

This Question Paper contains 20 printed pages.

(Part - A & Part - B)

Sl.No.

12 (E)

(JULY, 2018)

પ્રશ્ન પેપરનો સેટ નંબર જેની સામેનું વર્તુળ OMR શીટમાં ઘટ્ટ કરવાનું રહે છે.

Set No. of Question Paper, circle against which is to be darken in OMR sheet.

01

Part - A : Time : 1 Hour / Marks : 50

Part - B : Time : 2 Hours / Marks : 50

(Part - A)

Time : 1 Hour]

[Maximum Marks : 50

Instructions :

- 1) There are 50 objective type (M.C.Q.) questions in Part - A and all questions are compulsory.
- 2) The questions are serially numbered from 1 to 50 and each carries 1 mark.
- 3) Read each question carefully, select proper alternative and answer in the O.M.R. sheet.
- 4) The OMR sheet is given for answering the questions. The answer of each question is represented by (A) O, (B) O, (C) O, (D) O. Darken the circle ● of the correct answer with ball-pen.
- 5) Rough work is to be done in the space provided for this purpose in the Test Booklet only.
- 6) Set No. of Question Paper printed on the upper-most right side of the Question Paper is to be written in the column provided in the OMR sheet.

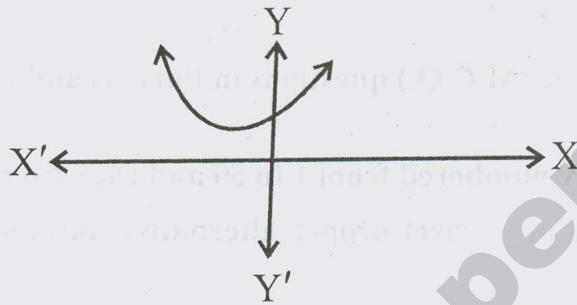
1) If  $a + \sqrt{b} = \sqrt{c}$  where  $a \in Q$  and  $\sqrt{b}$  and  $\sqrt{c}$  are surds, then

Rough Work

- \_\_\_\_\_.
- (A)  $a = 0$  and  $b = c$
  - (B)  $a = c$  and  $b = 0$
  - (C)  $a = b$  and  $b = c$
  - (D)  $a = 0$  and  $b = 0$

- 2)  $\sqrt{10+\sqrt{64}} = \sqrt{a+2\sqrt{b}}$  then for  $a$  and  $b$  \_\_\_\_\_.
- (A)  $a = 10$  and  $b = 64$   
 (B)  $a = 64$  and  $b = 10$   
 (C)  $a = 10$  and  $b = 16$   
 (D)  $a = 8$  and  $b = 2$

- 3) The graph of  $p(x) = x^2 + 4x + 5$  is drawn below. From this real zeros is/are \_\_\_\_\_.



- 4) If  $\alpha$ ,  $\beta$  and  $\gamma$  are the zeros of cubic polynomial  $p(x) = x^3 + 5x^2 + 6x$  then  $\alpha\beta\gamma =$  \_\_\_\_\_.

- (A)  $-7$  (B)  $7$   
 (C)  $6$  (D)  $0$

- 5)  $a = 3, b = 5, c = 7, d = 11$ . Then standard cubic polynomial is \_\_\_\_\_ from given values of  $a, b, c$  and  $d$ .

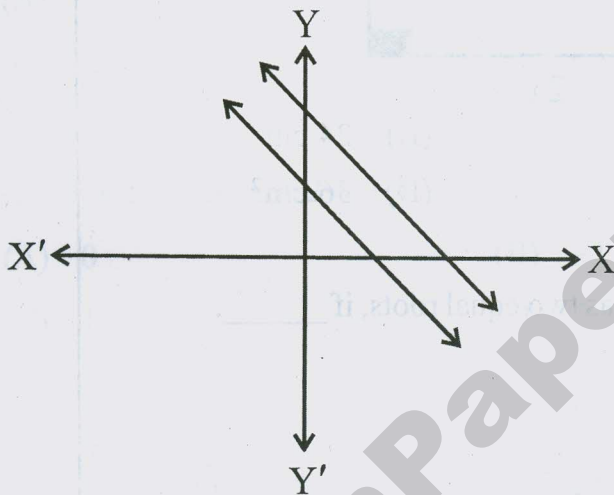
- (A)  $3x^3 + 5x^2 - 7x - 11$   
 (B)  $3x^3 - 5x^2 + 7x + 11$   
 (C)  $3x^3 + 5x^2 - 7x + 11$   
 (D)  $3x^3 + 5x^2 + 7x + 11$

