# District Institute of Education and training Hassan

# Hema Deevige



# Mathematics 10th Standard

## 2022–23

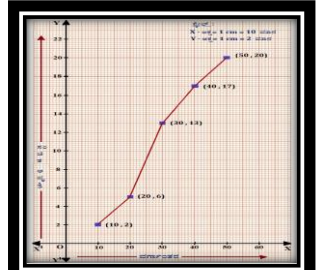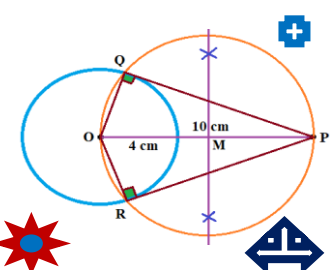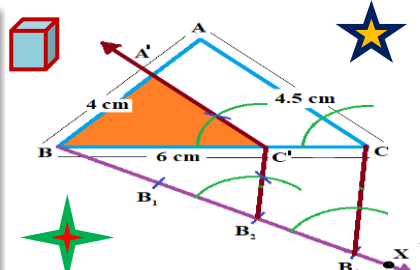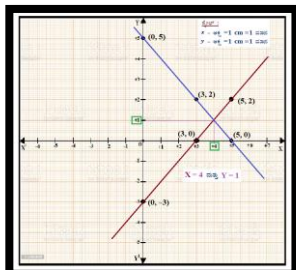# APPLIED QUESTIONS BANK
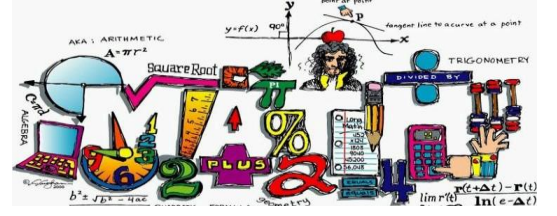
# ಜಿಲ್ಲಾ ಶಿಕ್ಷಣ ಮತ್ತು ತರಬೇತಿ ಸಂಸ್ಥೆ
# ಶಾಲಾ ಶಿಕ್ಷಣ ಮತ್ತು ಸಾಕ್ಷರತಾ ಇಲಾಖೆ. ಹಾಸನ.

## 2022-23 ನೇ ಸಾಲಿನ ಎಸ್. ಎಸ್. ಎಲ್. ಸಿ. ಘಟಕವಾರು ಗಣಿತ ವಿಷಯದ ಅನ್ವಯ ಪ್ರಶ್ನೆಗಳು

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$\text{ಬಹುಲಕ} = \ell + \left[\frac{f_1 - f_0}{2f_1 - f_0 - f_2}\right] \times h$$

ಕರ್ನಾಟಕ ಸರ್ಕಾರ
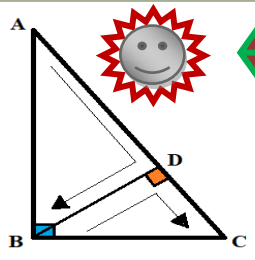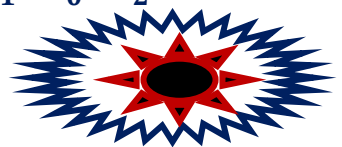
ಶಾಲಾ ಶಿಕ್ಷಣ ಮತ್ತು ಸಾಕ್ಷರತಾ ಇಲಾಖೆ, ಹಾಸನ ಜಿಲ್ಲೆ

# 10ನೇ ತರಗತಿ

## ವಿದ್ಯಾರ್ಥಿಗಳ ಉತ್ತಮ ಫಲಿತಾಂಶಕ್ಕಾಗಿ...

# ಗಣಿತ ವಿಷಯ

# ಘಟಕವಾರು ಅನ್ವಯಿಕ ಪ್ರಶ್ನೆಗಳು

## ಪರಿಕಲ್ಪನೆ ಮತ್ತು ಆಯೋಜನೆ

### ಶ್ರೀಮತಿ ಪುಷ್ಪಲತಾ H K

ಉಪನಿರ್ದೇಶಕರು (ಅಭಿವೃದ್ಧಿ)
ಶಾಲಾ ಶಿಕ್ಷಣ ಮತ್ತು ಸಾಕ್ಷರತಾ ಇಲಾಖೆ,
ಡಯಟ್, ಹಾಸನ.

## ಸಲಹೆ ಮತ್ತು ಮಾರ್ಗದರ್ಶನ

### ಶ್ರೀ ಫಣೇಶ್

ಉಪಪ್ರಾಂಶುಪಾಲರು
ಶಾಲಾ ಶಿಕ್ಷಣ ಮತ್ತು ಸಾಕ್ಷರತಾ ಇಲಾಖೆ,
ಡಯಟ್, ಹಾಸನ.

