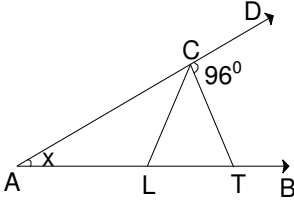
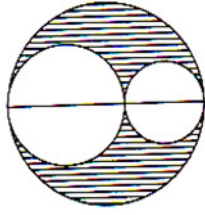
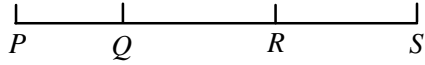


Paper-I ONLY for Engineering (150 marks)**MATHEMATICS Question 1 to 50 each for 3 marks**

1. A & B entered into partnership with capitals in the ratio 4 : 5, after 3 months, A withdraw $\frac{1}{4}$ of his capital & B withdraw $\frac{1}{5}$ of his capital. The gain at the end of 10 months was Rs. 760. Then A's share in this profit is
 (A) 330 (B) 360 (C) 380 (D) 430
2. At constant temperature, pressure of a definite mass of gas is inversely proportional to the volume. If the pressure is reduced by 20%, find respective change in volume
 (A) -16.66% (B) +25% (C) -25% (D) +16.66%
3. A man on the deck of a ship is 16m above water level. He observed that the angle of elevation of the top of a cliff is 45° and the angle of depression of the base is 30° . What is the height of the cliff?
 (A) 43.712 (B) 44.631 (C) 45.236 (D) 42.146
4. The difference between an exterior angle of (n-1) sided regular polygon and an exterior angle of (n+2) sided regular polygon is 6° then the value of n is
 (A) 13 (B) 14 (C) 12 (D) 15
5. The incomes of A, B, C are in the ratio of 12 : 9 : 7 and their spending are in the ratio is 15 : 9 : 8. If A saves 25% of his income, what is the ratio of the savings of A, B and C?
 (A) 15 : 18 : 11 (B) 11 : 18 : 15 (C) 11 : 15 : 18 (D) None
6. If $\sin A : \cos A = 4 : 7$, then the value of $\frac{7 \sin A - 3 \cos A}{7 \sin A + 2 \cos A}$ is
 (A) $\frac{3}{14}$ (B) $\frac{3}{2}$ (C) $\frac{1}{3}$ (D) $\frac{1}{6}$
7. In the given figure $AL = LC = CT$ and $\angle TCD = 96^\circ$. Then measure of $\angle LTC$ is

 (A) 32° (B) 84° (C) 64° (D) cannot be determined
8. Simplify $\left| \sqrt[3]{\sqrt{6\sqrt{a^9}}} \right|^4 \left| \sqrt[6]{\sqrt[3]{\sqrt{a^9}}} \right|^4$; the result is:
 (A) a^{16} (B) a^{12} (C) a^8 (D) a^4
9. There are two candles of equal lengths and of different thickness. The thicker one lasts for six hours. The thinner one last two hours less than the thicker one. Ramesh lights the two candles at the same time. When he went to bed he saw the thicker one is twice the length of the thinner one. How long ago did Ramesh light the two candles?
 (A) 1 hrs (B) 3 hrs (C) 6 hrs (D) none
10. Inside a triangular garden there is a flower bed in the form of a similar triangle. Around the flower bed runs a uniform path of such a width that the sides of the garden are double the corresponding sides of the flower bed. The area of the path and the flower bed are in the ratio of
 (A) 1:1 (B) 1:2 (C) 1:3 (D) None of these
11. On an alien planet, the inhabitants are similar to human beings, however they differ in one respect – either they have 3 heads and the normal amount of arms and legs (known as HEADERS) OR they have one head and 3 legs and 3 arms (known as LEGGERS). Last week, I was talking to a group of friends from the planet and between them they had 15 heads and 48 limbs (arms & legs). How many aliens are there in that group? (including headers and leggers)
 (A) 9 (B) 10 (C) 12 (D) None of these

12. Two circles are drawn inside a big circle with diameter $\frac{2}{3}$ rd and $\frac{1}{3}$ rd of the diameter of the bigger circle. The area of shaded portion, if length of diameter of the circle is 21 cm, is