Rough Work

- 6) If  $\alpha$ ,  $\beta$  and  $\gamma$  are the zeros of cubic polynomial  $p(x) = ax^3 + bx^2 + cx + d$ ,  $a \neq 0$  then sum of zeros  $\alpha + \beta + \gamma =$

- (A)  $\frac{c}{a}$  (B)  $\frac{-b}{a}$   
 (C)  $\frac{b}{a}$  (D)  $\frac{c}{-a}$

- 7) Two lines are shown in the following graph



From the above graph, what is true for their solution set from the alternatives given below?

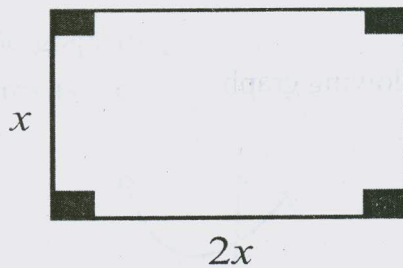
- (A) Their solution set is infinite set  
 (B) Number of solutions cannot be known without knowing the mathematical equations of lines  
 (C) Pair of equations has unique solution  
 (D) They have no solution
- 8) Kinjal tells her sister that 3 years ago, the sum of your age and my age was 36 years. Then tell me after 4 years, what will be the sum of your age and my age?
- (A) 53 years (B) 39 years  
 (C) 43 years (D) 50 years

Rough Work

9) In a two-digit number, the digit in ones place is  $x$  and the digit in tens place is  $y$ . Then double of that number is \_\_\_\_\_.

- (A)  $10x + 2y$  (B)  $20y + 2x$   
 (C)  $2y + 20x$  (D)  $2x + 10y$

10) The perimeter of a rectangle given in the figure is 36 cm. Then its area is \_\_\_\_\_.



- (A)  $12 \text{ cm}^2$  (B)  $24 \text{ cm}^2$   
 (C)  $72 \text{ cm}^2$  (D)  $36 \text{ cm}^2$
- 11) A quadratic equation has two equal roots, if \_\_\_\_\_.

- (A)  $D < 0$   
 (B)  $D > 0$   
 (C)  $D = 0$   
 (D)  $D$  is non-zero perfect square

12) The formula to find the third term of given equation  $x^2 - 8x + 15 = 0$  to make it perfect square is \_\_\_\_\_.

- (A)  $\pm 2\sqrt{\text{First term} \times \sqrt{\text{Last term}}}$   
 (B)  $\frac{(\text{Middle term})^2}{4 \times \text{First term}}$   
 (C)  $\frac{(\text{Middle term})^2}{4 \times \text{Last term}}$   
 (D)  $\frac{(\text{Last term})^2}{4 \times \text{First term}}$



Rough Work

13) Quadratic equation \_\_\_\_\_ has equal roots.

(A)  $x^2 - 10x + 25 = 0$

(B)  $x^2 - 10x - 25 = 0$

(C)  $x^2 + 10x - 25 = 0$

(D)  $x^2 - 25 = 0$

14) The product of the roots of equation  $x^2 - 3x = 10$  is \_\_\_\_\_.

(A) -10

(B) -15

(C) -30

(D) -5

15) If  $17x + 29y = 63$  and  $29x + 17y = 75$  then  $(y - x)^2 =$  \_\_\_\_\_.

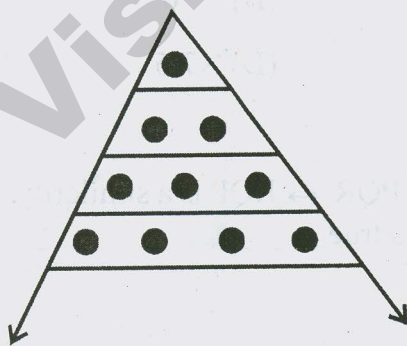
(A) 0

(B) -1

(C) 1

(D) 2

16) In the following figure, the number of dots upto a given row is the number of triangles. The dots form a triangle. Then the number of triangles upto 12<sup>th</sup> row is \_\_\_\_\_.



(A) 78

(B) 68

(C) 12

(D) 24

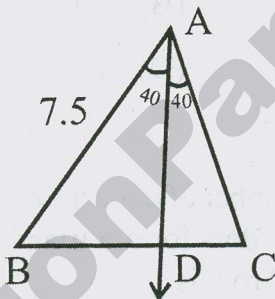
17) Here, an A.P.,  $-11, -15, -19, -23, \dots$  is given. The common difference is \_\_\_\_\_.

