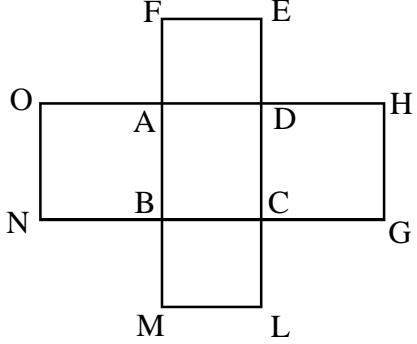44. The lines joining the points (1, 4), (-5,4), (-5, 3) and (1, -3) is a :
   (A) rectangle   (B) square
   (C) rhombus   (D) none of these

45. The HCF and LCM of two polynomials are $(x-2)$ and $(x^3 + 6x^2 - x - 30)$ respectively. If one of the polynomials is $(x^2 + x - 6)$, then the other polynomial is :
   (A) $x^2 - 7x + 10$ (B) $x^2 - 5x + 10$
   (C) $x^2 - 4x + 10$ (D) $x^2 + 3x - 10$

46. In the given diagram ABCD is a rectangle and ADEF, CDHG, BCLM, ABNO are four squares. If the perimeter of ABCD is 16cm and total area of the four squares is 68cm², then the area of ABCD is equal to :

   (A) 15cm²   (B) 20cm²
   (C) 25cm²   (D) 30cm²

47. If $y = f(x) = \dfrac{x+2}{x-1}$, then it is

incorrect to say :
   (A) $x = \dfrac{y+2}{y-1}$ (B) $f(0) = -2$
   (C) $f(1) = 0$ (D) $f(y) = x$

48. A hemispherical bowl of internal radius 9cm is full of water. This water is to be filled in cylinderical bottles of diameter 3cm and height 4cm. Then, the number of bottles needed to fill the water of the bowl is :
   (A) 50   (B) 52
   (C) 54   (D) 56

49. What is the probability of picking up a black ball from an urn containing 5 white balls, 3 red balls, 4 black balls and 8 green balls?
   (A) $\dfrac{1}{5}$ (B) $\dfrac{1}{3}$
   (C) $\dfrac{1}{4}$ (D) $\dfrac{1}{8}$

50. The length of two chords of a circle are 6cm and 8cm. If the smaller chord is at a distance of 4cm from the centre, the distance of the other chord from the centre is :
   (A) 5cm   (B) 6cm
   (C) 4cm   (D) 3cm

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SPACE FOR ROUGH WORK

24ᵗʰMIX
(MATHEMATICS)

Time Allowed 1 hour   Maximum Marks : 100

Read the following instructions carefully before you begin to answer the questions.

1. This booklet contains 50 questions in all.
2. All questions are compulsory and each question carries 2 marks.
3. Before you start to answer the questions you must check up this booklet and ensure that it contains all the pages 7(Seven) and see that no page is missing or repeated. If you find any defect in this Booklet, you must replace it immediately.
4. There will **NOT** be any negative marking for wrong answers.
5. You are required to fill the information on the answer sheet which you will get in the examination hall by **H.B. pencil or BALL point pen.**
6. **Answer Sheet** and **Question Paper** will be supplied in examination hall. After the test is over, you should hand over the answer sheet to the invigilator before leaving the room.
7. You should write your **Name, Roll No.,** carefully on the space provided in the answer sheet. Otherwise you will be awarded **ZERO** mark.
8. If you wish to change your answer, **ERASE** completely the darkened circle by using an **ERASER** and then blacken the new circle. If not erased completely, smudges will be left on the erased circle and the question will be read as having two answer and will be ignored for giving any credit.
9. Answer the questions as quickly and as carefully as you can. Some questions may be difficult and others easy. Do not spend too much time on any question.
10. You are not allowed to leave the examination hall until you are advised to do so by the invigilator.