- (A) 190cm^2 (B) 154cm^2 (C) 200cm^2 (D) 206cm^2
13. If A(-2, 5) and B(3, 2) are the two points on a straight line. If AB is extended to 'C' such that $AC = 2BC$, then the coordinates of 'C' are
 (A) $\left(\frac{1}{2}, \frac{3}{2}\right)$ (B) $\left(\frac{7}{2}, \frac{1}{2}\right)$ (C) (8, -1) (D) (-1, 8)
14. If $27 * 3 = 243$, $5 * 4 = 80$, then what is the value of $3 * 7$?
 (A) 84 (B) 147 (C) 63 (D) 23
15. A man ate 100 bananas in 5 days, each day eating 6 more than previous day. How many bananas did he eat on the first day?
 (A) 6 (B) 10 (C) 8 (D) 12
16. A cube and a cuboid are equal in volume. If the lengths of the edges of the cuboid are 4, 8, 16, then the length of the edge of the cube is
 (A) 4 (B) 8 (C) 12 (D) 16
17. A man makes a trip by automobile at an average speed of 50km/hr. He returns over the same route at an average speed of 45km/hr. His average speed for the entire trip is
 (A) $47\frac{7}{19}$ (B) $47\frac{1}{4}$ (C) $47\frac{1}{2}$ (D) none
18. The last (unit's) digit of the number obtained by multiplying the numbers $1281 \times 1382 \times 1483 \times 1584 \times 1785 \times 1886 \times 1987 \times 2088 \times 2589$ will be:
 (A) 0 (B) 9 (C) 7 (D) 2
19. Find the remainder when 2010000^{1000} is divided by 3?
 (A) 1 (B) 2 (C) 4 (D) 0
20. There are two examinations rooms A & B. If 10 students are sent from A to B, then the number of students in each room is the same. If 20 candidates are sent from B to A, then the number of students in A is double the number of students in B, then the number of students in room A is
 (A) 20 (B) 80 (C) 100 (D) 200
21. In figure, the length of \overline{PS} is $2x+12$, and the length of \overline{PQ} is $6x-10$. If R is the midpoint of \overline{QS} what is the length of \overline{PR} ?

 (A) $-2x+11$ (B) $-2x+22$ (C) $2x+22$ (D) $4x+1$
22. If 78 is divided into three parts which are proportional to $1, \frac{1}{3}, \frac{1}{6}$, the middle part is:
 (A) $9\frac{1}{3}$ (B) 13 (C) $17\frac{1}{3}$ (D) $18\frac{1}{3}$
23. A man walks east and turns right and then from there to his left and then 45degrees to his right. In which direction did he go?
 (A) North (B) north east (C) south east (D) south

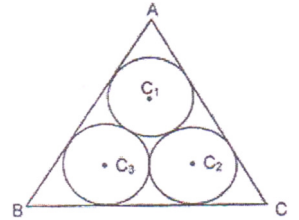
24. A water tank has three taps X, Y and Z. X fills four buckets in 24 min, Y fills 8 buckets in 1 hour and Z fills 2 buckets in 20 min. If all the taps are opened together, a full tank is emptied in 2 hours. If a bucket can hold 5 litres of water, what is the capacity of the tank ?

(A) 120 litres (B) 240 litres (C) 180 litres (D) 60 litres

25. The angles of a triangle are in the ratio 3 : 4 : 5. How many degrees is the smallest angle?

(A) 45° (B) 50° (C) 60° (D) 30°

26. The three equal circles of radius $(\sqrt{3}-1)$ cm are placed in the triangle as shown. Find the length of one of the sides of triangle ABC.



(A) $2(\sqrt{3}+1)$ cm (B) $2(\sqrt{3}-1)$ cm (C) 3 cm (D) 4 cm

27. Ben Johnson and Carl Lewis run at speeds of 10 m/s and 11 m/s respectively on a circular track. They start simultaneously from the same point on the 420 m long track and run in opposite directions. After they start, how many times would they have met each other when Ben Johnson has run a distance of 1 km?

(A) 6 (B) 5 (C) 4 (D) 7

28. A quadrilateral is formed by joining the midpoints of the sides of a rhombus. If the diagonals of the rhombus are d_1 and d_2 , then two of the adjacent sides of the quadrilateral are

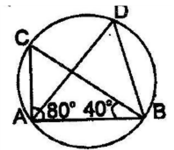
(A) d_1, d_2 (B) $d_1/2, d_2/2$ (C) $d_1/4, d_2/4$ (D) $d_1/3, d_2/3$

29. The minute hand of a clock is 10cm long. The area of the face of the clock swept by the minute hand between 9 AM and 9.35 AM is

(A) 366.6cm^2 (B) 244.4cm^2 (C) 183.3cm^2 (D) 188.39cm^2

30. In the given figure, $\angle CAB = 80^\circ$, $\angle ABC = 40^\circ$. The sum of $\angle DAB + \angle ABD$ is equal to:

(A) 80° (B) 100° (C) 120° (D) 140°



31. The area of two similar triangles are in the ratio 9 : 4. The medians of these triangle are in the ratio

(A) 9 : 4 (B) 4 : 9 (C) 3 : 2 (D) 2 : 3

32. A box measures 30 cm \times 24 cm \times 18 cm. The longest rod that can be placed in it has the length

(A) 16 cm (B) 30 cm (C) 42.42 cm (D) 42.52 cm

33.
$$\frac{(0.051 \times 0.051 \times 0.051 - 0.041 \times 0.041 \times 0.041)}{(0.051 \times 0.051 + 0.051 \times 0.041 + 0.041 \times 0.041)} =$$

(A) 0.00092 (B) 0.0010 (C) 0.092 (D) 0.010

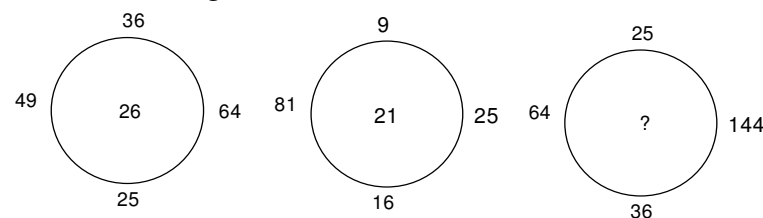
34. The investigator asked Jaclyn about her children. Jaclyn said "I have 3 daughters, Alice, Betty, and Cindy. The product of their ages is 36. The sum of their ages is the same as the street number of our next door neighbor."