## ಕಾರ್ಯಕ್ರಮ ಸಂಯೋಜಕರು

### ಶ್ರೀ ನಟರಾಜ್ S P

ಹಿರಿಯ ಉಪನ್ಯಾಸಕರು
ಶೈಕ್ಷಣಿಕ ಮತ್ತು ತಂತ್ರಜ್ಞಾನ ವಿಭಾಗ
ಡಯಟ್, ಹಾಸನ

2023 ರ ಎಸ್.ಎಸ್.ಎಲ್.ಸಿ. ಪರೀಕ್ಷೆಯ ವೇಳಾಪಟ್ಟಿಯು ಬಿಡುಗಡೆಗೊಂಡಿದ್ದು ಪ್ರಸ್ತುತ ಸಾಲಿನ ಪರೀಕ್ಷೆಯು 31 ಮಾರ್ಚ್-2023 ರಿಂದ ಪ್ರಾರಂಭಗೊಂಡು 15 ಏಪ್ರಿಲ್ 2023 ಕ್ಕೆ ಅಂತ್ಯಗೊಳ್ಳಲಿದೆ. ಪರೀಕ್ಷೆಯನ್ನು ಉತ್ಸಾಹ ಮತ್ತು ಉಲ್ಲಾಸದಿಂದ ಎದುರಿಸಲು ವಿದ್ಯಾರ್ಥಿಗಳು ಸಿದ್ಧತೆ 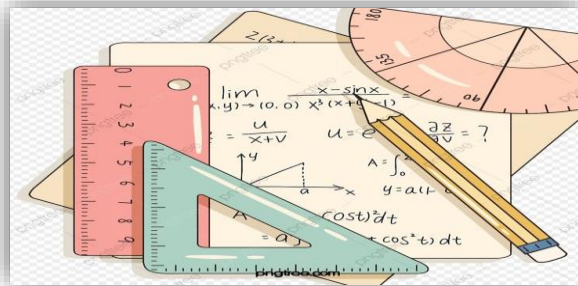ಮಾಡಿಕೊಳ್ಳುತ್ತಿದ್ದಾರೆ. ಶಿಕ್ಷಕರು ಪಾಠ ಬೋಧನೆಯನ್ನು ಪೂರ್ಣಗೊಳಿಸಿ ವಿಷಯಗಳ ಪುನರಾವರ್ತನೆ ಮತ್ತು ಪೂರ್ವಸಿದ್ಧತಾ ಅಥವಾ ಅಣಕು ಪರೀಕ್ಷೆಗಳನ್ನು ನಡೆಸುತ್ತಿದ್ದಾರೆ. ಈ ಸಂದರ್ಭದಲ್ಲಿ ಹಿಂದಿನ ಸಾಲಿನ ಪ್ರಶ್ನೆಪತ್ರಿಕೆಗಳಿಗೆ ಹಾಗೂ ಮಂಡಳಿ ನೀಡುವ ಮಾದರಿ ಪ್ರಶ್ನೆ ಪತ್ರಿಕೆಗಳಿಗೆ ಉತ್ತರಿಸುವುದು, ವಿಶೇಷ ತರಗತಿಗಳನ್ನು ತೆಗೆದುಕೊಳ್ಳುವುದು, ಗುಂಪು ಅಧ್ಯಯನ ನಡೆಸುವುದು, ಶೇಕಡ 100 ಕ್ಕೆ 100 ಅಂಕಗಳನ್ನು ಪಡೆದ ವಿದ್ಯಾರ್ಥಿಗಳ ಉತ್ತರ ಪತ್ರಿಕೆಗಳನ್ನು ವಿದ್ಯಾರ್ಥಿಗಳ ಪರಾಮರ್ಶೆಗೆ ಒದಗಿಸುವುದು, ಪೋಷಕರಿಗೆ ತಮ್ಮ ಮಕ್ಕಳ ಶೈಕ್ಷಣಿಕ ಪ್ರಗತಿಯನ್ನು ವಿವರಿಸಿ ಅವರ ನೆರವು ಪಡೆಯುವುದು, ಹೀಗೆ ಹಲವಾರು ಕಾರ್ಯಗಳನ್ನು ಶಿಕ್ಷಕರು ಮತ್ತು ವಿದ್ಯಾರ್ಥಿಗಳು ಮಾಡುತ್ತಿದ್ದಾರೆ.