1. The real factors of $x^2 + 4$ are :

   (A) $(x^2 + 2)(x^2 + 2)$

   (B) $(x^2 + 2)(x^2 - 2)$

   (C) $x^2(x^2 + 4)$

   (D) $(x^2 - 2x + 2)(x^2 + 2x + 2)$

2. The abscissa and ordinate of a point are natural numbers. Then the point lies in :

   (A) 1st quadrant   (B) 2nd quadrant

   (C) 3rd quadrant   (D) 4th quadrant

3. ABCD is a rhombus and E is the mid point of BC. If DE and AB when produced meets at F, then AF is equal to :

   (A) $\frac{3}{2}AB$ (B) 4BE

   (C) 3AB   (D) 2BE

4. With a rational denominator, the expression $\dfrac{\sqrt{2}}{\sqrt{2} + \sqrt{3} - \sqrt{5}}$ is equivalent to :

   (A) $\dfrac{3 + \sqrt{6} + \sqrt{15}}{6}$ (B) $\dfrac{\sqrt{6} - 2 + \sqrt{10}}{6}$

   (C) $\dfrac{2 + \sqrt{6} + \sqrt{10}}{6}$ (D) $\dfrac{2 + \sqrt{6} - \sqrt{10}}{6}$

5. Mid points of the sides PQ and PR of a ΔPQR are (3, 5) and (-3, -3) respectively, then the length of the side QR is :

   (A) 10 unit   (B) 15 unit

   (C) 20 unit   (D) 30 unit

6. The minute hand of a clock is 42cm long. Find the distance described by its tip in 20 minutes :

   (A) 88cm   (B) 66cm

   (C) 44cm   (D) 22cm

7. The bisector of $\angle PRS$ which is an exterior angle of ΔPQR is parallel to PQ of ΔPQR, then :

   (A) PQ = PR   (B) PQ = QR

   (C) PR = RQ   (D) None of these

38. The bottom, side and front areas of a cuboid are known. The product of these areas is equal to :

    (A) the volume of the cuboid.

    (B) the square root of the volume

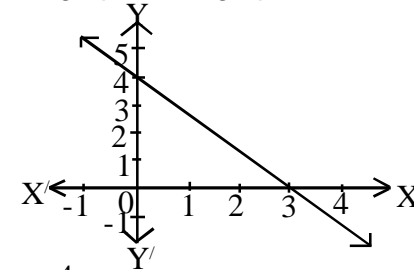   (C) the surface area of the cuboid

    (D) the square of the volume of the cuboid

39. If $2^{x-1} + 2^{x+1} = 320$ then x is equal to :

    (A) 6   (B) 8

    (C) 5   (D) 7

40. The given graph is the graph of
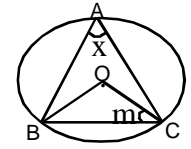

    (A) $y = \dfrac{-4}{3}x + 1$

    (B) $y = -2x - 3$

    (C) $y = x - 3$

    (D) $4x + 3y = 12$
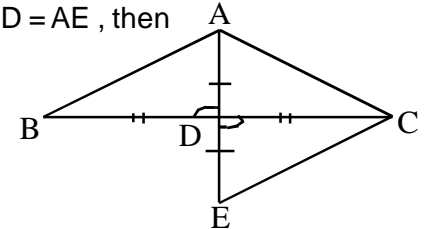
41. In the figure, O is the centre of the circle; $\angle BCO = m^0$ and $\angle BAC = x^0$, then

    (A) $m + x = 90^0$ (B) $m + x = 180^0$

    (C) $2m + x = 180^0$ (D) $m + 2x = 180^0$

42. In the figure, if AD is a median of ΔABC and AD = AE, then

    (A) AB+AC< 2AD   (B) AB+AC>2AD

    (C) AB+AC<AE   (D) AC+CE<AE

43. The expression $\dfrac{x^2 - 3x + 2}{x^2 - 5x + 6} \div \dfrac{x^2 - 5x + 4}{x^2 - 7x + 12}$ when simplified is

    (A) $\dfrac{(x-1)(x-6)}{(x-3)(x-4)}$ (B) $\dfrac{x+3}{x-3}$

    (C) $\dfrac{x+1}{x-1}$ (D) 1

31. A man has a certain numbers of chicken and cows. Their head count is 30. If the total number of their legs is 84, what is the ratio between the number of chickens and cows ?
   (A) 1 : 2   (B) 2 : 3
   (C) 3 : 2   (D) 3 : 4