The investigator went next door and came back and said: "Still not enough information". Jaclyn said: "Oh, I forgot to tell you that my oldest daughter is now in school".

The investigator found out the ages of her daughters immediately. What is the age of the oldest daughter?

(A) 6 (B) 9 (C) 12 (D) None of these

35. Find the missing number

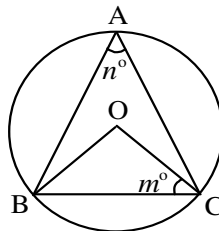
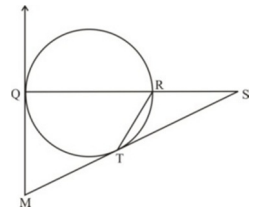


(A) 24 (B) 25 (C) 23 (D) 31

36. If $3^{x+1} \times 9^{2x} = 27^{x-2}$, the value of x lies between

(A) -3 and -2 (B) -4 and -3 (C) -5 and -4 (D) -6 and -5

37. A square and a regular hexagon have the same perimeter. If the area of the square is 2.25, what is the area of the hexagon?
 (A) 2.250 (B) 2.598 (C) 2.838 (D) 3.464
38. Ratio of sides of rectangle is 2. Its area is 4 cm^2 , then the perimeter of rectangle is :
 (A) $4\sqrt{2}$ (B) $6\sqrt{2}$ (C) $8\sqrt{2}$ (D) $10\sqrt{2}$
39. If $x^2 + y^2 - 6x - 10y = -34$, then find xy
 (A) 15 (B) 20 (C) 12 (D) 18
40. A solid wooden toy in the form of a cone is mounted on a hemisphere. If the radii of the hemisphere is 4.2 cm and the total height of the toy is 10.2 cm , then volume of wood used in the toy is approximately
 (A) 343 cm^3 (B) 266 cm^3 (C) 532 cm^3 (D) 133 cm^3
41. The radius of the base of a conical tent is 7 m . The tent is 24 m high. Find the cost of the canvas required to make the tent, if one square meter of canvas costs Rs.180 (Take $\pi = 22/7$).
 (A) Rs. 99000 (B) Rs.98000 (C) Rs.95000 (D) Rs. 97000
42. The LCM of two numbers is 36 and their HCF is 6. If one of the numbers is 12, then what is the other number?
 (A) 18 (B) 21 (C) 15 (D) no such number exist
43. Each edge of a cuboid is increased by 20% then the percentage increase in volume of the cuboid is :
 (A) 144% (B) 40% (C) 72.8% (D) 44%
44. In the shown figure (not to scale), STM and MQ are tangents to the circle at T and Q respectively. SRQ is a straight line. $SR = TR$ and $\angle TSR = 25^\circ$. Find $\angle QMT$.
 (A) 55° (B) 60° (C) 75° (D) 80°
45. In the figure 6, O is the centre and $\angle BAC = n^\circ$, $\angle OCB = m^\circ$ then



- (A) $m + n = 90^\circ$ (B) $m + n = 180^\circ$ (C) $m + n = 120^\circ$ (D) $m + n = 150^\circ$
46. A man bought 50 dozen fruits consisting of apples and bananas. A banana is cheaper than an apple. The number of dozens of apples he bought is equal to the cost per dozen of bananas in rupees and vice versa. If he has spent a total amount of Rs 1050, find the number of dozens of apples and bananas he bought respectively.
 (A) 12 and 38 (B) 14 and 36 (C) 15 and 35 (D) 28 and 32
47. If $\sin x + \sin^2 x = 1$ then $\cos^{12} x + 3\cos^{10} x + 3\cos^8 x + \cos^6 x - 1 =$
 (A) 4 (B) 3 (C) 2 (D) 0
48. The simplified form of the expression $(x^{-1} + y^{-1})^{-1}$ is $(x, y \neq 0)$
 (A) $\frac{xy}{x+y}$ (B) $\frac{x+y}{xy}$ (C) $\frac{1}{x} + \frac{1}{y}$ (D) none of these
49. If $\sin A : \cos A = 4 : 7$, then the value of $\frac{7 \sin A - 3 \cos A}{7 \sin A + 2 \cos A}$ is
 (A) $3/14$ (B) $3/2$ (C) $1/3$ (D) $1/6$
50. The average age of a class of 30 students and a teacher reduces by 0.5 years if we exclude the teacher. If the initial average is 14 years, find the age of the class teacher.
 (A) 29 (B) 25 (C) 30 (D) 35