ಪ್ರಸ್ತುತ ಸಾಲಿನಲ್ಲಿ ಹತ್ತನೆಯ ತರಗತಿಯಲ್ಲಿ ವ್ಯಾಸಂಗ ಮಾಡುತ್ತಿರುವ ಎಲ್ಲಾ ವಿದ್ಯಾರ್ಥಿಗಳು ಉತ್ತಮ ಅಂಕಗಳನ್ನು ಪಡೆದು ಉತ್ತೀರ್ಣರಾಗಬೇಕೆಂಬುದು ಎಲ್ಲಾ ಭಾಗೀದಾರರ ಅಪೇಕ್ಷೆಯಾದರೂ ನಾವು ನಿರೀಕ್ಷಿಸಿದಂತೆ ಕೆಲವು ವಿದ್ಯಾರ್ಥಿಗಳು ಉತ್ತಮ ಸಾದನೆ ತೋರುವಲ್ಲಿ ಸಫಲರಾಗದಿರುವುದು ಕಳವಳಕಾರಿ ಸಂಗತಿಯಾಗಿದೆ. ಈ ವಿದ್ಯಾರ್ಥಿಗಳು ಉತ್ತಮ ಅಂಕಗಳನ್ನು ಗಳಿಸಿ ಉತ್ತೀರ್ಣರಾಗುವಂತೆ ಮಾಡಲು ಇಲಾಖೆಯ ಹಲವಾರು ಕಾರ್ಯತಂತ್ರಗಳನ್ನು ಯೋಜಿಸಿ ಜಾರಿಗೊಳಿಸುತ್ತಿದೆ. ಅದರಲ್ಲಿ "ಘಟಕವಾರು ಅನ್ವಯಿಕ ಪ್ರಶ್ನೆಗಳ" ಕೈಪಿಡಿಯು ಒಂದಾಗಿದ್ದು, ತಮ್ಮ ಶಾಲೆಯ ಸನ್ನಿವೇಶಕ್ಕೆ ಸರಿಹೊಂದುವ ಅಂಶಗಳ ಜೊತೆ ಈ ಕೈಪಿಡಿಯನ್ನು ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ ತಲುಪಿಸುವುದು, ಇದರಲ್ಲಿನ ಅಂಶಗಳನ್ನು ವಿದ್ಯಾರ್ಥಿ ಕಲಿಯುವಂತೆ ಮಾಡುವುದು ಗಣಿತ ವಿಷಯದ ಶಿಕ್ಷಕರ ಜವಾಬ್ದಾರಿಯಾಗಿದೆ. ಶಿಕ್ಷಕರು ಇದರ ಒಂದು ಪ್ರತಿಯನ್ನು ಪಡೆದು ಪುನರಾವರ್ತನೆಯ ವೇಳೆಯಲ್ಲಿ ಬಳಕೆ ಮಾಡುವುದರ ಮೂಲಕ ಈ ಕೈಪಿಡಿಯ ಸದುಪಯೋಗ ಪಡಿಸಿಕೊಂಡು ಹಾಸನ ಜಿಲ್ಲೆಯ ಎಲ್ಲಾ ವಿದ್ಯಾರ್ಥಿಗಳು ಉತ್ತಮ ಶ್ರೇಣಿಯಲ್ಲಿ ಗುಣಮಟ್ಟದ ಫಲಿತಾಂಶದೊಂದಿಗೆ ಉತ್ತೀರ್ಣಗೊಳ್ಳಲಿ ಎಂದು ಹಾರೈಸುತ್ತೇನೆ. ಈ ಕೈಪಿಡಿ ರಚನೆಯ ಕಾರ್ಯಕ್ರಮದ ಸಂಯೋಜಕರಾದ ಶ್ರೀ ನಟರಾಜ್ S P, ಹಿರಿಯ ಉಪನ್ಯಾಸಕರು, ಶೈಕ್ಷಣಿಕ ಮತ್ತು ತಂತ್ರಜ್ಞಾನ ವಿಭಾಗ ಡಯಟ್, ಹಾಸನ ಮತ್ತು ಸಾಹಿತ್ಯ ರಚನಾ ತಂಡದ ಎಲ್ಲಾ ಸಂಪನ್ಮೂಲ ಶಿಕ್ಷಕರಿಗೂ ಅಭಿನಂದನೆಗಳನ್ನು ಸಲ್ಲಿಸುತ್ತೇನೆ.