- (A)  $-4$  (B)  $18$   
 (C)  $-18$  (D)  $-7$

18) If  $S_m = n$  and  $S_n = m$  then  $S_{m+n} =$  \_\_\_\_\_.

- (A)  $-(m+n)$   
 (B)  $0$   
 (C)  $m+n$   
 (D)  $2m-2n$

19) In the following figure,  $BD : DC = 3:4$  and  $AB = 7.5$  then  $AC =$  \_\_\_\_\_.



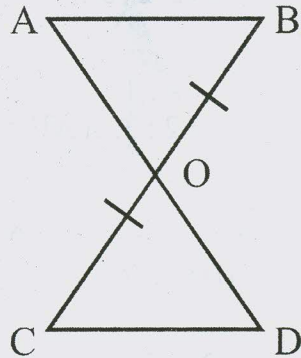
- (A)  $5$  (B)  $10$   
 (C)  $-10$  (D)  $7.5$

20) In  $\Delta PQR$ , correspondence  $PQR \leftrightarrow RQP$  is a similarity. Then \_\_\_\_\_ of the following is true.

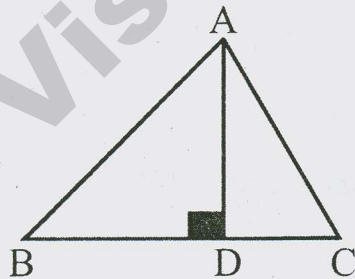
- (A)  $\angle P \cong \angle Q$   
 (B)  $\angle P \cong \angle R$   
 (C)  $\angle Q \cong \angle R$   
 (D)  $\angle P \cong \angle Q \cong \angle R$

- 21) In the following figure,  $\triangle ABO$  and  $\triangle COD$  are to be formed congruent where  $OC = OB$  then condition \_\_\_\_\_ is lacking with given condition.

Rough Work



- (A)  $\angle B \cong \angle O$   
 (B)  $\overline{AB} \cong \overline{CD}$   
 (C)  $\overline{AO} \cong \overline{OD}$   
 (D)  $\angle A \cong \angle D$
- 22) The line segment adjacent to  $\overline{AB}$  in the following figure is \_\_\_\_\_.



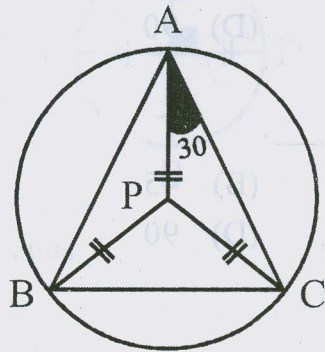
- (A)  $\overline{BD}$                       (B)  $\overline{CD}$   
 (C)  $\overline{AC}$                       (D)  $\overline{AD}$

Rough Work

- 23) In  $\triangle ABC$ ,  $AB = BC = AC = 4$ . Then its length of altitude is \_\_\_\_\_.
- (A) 6 (B) 4  
(C)  $3\sqrt{3}$  (D)  $2\sqrt{3}$
- 24) In  $\triangle ABC$ ,  $m \angle A : m \angle B : m \angle C = 1 : 2 : 3$ . If  $AB = 15$  then  $BC =$  \_\_\_\_\_.
- (A)  $\frac{15\sqrt{3}}{2}$  (B) 17  
(C) 8 (D) 7.5
- 25) The coordinates of the midpoint of a line segment whose endpoints are  $P(x_1, y_1)$  and  $Q(x_2, y_2)$  are \_\_\_\_\_.
- (A)  $\left[ \frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right]$   
(B)  $\left[ \frac{x_1 + y_1}{2}, \frac{x_2 + y_2}{2} \right]$   
(C)  $\left[ \frac{y_1 + y_2}{2}, \frac{x_1 + y_1}{2} \right]$   
(D)  $\left[ \frac{x_1 + x_2 + y_1 + y_2}{2}, \frac{x_1 - x_2 - y_1 - y_2}{2} \right]$
- 26) If  $P$  is in the interior of  $\triangle ABC$  then  $\angle APB + \angle BPC =$  \_\_\_\_\_.
- (A)  $\angle C - \angle BPC$   
(B)  $\angle C - \angle A$   
(C)  $\angle C - \angle A$   
(D)  $\angle C + \angle BPC$



- 27) Circumcircle of  $\Delta ABC$  is given in figure. If  $m\angle PAC = 30$  then  $m\angle APC =$  \_\_\_\_\_.