32. If the sum of eleven consecutive natural numbers is 2761, then the middle number is :
   (A) 249   (B) 250
   (C) 251   (D) 252

33. The cost C of sending a parcel post package weiging P grams, P is an integer , is Rs 10 for the first gram and Rs. 3 for each additional gram. The formula for the cost is :
   (A) C = 10 + 3P   (B) C = 10P + 3
   (C) C = 10 + 3(P-1)   (D) C = 9 + 3P

34. A circle of radius 25 unit has a chord going through a point that is located 10 units from the centre. What is the possible length that could have ?
   (A) 25 unit   (B) $\sqrt{525}$ unit
   (C) 40 unit   (D) $\sqrt{2100}$ unit

35. Axioms of Superposition states that :
   (A) Every angle has one and only one internal bisector.
   (B) Magnitudes (entities) which can be made coincide with one another one equal .
   (C) Every straight line of finite length i.e a line segment has one and only one point of bisection.
   (D) All right angles are equal to one another.

36. Event are said to be exhaustive set if the sum of their probabilities is
   (A) 1   (B) -1
   (C) 0   (D) 2

37. ABCD is a trapezium with $AB \parallel DC$ and diagonals AC and BD intersect at O. Then which of the following is true ?
   (A) Area of $\triangle AOB =$ Area of $\triangle DOC$
   (B) Area of $\triangle AOD =$ Area of $\triangle BOC$
   (C) Area of $\triangle AOB =$ Area of $\triangle AOD$
   (D) Area of $\triangle DOC =$ Area of $\triangle BOC$

SPACE FOR ROUGH WORK

8. The linear equation which expresses the relationship between x and y sa shown in the accompanying table is :

x	0	6	2	-2
y	3	0	2	4

   (A) $y = 100 - 10x$ (B) $4x + 3y = 12$
   (C) $x + 2y = 6$ (D) $x = 5 - 2y$

9. If a conical cup contains water equal to $\dfrac{1}{8}^{th}$ of its whole volume then the ratio of the height of the cone to the depth of the water is
   (A) 8:1   (B) 6:1
   (C) 4:1   (D) 2:1

10. The area of the triangle formed between lines $x = 0$, $y = 0$ and $2x - 3y + 6 = 0$ is :
   (A) 3 Sq. unit   (B) 4 Sq. unit
   (C) 2 Sq. unit   (D) 5 Sq. unit

11. One of the common zero of the polynomials $x^2 - 9$ and $x^2 + 6x + 9$ is :
   (A) 3   (B) -3
   (C) 9   (D) -9

12. In throwing a fair die, the probability of happening a prime number is :
   (A) $\dfrac{1}{2}$ (B) $\dfrac{1}{3}$
   (C) $\dfrac{1}{6}$ (D) $\dfrac{2}{3}$

13. If the length of the longest rod that can be placed on the ground in a cubical room is $4\sqrt{2}$ m, then the area of the four walls of the room is :
   (A) 64m²   (B) 128m²
   (C) 32m²   (D) 16m²

14. If $p = 5 + 2\sqrt{6}$ and $q = \dfrac{1}{p}$ then $p^2 + q^2$ is :
   (A) 49   (B) 98
   (C) 100   (D) None of these

15. The figure formed by joining the mid points of the quadrilateral is a :
   (A) triangle   (B) parallelogram
   (C) trapezium   (D) none of these

SPACE FOR ROUGH WORK

16. If -2 and 1 are the zero of the polynominal $x^3 + 10x^2 + px + q$, then the value of p and q are respectively :
    (A) 5 and -3
    (B) 17 and -8
    (C) 7 and -18
    (D) 23 and -9