ದಿನಾಂಕ : 09-01-2023

**ಶ್ರೀಮತಿ ಪುಷ್ಪಲತಾ H K**
ಉಪನಿರ್ದೇಶಕರು (ಆಭಿವೃದ್ಧಿ)
ಶಾಲಾ ಶಿಕ್ಷಣ ಮತ್ತು ಸಾಕ್ಷರತಾ ಇಲಾಖೆ,
ಡಯಟ್ ಹಾಸನ.

# ARITHMATIC PROGRESSION

1) In an arithmetic progression 5,3, 1, –1 , . . . . the common difference is

  (A) - 2          (B)  2

  (C) - 3          (D)  5

2) The common difference of the Arithmetic progression 8, 5, 2, –1, ...  is

  (A)  - 3          (B)  - 2

  (C)  3          (D)  8

3) If 4, x, 10 are in Arithmetic Progression the value of x is

  (A) 14          (B) –6

  (C) –7          (D) 7

4) If the sum of two consecutive integers is 27, then the integers are

  (A) 7and20          (B)  13and14

  (C) 1and26          (D) –13and–14

5) The $n^{th}$ term of an Arithmetic Progression is $a_n = 4n + 5$. Then its $5^{th}$ term is

  (A)  20          (B)  14

  (C)  25          (D)  24

6) Which of the following is an Arithmetic Progression ?
  (A)1, –1, –2, ..........          (B) 1, 5, 9, ...............

  (C)2, –2, 2, –2, ............ (D)1, 2, 4, 8, ..........

---

7) The 11$^{th}$ term of the Arithmetic Progression – 3,– 1,     1,3,. . . . . is

      (A)    23          (B) – 23
      (C)  – 17        (D)   17

8) The sum of the first 10 terms of an Arithmetic  Progression  is 155 and the sum of the first 9 terms of the same progression is 126 then the 10th term of the progression is

      (A)   27         (B)  126
      (C)   29         (D)  25

9) If the nth term of an arithmetic progression $a_n = 3n - 2$, then its 9th  term   is

      (A) – 25         (B)   5

      (C)  – 5         (D)   25.

10) In   an   arithmetic   progression,   if $a_n = 2n + 1$,   then   the common  difference of the given progression is

      (A)  0          (B)   1

      (C)  2          (D)   3

11) The common difference of the Arithmetic progression 100, 93, 86,   is

      (A)   4        (B)   8

      (C)   7        (D)   – 7

12) If the n-th term of an arithmetic progression is 5n + 3, then 3rd term of the arithmetic progression is

      (A)  11        (B)  18

      (C)  12        (D)  13

13) If the n-th term of an arithmetic progression term is $a_n = 24 - 3n$ , then its 2nd term is

      (A)  18        (B)   15

      (C)  0        (D)   2

14) The 10th term of an A.P.    5,9,13,............... is

(A)   36                          (B)  31

(C)   41                          (D)  21

15) **If the nth term of an arithmetic progresssion is $4n^2 - 1$ , then the 8th term is**

(A)  32                          (B)  31

(C)  256                         (D)  255

16) **Sum of all the first 'n' terms of even natural number is**
    (A)  $n(n+1)$                (B) $n(n+2)$

    (C)  $n^2$                   (D) $2n^2$

17) **In an Arithmetic progression if *'a'* is the first term and *'d'* is the commondifference,thenwriteits$n^{th}$ term.**

18) **In an Arithmetic progression the sum of first four terms is 20 and the sum of first three terms is 12 then find the fourth term of the arithmetic progression.**

19) **Writetheformulatofindthesumofthefirst$n$termsofanArithmeticpro gression,whosefirsttermis$a$andthelasttermis$a_n$.**

20) **If the first term and the common difference of an A.P. are 6 and  5 respectively , find its 3rd term .**

**2 MARK QUESTION**

1. **Findthe sumoffirst20termsofthe Arithmeticprogression10,  15, 20, ............................ byusingformula.**

2. **Find the sum of first 20 positive integers using formula.**

3. **Findthe30thtermofthearithmeticprogression 5, 8, 11,. . . . . . . .  by usingformula.**

4. **Findthe12thtermoftheArithmeticprogression2,5,8, . . . . . . . . . . . by using formula.**

5. Find the sum of arithmetic progression 7, 11, 15,. . . to  16  terms using formula.

6. Find how many terms of the arithmetic progression   3,6,  9, .... must be added to get the sum 165.

7. Find the sum of first 20 terms of arithmetic series 5+10+15+. . . . using suitable formula.

8. Find the sum of  5+8+11+... to 10 terms using the formula.

9. Find the 15th term of the arithmetic progression 6, 10, 14  . . . using the formula.

10.   Find the sum of first 15 terms of 3 + 6 + 9 .................. using the formula

11.    Verify whether 130 is a term of the arithmetic progression 3, 7, 11 .........

12.    Findthesumoffirsttwentytermsof Arithmeticseries  2+7+12+ …  usingsuitableformula.

13.    Findthesumofalltwodigitnaturalnumberswhicharedivisibleby5.

14.    Findthesumoftheseries 3+7+11+………. to10terms.

15.   Atconstantpressurecertainquantityofwaterat24°Cisheated.Itwaso bservedthattheriseoftemperaturewasfoundtobe4°Cperminute.Calcul atethetimerequiredto rise the temperature of water to 100°C atsealevelbyusingformula.