Rough Work

- (A) 120 (B) 60  
(C) 90 (D) 40
- 28) The coordinates of the point which divides  $\overline{AB}$  joining  $A(x_1, y_1)$  and  $B(x_2, y_2)$  in the ratio  $\lambda : 1$  is \_\_\_\_\_.

(A)  $\left[ \frac{\lambda x_1 + x_2}{\lambda + 1}, \frac{\lambda y_1 + y_2}{\lambda + 1} \right]$

(B)  $\left[ \frac{\lambda x_2 + x_1}{\lambda - 2}, \frac{\lambda y_2 + y_1}{\lambda + 1} \right]$

(C)  $\left[ \frac{\lambda x_2 + x_1}{\lambda + 1}, \frac{\lambda y_2 + y_1}{\lambda + 1} \right]$

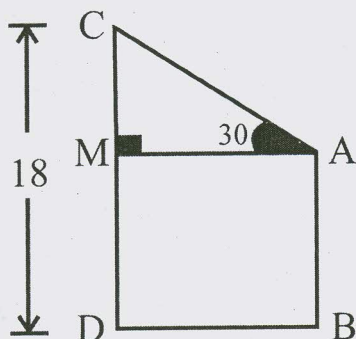
(D)  $\left[ \frac{\lambda x_2 + x_1}{\lambda - 1}, \frac{\lambda y_2 + y_1}{\lambda - 1} \right]$

- 29) If  $\sin \theta = \frac{1}{2}$  then  $\frac{\theta^2}{15} =$  \_\_\_\_\_.

- (A) 30 (B) 60  
(C) 90 (D) 45

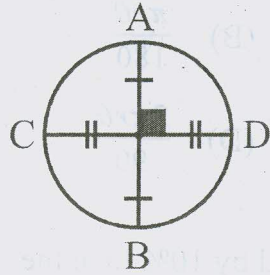
Rough Work

- 30) The ratio of the height of tower and length of its shadow is  $1:\sqrt{3}$ . Then the angle of elevation of sun is \_\_\_\_\_.
- (A) 30 (B) 45  
(C) 60 (D) 90
- 31)  $\sin \theta : \cos \theta = 1:\sqrt{3} \therefore \theta =$  \_\_\_\_\_.
- (A) 30 (B) 45  
(C) 60 (D) 90
- 32) If  $\sec^2 \theta - \operatorname{cosec}^2 \theta = 0$  then  $\theta =$  \_\_\_\_\_.
- (A) 90 (B) 45  
(C) 60 (D) 30
- 33)  $\sin 2A = \cos 4A$  then  $A =$  \_\_\_\_\_.
- (A) 15 (B) 30  
(C) 45 (D) 60
- 34) The angle of elevation of the top of a house from a point A on the ground is 45. The distance of a house from A is  $x$  and height of house is  $y$  then \_\_\_\_\_.
- (A)  $x = y$  (B)  $x < y$   
(C)  $x > y$  (D)  $x = 2y$
- 35) In the following figure,  $AB = 12$ ,  $CD = 18$ ,  $m\angle CAM = 30$  then  $AC =$  \_\_\_\_\_.



- (A) 12 (B) 10  
(C) 18 (D) 8

36) What can be said about  $\overline{AB}$  in the following figure?

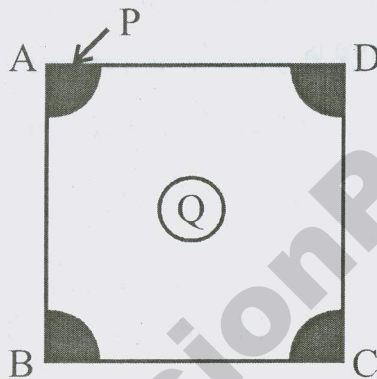


- (A) Circumradius (B) Radius  
(C) Diameter (D) Ray

37) The measure of an angle inscribed in a semicircle is \_\_\_\_\_.

