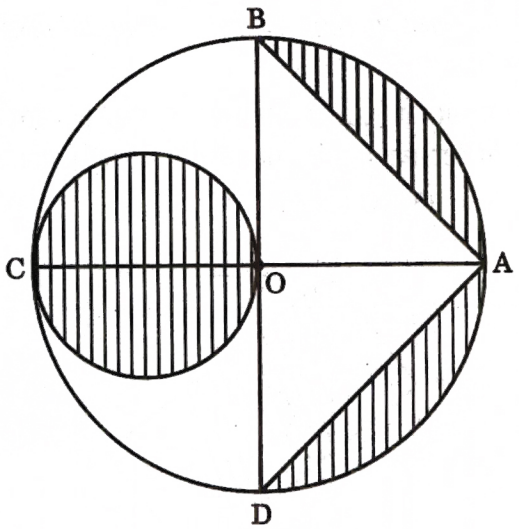
(b) $\frac{312}{13}$ square cm

(c) $\frac{208}{17}$ square cm

(d) $\frac{156}{13}$ square cm

*Consider the following for the next **two (02)** items that follow :*

ABCD is a circle with centre O and taking OC as a diameter, a circle is drawn as shown in the figure given below. Let OB = 7 cm. (Use $\pi = \frac{22}{7}$)



79. What is the area of the shaded region ?

(a) 38·5 square cm

(b) 48 square cm

(c) 52·5 square cm

(d) 66·5 square cm

80. What is the ratio of the area of the shaded region to the area of the non-shaded region ?

(a) $\frac{19}{25}$

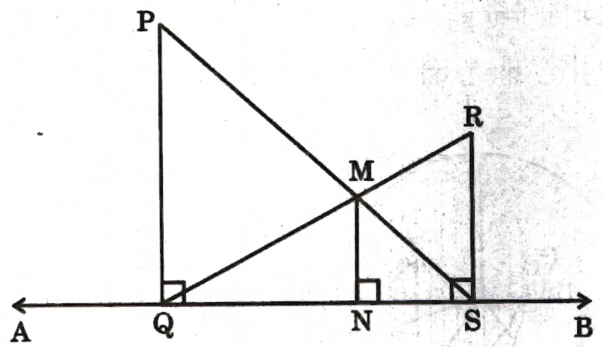
(b) $\frac{18}{25}$

(c) $\frac{17}{25}$

(d) $\frac{16}{25}$

*Consider the following for the next **two (02)** items that follow :*

Let two parallel line segments PQ = 5 cm and RS = 3 cm be perpendicular to a horizontal line AB, as shown in the figure given below. The point of intersection of PS and QR is M and MN is perpendicular to QS.



81. What is the length of MN ?

(a) $\frac{3}{8}$ cm

(b) $\frac{5}{8}$ cm

(c) $\frac{9}{8}$ cm

(d) $\frac{15}{8}$ cm

82. What is the ratio of the area of the quadrilateral PQNM to the area of the quadrilateral RSNM ?

(a) $\frac{200}{117}$

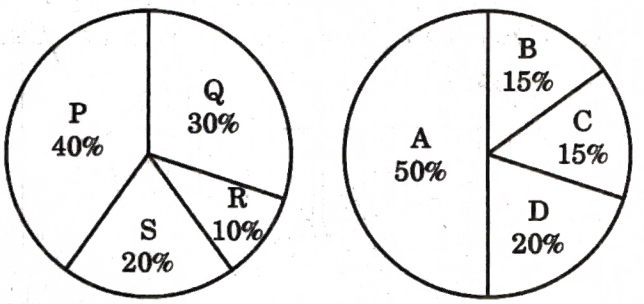
(b) $\frac{212}{117}$

(c) $\frac{275}{117}$

(d) $\frac{250}{117}$

*Consider the following for the next **three (03)** items that follow :*

The following Pie-Chart-I shows the people migrating to Delhi from different Indian States (P, Q and R are three different States and S is the combined group of other States) and Pie-Chart-II indicates the different age groups A, B, C and D of these migrating people for each State.



83. If the people coming from a particular State belonging to S are 15% and 24,000 in number, then what is the total number of migrating people belonging to the age group B ?

(a) 1·2 lac

(b) 1·25 lac

(c) 1·30 lac

(d) 1·50 lac

84. What is the maximum of differences between the number of people coming from different groups P, Q, R and S ?

(a) 1·6 lac

(b) 1·8 lac

(c) 2·4 lac

(d) 2·6 lac

85. What is the difference between number of people coming from R having age group A and those coming from Q having age group D ?