## 3 MARK QUESTION

1. Thesumoffirst9termsofanArithmeticprogressionis144andits 9thtermis28.Thenfindthefirsttermandcommondifferenceofthe Arithmeticprogression.

2. Findthearithmeticprogressionwhose3rdtermis16        and        its 7thtermexceedsthe5thtermby12

3. The sum of Rs. 700 is to be used to give seven cash prizes to students of a school for their overall academic performance. If each prize is Rs. 20 less than its preceding prize, Find the value of each of the prizes.

4. TheseventhtermofanArithmeticprogressionisfourtimesitssecondte

rm and twelfth term is 2 more than three timesof its fourth term. Findtheprogression.

5. A line segment is divided into four parts forming an Arithmetic progression.The sum of the lengths of 3rd and 4th parts is three times the sum of thelengths of first two parts. If the length of fourth part is 14 cm, find the totallengthofthelinesegment.

6. The sum of first n terms of an arithmetic progression is 210 and sum of its first (n-1) terms is 171. If the first term is 3 , then write the arithmetic progression .

## 4 MARK QUESTION

21) There are five terms in an Arithmetic Progression. The sum of these termsis 55, and the fourth term is five more than the sum of the first two terms.FindthetermsoftheArithmeticprogression.

22) In an Arithmetic Progression sixth term is one more than twice the thirdterm. The sum of the fourth and fifth terms is five times the second term.FindthetenthtermoftheArithmeticProgression.

23) The sum of the fourth and eighth terms of an arithmetic progression is 24andthesumofthesixthandtenthtermsis44.Findthefirstthreeterms oftheArithmeticprogression.

24) The pth, qth and rth term of an A.P. are a, b and c respectively. Prove that $a(q–r) + b(r–p) + c(p–q) = 0$

25) The sum of the first three terms of an A.P is 33. If the product of the first term and third term exceeds the 2nd term by 29 , then find the A.P.

26) If the sum of first 8 terms of arithmetic progressions is 136 and that of first 15 terms is 465 , then find the sum of first 25 terms.

27) The sum of the 5th and 9th terms of an arithmetic progression is 40 and the sum of the 8th and 14th term is 64 . Find the sum of first 20 terms .

28) The common difference of two different arithmetic progressions are equal. The first term of the first progression is 3 more than the first term of second progression. If the 7th term of first progression is 28 and 8th term of second progression is 29,then find the both different arithmetic progressions.
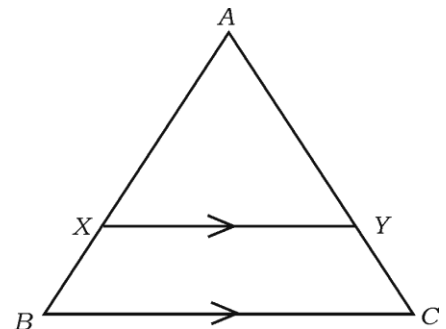
## TRIANGLES

## 1 MARK QUESTION

1) In the $\Delta ABC$, $XY \| BC$ then

A) $\dfrac{AX}{AB} = \dfrac{AC}{AY}$

(B) $\dfrac{AX}{BX} = \dfrac{AY}{CY}$

(C) $\dfrac{AX}{BX} = \dfrac{XY}{AY}$

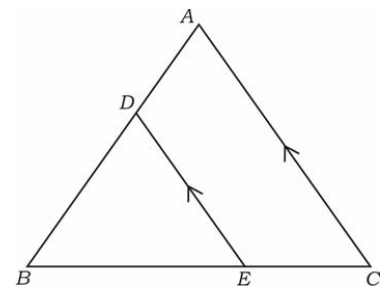(D) $\dfrac{AB}{BX} = \dfrac{AC}{AY}$

2) In the $\Delta ABC$, if $DE \| AC$, then the correct relation is

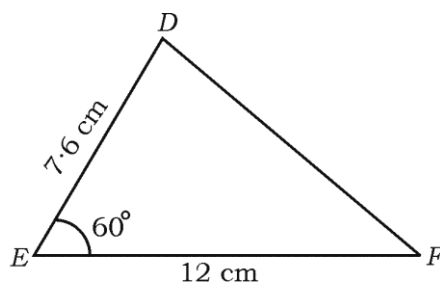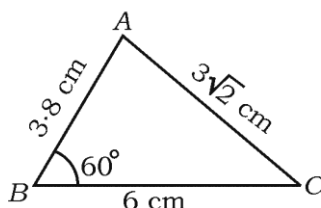(A) $\dfrac{BD}{AB} = \dfrac{AC}{DE} = \dfrac{BC}{BE}$