- (A) 30 (B) 45  
(C) 60 (D) 90

38)

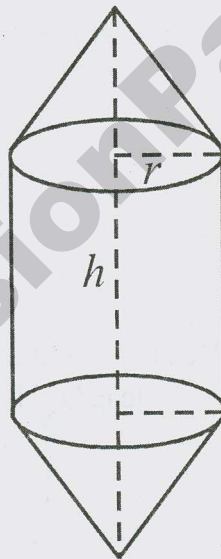


In the above figure, area of a square ABCD is S and area of each shaded portion is P and area of inner circle is Q. Then the area of remaining part of a square is \_\_\_\_\_.

- (A)  $S - 4P - Q$   
(B)  $S - P - 4Q$   
(C)  $S - P - 3Q$   
(D)  $S - P - Q$

Rough Work

- 39) The formula to find the length of minor arc is \_\_\_\_\_.
- (A)  $\frac{\pi r \theta}{360}$  (B)  $\frac{\pi r \theta}{180}$   
 (C)  $\frac{\pi r^2 \theta}{360}$  (D)  $\frac{2\pi r \theta}{90}$
- 40) If the radius of a circle is increased by 10% then the area of new corresponding circle is \_\_\_\_\_.
- (A)  $1.21 \pi r^2$  (B)  $1.24 \pi r^2$   
 (C)  $1.21 \pi r$  (D)  $12.1 \pi r^2$
- 41) If the area of a circle and circumference are numerically equal then radius of circle is \_\_\_\_\_.
- (A)  $\pi$  (B)  $\frac{\pi}{2}$   
 (C) 1 (D) 2
- 42) The total volume of following figure is \_\_\_\_\_.



- (A)  $2 \times$  volume of cone + volume of cylinder  
 (B) volume of cone +  $\frac{1}{2}$  volume of cylinder  
 (C) volume of cylinder +  $\frac{1}{2}$  volume of cone  
 (D) volume of cone + volume of cylinder



Rough Work

- 43) The volume of a sphere with diameter 2 cm is \_\_\_\_\_  $\text{cm}^3$ .
- (A)  $\frac{4}{3}\pi$  (B)  $\frac{2}{3}\pi$   
(C)  $\frac{1}{2}\pi$  (D)  $\frac{1}{6}\pi$
- 44) 1 meter<sup>3</sup> = \_\_\_\_\_.
- (A) 100 litre (B) 10000 litre  
(C) 1000 litre (D) 10 litre
- 45) A cylinder and cone of equal base radius and equal height are given. Which of the following statement is true?
- (A) Volume of cylinder and cone are equal  
(B) Volume of cylinder is one-third of volume of cone  
(C) Volume of cone is half of the volume of cylinder  
(D) Volume of cone is one-third of volume of cylinder
- 46)  $\bar{X} - Z = 3$ ,  $\bar{X} + Z = 45$  then  $M =$  \_\_\_\_\_.
- (A) 24 (B) 26  
(C) 22 (D) 23
- 47) \_\_\_\_\_ is taken on y axis to draw cumulative frequency curve.
- (A) Frequency  
(B) Cumulative frequency  
(C) Upper limits  
(D) Mid value

Rough Work

- 48) If  $a > b > c$  ( $a, b, c \in \mathbb{N}$ ) and mean of  $a, b$  and  $c$  is 19 and  $a + c = 35$  then their median  $M =$  \_\_\_\_\_.
- (A) 20 (B) 22  
(C) 44 (D) 36
- 49) The probability that you will get 101 marks in the paper which is in your hand is \_\_\_\_\_.
- (A) 1 (B) 0.5  
(C) 0 (D) -0.5
- 50) Two fair dice are rolled simultaneously. The probability of getting the same number on both dice is \_\_\_\_\_.
- (A)  $\frac{1}{36}$  (B)  $\frac{1}{12}$   
(C)  $\frac{1}{6}$  (D) 1

**12 (E)**  
(JULY, 2018)

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**(Part - B)**

*Time : 2 Hours]*

*[Maximum Marks : 50*

**Instructions :**

- 1) Write in a clear hand writing.
  - 2) There are four sections in Part - B of the question paper and total 1 to 17 questions are there.
  - 3) All the questions are compulsory. Internal options are given.
  - 4) The numbers at the right side represent the marks of the questions.
  - 5) Draw figure wherever required. Retain all the lines of construction.
  - 6) Start new section on new page.
  - 7) Maintain sequence.
- 

**SECTION-A**

- Answer the following questions number 1 to 8 by showing calculations in brief: [Each question carries 2 marks].