(a) 6,000

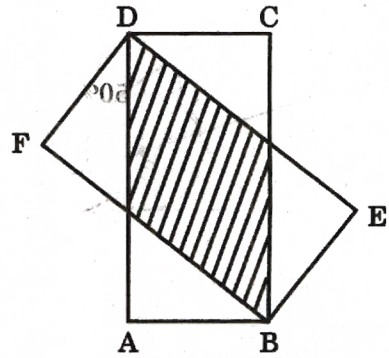
(b) 8,000

(c) 12,000

(d) 18,000

*Consider the following for the next **two (02)** items that follow :*

Consider two identical rectangles ABCD and BEDF as shown in the figure given below. Let AB = 1 cm and BC = 2 cm.



86. What is the area of the overlapping region ?

(a) $\frac{8}{5}$ square cm

(b) $\frac{5}{4}$ square cm

(c) $\frac{4}{5}$ square cm

(d) $\frac{3}{4}$ square cm

87. What is the area of the non-overlapping region ?

(a) $\frac{3}{4}$ square cm

(b) $\frac{11}{4}$ square cm

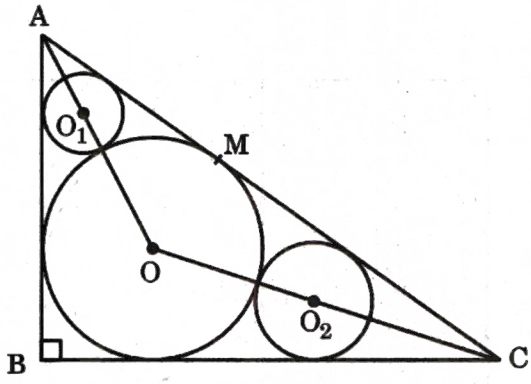
(c) $\frac{3}{2}$ square cm

(d) $\frac{5}{4}$ square cm

Consider the following for the next ***three (03)*** *items that follow :*

ABC is a right-angled triangle with $\angle ABC = 90°$. The centre of the incircle of the given triangle is at O, whose radius is 2 cm. Two more circles with centres at O_1 and O_2, touch this circle and the two sides as shown in the figure given below.

Further, MA : MC = 2 : 3.



88. What is AB + BC equal to ?

(a) 10 cm

(b) 12 cm

(c) 13 cm

(d) 14 cm

89. What is the radius of the circle with centre at O_1 ?

(a) $4 - \sqrt{5}$

(b) $1 + \sqrt{5}$

(c) $2 + \sqrt{5}$

(d) $3 - \sqrt{5}$

90. What is the radius of the circle with centre at O_2 ?

(a) $5 - \sqrt{10}$

(b) $1 + 2\sqrt{5}$

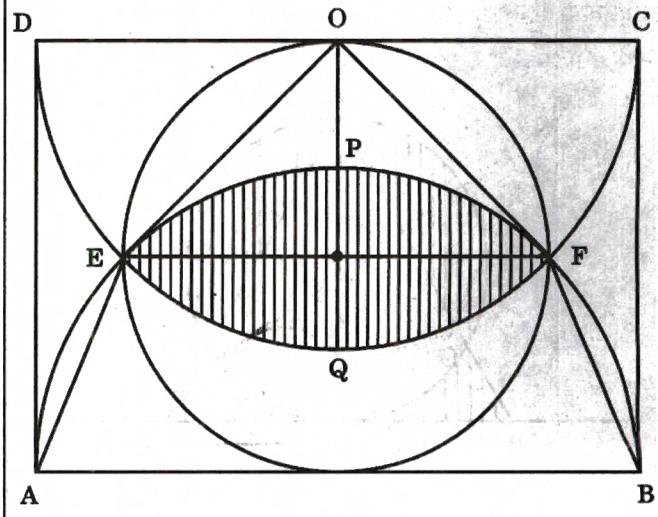
(c) $\dfrac{22 - 4\sqrt{10}}{9}$

(d) $\dfrac{22 - 2\sqrt{10}}{9}$

Consider the following for the next ***three (03)*** *items that follow :*

Consider two identical semicircles and one circle inscribed in a rectangle of length 10 cm as shown in the figure given below.

(Take $\pi = 3{\cdot}14$ and $\sqrt{2} = 1{\cdot}4$).