(B) $\dfrac{BD}{AB} = \dfrac{DE}{AC} = \dfrac{BE}{BC}$

(C) $\dfrac{AB}{BD} = \dfrac{AC}{DE} = \dfrac{BE}{EC}$

(D) $\dfrac{AD}{BD} = \dfrac{DE}{AC} = \dfrac{BE}{EC}$

3) Observe the given two triangles and then identify the length of $DF$ in the following:

(A) 6 $\sqrt{2}$ cm          (B) 3 $\sqrt{2}$ cm

(C) 4.2 cm          (D) 8.4 cm

4) $\Delta ABC \sim \Delta PQR$. Area of $\Delta ABC$=64cm$^2$ and the area of $\Delta PQR$=100cm$^2$ . If **AB=8cm** then the length of **PQ** is

     (A) 12 cm          (B) 15 cm

     (C) 10 cm          (D) 8 cm

5) In the $\Delta ABC, \angle B = 90°$ and    $BD \perp AC$ . If **AB=6cm, BC= 8cm** then the length of **CD** is

(A) 10 cm      (B)          6.4 cm

     (C) 4.8 cm      (D)      3.6 cm
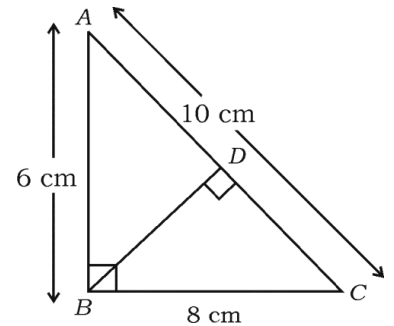


6) In the figure, if $\Delta POQ \sim \Delta SOR$ and **PQ:RS=1:2**, then **OP:OS** is
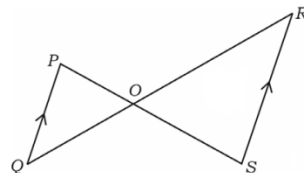


     (A) 1 : 2          (B) 2 : 1

     (C) 3 : 1          (D) 1 : 3.

7) If a pair of linear equations $a_1x + b_1y + c_1=0$   $a_2x + b_2y + c_2=0$ in two variables have unique solution then correct relation among the following is

     (A) $\dfrac{a_1}{a_2} \neq \dfrac{b_1}{b_2}$          (B) $\dfrac{a_1}{a_2} = \dfrac{b_1}{b_2} = \dfrac{c_1}{c_2}$

(C) $\dfrac{a_1}{a_2} = \dfrac{b_1}{b_2}$  (D) $\dfrac{a_1}{a_2} = \dfrac{b_1}{b_2} \neq \dfrac{c_1}{c_2}$

8) **Which of the following pair of triangles are always similar**

  (A) Two isosceles triangles  (B) Two scalene triangles

  (C) Two equilateral triangles  (D) Two right angle triangles

9) **In the given △ ABC , DE ∥ BC . If DE = 5cm , BC = 8cm and AD = 3.5cm , then the length of AB is**
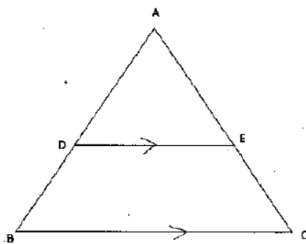


  (A) 5.6cm  (B) 4.8cm

  (C) 5.2cm  (D) 6.4cm

10) **In △ABC, ∠ABC =90°,BD⊥AC if BD=8cmandAD=4cmthenthe lengthofCDis**

  (A) 16cm  (B) 4cm

  (C) 64cm  (D) 12cm
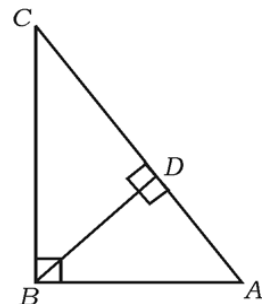


11) **Write the statement of "Basic Proportionality" theorem (Thales theorem)**

12) **State " Pythagoras's theorem "**

**2 MARK QUESTION**

13) △ *ABC~△DEF* andtheirareasare64cm$^2$ and100cm$^2$ respectively.If *EF=12cmthenfindthemeasureofBC.*

**14)** A vertical pole of height 6 m casts a shadow 4 m long on the ground, and at the same time a tower on the same ground casts a shadow 28 m long . Find the height of the tower.