1) Find the square root:  $10 + \sqrt{91}$  [2]

2) Divide  $5x^3 + 9x^2 + 20$  by  $x + 2$ . [2]

3) Solve the following pair of linear equations by elimination method. [2]

$$4x + 19y + 13 = 0$$

$$13x - 23y + 19 = 0$$

- 4) Find the sum of first 30 positive integer multiples of 6. [2]

OR

If  $S_m = S_n$  for some A.P. then prove that  $S_{m+n} = 0$ .

- 5) P, Q and R are the mid points of the sides of  $\Delta ABC$  and X, Y and Z are the mid points of  $\Delta PQR$ . If area of  $\Delta XYZ$  is 10 then find the area of  $\Delta PQR$ . [2]

- 6) Find the coordinates of the point which divides the line segment  $\overline{AB}$  joining A(2, 3) and B (6, 7) in the ratio 3 : 1 from A. [2]

- 7)  $\sin\theta + \operatorname{cosec}\theta = 2$  then find the value of  $\sin^5\theta + \operatorname{cosec}^6\theta$ . [2]

OR

If  $\sin\theta = \frac{a}{\sqrt{a^2+b^2}}$ ,  $0 < \theta < 90$  then find the values of  $\sec\theta$  and  $\tan\theta$ .

- 8) For some data mean  $\bar{X}=35.8$ ,  $\sum f_i u_i = 4$ ,  $\sum f_i = 50$  and  $C = 10$  then find assumed mean. [2]

### SECTION - B

- Answer the following questions number 9 to 12 with calculations: [Each question carries 3 marks].

- 9) The sum of areas of two squares is  $400 \text{ m}^2$ . If the difference between the perimeter of these squares is 16 meter then find the length of both squares. [3]

- 10) A coconut tree breaks due to storm and the broken part bends such that the top of the tree touches the ground making an angle having measure  $30^\circ$  with the ground. The distance from the foot of the tree to the point where the top touches the ground is 15 meter. Find the height of the tree (Take  $\sqrt{3} = 1.73$ ). [3]



- 11) The median of 230 observations of the following frequency distribution is 46. Find  $a$  and  $b$ . [3]

Class	10-20	20-30	30-40	40-50	50-60	60-70	70-80
Frequency	12	30	$a$	65	$b$	25	18

OR

The distribution below shows the number of wickets taken by bowlers in one-day cricket matches. Find the mean of the number of wickets.

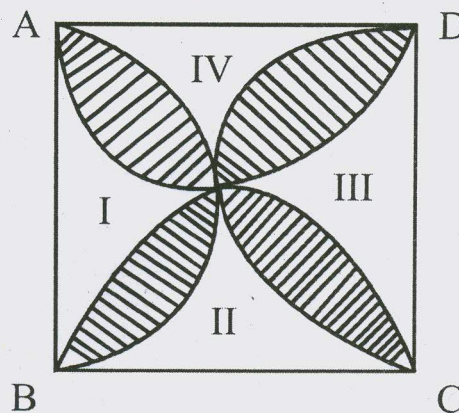
No. of wickets	20-60	60-100	100-150	150-250	250-350	350-450
No. of bowlers	7	5	16	12	2	3

- 12) A dice is thrown once. Find the probability of getting [3]
- a prime number
  - a number lying between 2 and 5
  - an even number on the dice.

**SECTION - C**

■ Answer the following questions from 13 to 15 as required with the calculations: [Each question is of 4 marks].

- 13) A circle touches all the four sides of  $\square ABCD$ . Prove that  $AB + CD = AD + BC$ . [4]
- 14) In a figure given below, a design is constructed by semicircles in a square of side 7 cm. Find the area of the region covered by design. [4]



- 15) An oil tank is cylindrical from middle and hemispherical at the ends having length from one end to another end is 9.2m. and diameter of hemispherical ends is 4.2 m. What is the cost of painting it from outside at the rate Rs. 16 per square meter? [4]

OR

A cone with hemispherical base is having diameter 21 cm and slant height 12 cm. Find the total surface area of it.

**SECTION - D**

- Answer the following question no. 16 to 17: [Each of 5 marks].

- 16)  $\angle B$  is right angle in  $\triangle ABC$  then prove that  $AB^2 + BC^2 = AC^2$ . [5]

OR

In  $\triangle XYZ$ ,  $m\angle Y = 90$  and  $\overline{YM}$  is median. Then prove that  $XY^2 + YZ^2 + XZ^2 = 8YM^2$ .

- 17) Obtain point C on  $\overline{AB}$  such that  $AC : CB = 4 : 3$ . Write the points of construction. [5]

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