17. In the adjoining figure the internal bisectors of $\angle B$ and $\angle C$ meet at P and the extrenal bisectors of $\angle B$ and $\angle C$ meet at Q.
    Then $\angle BPC + \angle BQC =$ ____
    (A) $90^0 + \frac{1}{2}\angle BAC$
    (B) $2\angle BPC$
    (C) 180^0
    (D) 90^0

18. The sides of a triangle are 5cm 12cm and 13cm, then its area is :
    (A) 0.0024m²
    (B) 0.0026m²
    (C) 0.003m²
    (D) 0.0015m²

19. The quadrilateral formed by four angle bisectors of a given parallelogram is a :
    (A) square
    (B) rhombus
    (C) trapezium
    (D) rectangle

20. If the circumference of a circle is equal to the perimeter of a square, find the ratio of the area of the circle to the area of the square.
    (A) $\pi : 2$
    (B) $2 : \pi$
    (C) $4 : \pi$
    (D) $\pi : 4$

21. If the height of a cylinder is double, by what number must the radius of its base be multiplied so that the resulting cylinder has the same volume as that of the original cylinder ?
    (A) 4
    (B) $\frac{1}{\sqrt{2}}$
    (C) 2
    (D) $\frac{1}{2}$

22. In an isosceles triangle :
    (A) The angles opposite to the equal sides are equal.
    (B) The altitudes corresponding to the equal sides are equal.
    (C) The median corresponding to the equal sides are equal.
    (D) All the above.

23. The angle between the hour hand and minute hand of a clock when it is 15 minutes past 3 am in circular measure is :

    (A) $\frac{2\pi}{3}$
    (B) $\frac{\pi}{24}$
    (C) $\frac{\pi}{25}$
    (D) $\frac{7\pi}{4}$

24. When simplified $\left(x^{-1} + y^{-1}\right)^{-1}$ is equal to :
    (A) $x + y$
    (B) $\frac{xy}{x+y}$
    (C) $\frac{1}{xy}$
    (D) $\frac{x+y}{xy}$

25. If $f(x) = \frac{x(x-1)}{2}$ then $f(x+2)$ equals
    (A) $f(x) + f(2)$
    (B) $(x+2)f(x)$
    (C) $\frac{(x+2)f(x+1)}{2}$
    (D) $\frac{xf(x)}{x+2}$

26. The graph of the two equations $\frac{4}{x} + 5y = 7$ and $\frac{3}{x} + 4y = 5$ intersect at :
    (A) $\left(\frac{1}{3}, -1\right)$
    (B) $\left(-\frac{1}{3}, 1\right)$
    (C) $\left(-\frac{1}{3}, -1\right)$
    (D) $\left(\frac{1}{3}, 1\right)$

27. A cube of edge k is divided in 'n' equal cubes, what is the edge of the new cube ?
    (A) $\sqrt[3]{nk}$
    (B) $\frac{k}{\sqrt[3]{n}}$
    (C) $\sqrt[3]{nk}$.
    (D) $\frac{\sqrt[3]{n}}{k}$

28. Two circles of radii 10cm and 6cm intersect at two points and the distance between their centre is 8cm. Find the length of the common chord.
    (A) 6cm
    (B) 8cm
    (C) 10cm
    (D) 12cm

29. The value of $\dfrac{\left(\sqrt{3} - \sqrt{2}\right)\left(5 + 2\sqrt{6}\right)}{\left(\sqrt{3} + \sqrt{2}\right)}$ is :
    (A) 1
    (B) 49
    (C) -1
    (D) -49

30. How many of the following four numbers are rational ?
    $\sqrt{3} + \sqrt{3}$, $\sqrt{3} - \sqrt{3}$, $\sqrt{3} \times \sqrt{3}$, $\sqrt{3} \div \sqrt{3}$
    (A) one
    (B) two
    (C) three
    (D) four

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