**15)** The diagonal *BD* of parallelogram *ABCD* intersects *AE* at *F* as shown in the figure. If *E* is any point on *BC*,then prove that *DF×EF* = *FB×FA*.
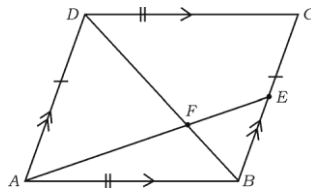
**16)** In△*ABC*, *AD⊥BC* and $AD^2 = BD×CD$ .Provethat $AB^2 + AC^2 = (BD+CD)^2$.
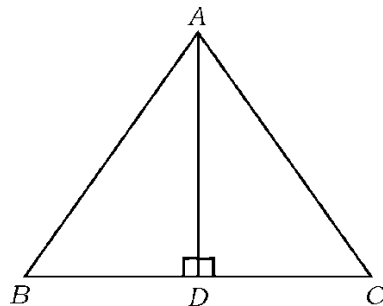
**17)** In△*ABC*, *DE* || *BC*. If *AD* = 5 cm, *BD* = 7 cm and *AC* = 18 cm, find thelength of AE .
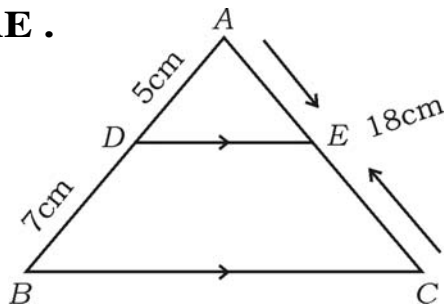
**18)** In the given figure if PQ || RS, prove that △ POQ ~ △ SOR.

**19)** The perimeters of two similar triangles are 25 cm and 15 cm . If one side of the first triangle is 9 cm, find the corresponding side of the second triangle.
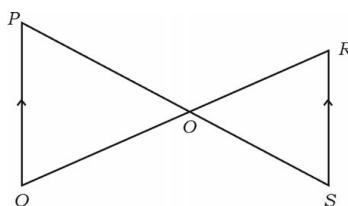
**20)** In the given figure △ ABC and △ DBC are on the same base BC . AD intersects BC at 'O' . If AL ⊥ BC and DM ⊥ BC , prove that

$$\frac{\text{area of } \triangle \text{ ABC}}{\text{area of } \triangle \text{ DBC}} = \frac{AO}{DO}$$
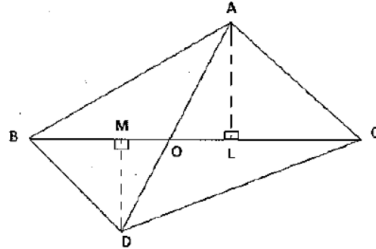


**21)** In the adjoining figure , XY ‖ BC . AX = p − 3 ; BX = 2p − 2 and $\frac{AY}{CY} = \frac{1}{4}$ . Find the value of p .
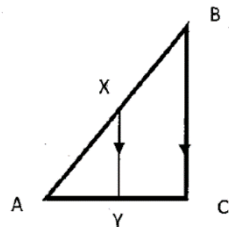


**22)** In the figure , PC ‖ QK and BC ‖ HK . If AQ = 6 cm , QH = 4 cm , HP = 5 cm and KC = 18 cm , then find the lengths of AK and AB .
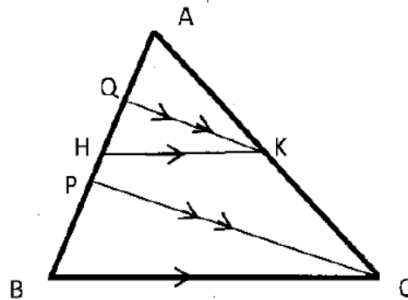


**23)** In △ ABC, DE ‖ BC, if AD = 2 cm, DB = 5 cm and AE = 4 cm, find AC.
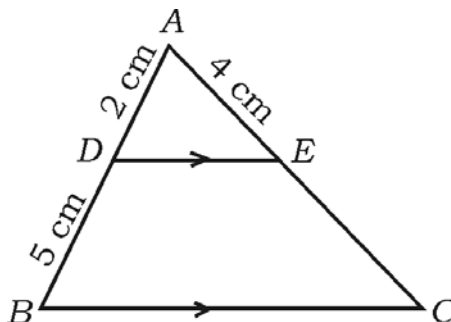
**24)** In $\triangle ABC$, $\angle ABC = 90°$, $BD \perp AC$. If $BD = 8$cm, $AD = 4$cm, find $CD$ and $AB$.
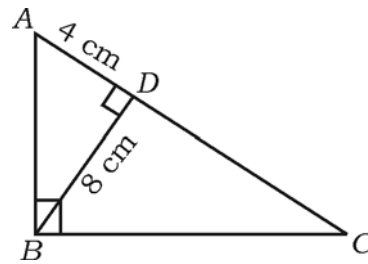
**25)** In the $\triangle ABD$, C is a point on $BD$ such that $BC:CD = 1:2$, and $\triangle ABC$ is an equilateral triangle. Then prove that