91. What is the area of triangle EOF ?

(a) $12{\cdot}5\sqrt{3}$ square cm

(b) $6{\cdot}25\sqrt{3}$ square cm

(c) 12·5 square cm

(d) 6·25 square cm

92. What is the area of trapezium AEFB ?

(a) 30 square cm

(b) 25 square cm

(c) 20 square cm

(d) 18·75 square cm

93. What is the area of the shaded region ?

(a) 14·75 square cm

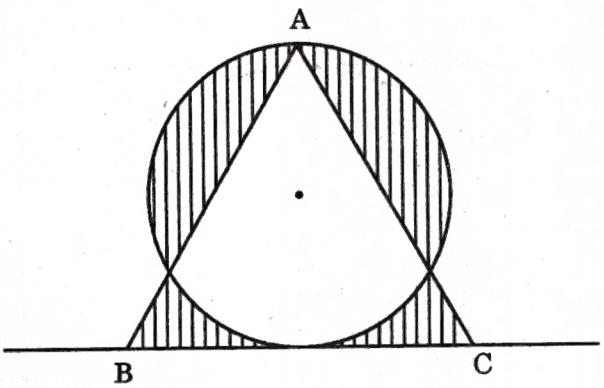
(b) 14·25 square cm

(c) 7·225 square cm

(d) 7·625 square cm

Consider the following for the next ***two (02)*** *items that follow :*

Consider a circle of area 9π square unit and an equilateral triangle ABC as shown in the figure given below.



94. What is the length of the side of the triangle ABC ?

(a) $2\sqrt{3}$ unit

(b) $4\sqrt{3}$ unit

(c) $6\sqrt{3}$ unit

(d) $8\sqrt{3}$ unit

95. What is the area of the shaded region ?

(a) $6(\pi + \sqrt{3})$ square unit

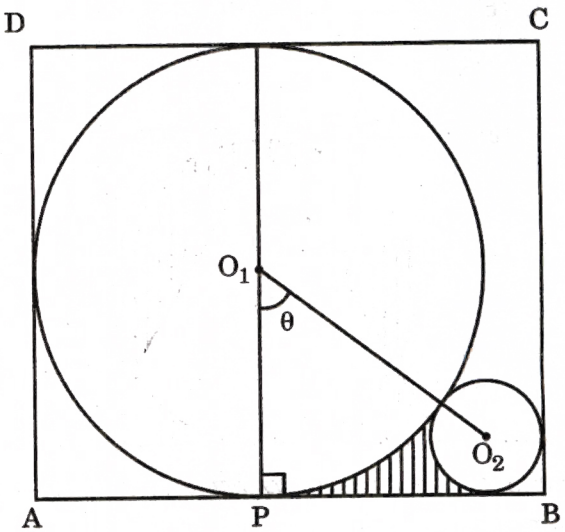
(b) $3(\pi + 2\sqrt{3})$ square unit

(c) $1{\cdot}5(3\pi + 8\sqrt{3})$ square unit

(d) $6(\pi + 2\sqrt{3})$ square unit

Consider the following for the next ***three (03)*** *items that follow :*

Two circles with centres at O_1 and O_2 touching each other are placed inside a rectangle of sides 9 cm and 8 cm as shown in the figure given below.



96. What is the sum of the areas of the two circles ?

(a) 17π square unit

(b) $16{\cdot}75\pi$ square unit

(c) $16{\cdot}5\pi$ square unit

(d) $16{\cdot}25\pi$ square unit

97. Which one of the following is correct in respect of angle θ ?

(a) $0 < \theta < 30°$

(b) $30° < \theta < 45°$

(c) $45° < \theta < 60°$

(d) $60° < \theta < 90°$

98. What is the area of the shaded region ?

(a) $\frac{240-10\pi-\pi\theta}{24}$ square unit

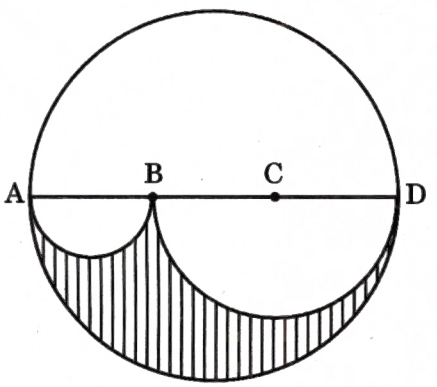
(b) $\frac{240-6\pi-\pi\theta}{24}$ square unit

(c) $\frac{120-12\pi-\pi\theta}{24}$ square unit

(d) $\frac{240-12\pi-\pi\theta}{24}$ square unit

Consider the following for the next ***two (02)*** *items that follow :*

Let ABCD be the diameter of a circle of radius 6 cm. The lengths AB, BC and CD are equal. Semi-circles are drawn with AB and BD as diameters as shown in the figure given below.



99. What is the ratio of the area of the shaded region to that of the non-shaded region ?

(a) 2 : 7

(b) 2 : 5

(c) 3 : 5

(d) 5 : 8

100. What is the perimeter of the shaded region ?

(a) 24π cm

(b) 18π cm

(c) 15π cm

(d) 12π cm

कच्चे काम के लिए जगह
SPACE FOR ROUGH WORK

कच्चे काम के लिए जगह
SPACE FOR ROUGH WORK