$AD^2 = 7AC^2$.
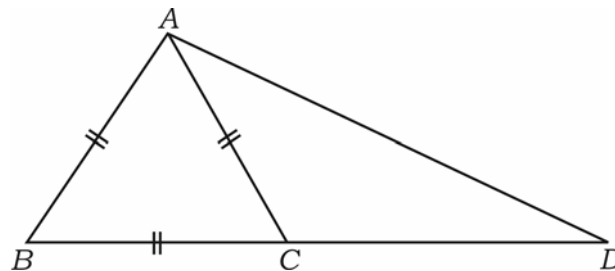


**26)** In $\triangle ABC$, $AB = AC$. P is a point on $BC$ such that $PN \perp AC$ and $PM \perp AB$ as shown in the figure. Prove that $MB.CP = NC.BP$
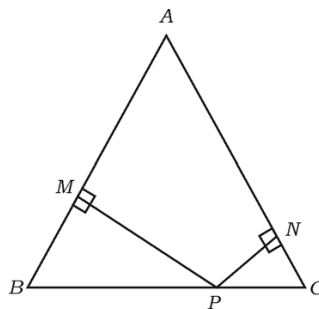


**27)** In $\triangle ABC$, $DE \parallel BC$. If $3DE = 2BC$ and the area of $\triangle ABC$ is $81 \ cm^2$ , show that the area of $\triangle ADE$ is $36 \ cm^2$ .

---
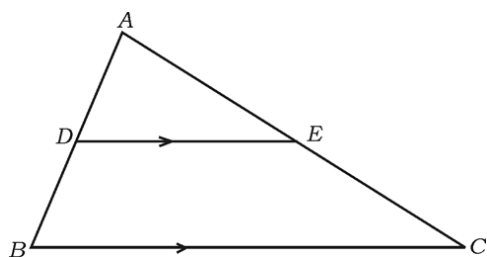
28) Prove that "if in two triangles, corresponding angles are equal, then their corresponding sides are in the same ratio ( or proportion ) and hence the two triangles are similar" .

29) Prove that "In a right triangle, the square of the hypotenuse is equal to the sum of the squares of the other two sides".

30) Prove that "the ratio of the areas of two similar triangles is equal to the square of the ratio of their corresponding sides".

31) A vertical tree is broken by the wind at a height of 6 metre from its foot and its top touches the ground at a distance of 8 metre from the foot of the tree. Calculate the distance between the top of the tree before breaking and the point at which tip of the tree touches the ground, after it breaks.

32) In $\triangle ABC$, $AD$ is drawn perpendicular to $BC$. If $BD:CD = 3:1$, then prove that $BC^2 = 2(AB^2 - AC^2)$

33) State and prove Pythagoras theorem.

34) State and prove basic proportionality theorem (Thales theorem).

35) State and prove : The converse of the Pythagoras theorem.

# PAIR OF LINEAR EQUATIONS IN TWO VARIABLES

## 1 MARK QUESTION

*1.* The relation between the ratio of coefficients of pair of linear equations $a_1x+b_1y+c_1=0$ and $a_2x+b_2y+c_2=0$ which have no solution is

(A) $\dfrac{a_1}{a_2}=\dfrac{b_1}{b_2}=\dfrac{c_1}{c_2}$   (B) $\dfrac{a_1}{a_2}\neq\dfrac{b_1}{b_2}$   (C) $\dfrac{a_1}{a_2}=\dfrac{b_1}{b_2}$   (D) $\dfrac{a_1}{a_2}=\dfrac{b_1}{b_2}\neq\dfrac{c_1}{c_2}$

2. The lines represented by $3x+4y=13$ and $2x-3y=3$ are

    (A) Intersecting lines     (B) Parallel lines      (C) Co-incident lines

    (D) Perpendicular lines to each other

3. The value of x and y for the equations $x+y=14$ and $x-y=14$ are

    (A) (-14 ,0)      (B) (14,0)      (C) (28, 14) (D) ( 14,-7)

4. Among the following pair of linear equations which has infinitely many solutions

    (A) $2x-3y+6=0$          $2x+3y+6=0$

    (B)$3x-4y-6=0$         $3x-4y+6=0$

    (C) $x-y+10=0$          $x-y+10=0$

    (D) $5x-10y+20=0$     $5x-20y+30=0$

5. The pair of equations $5x-15y=8$ and $3x-9y=24$ has

    (A) unique solution               (B) one solution       (C) no solution

    (D) infinite number of solutions

  6. The given graph represents a pair of linear equations in two variables
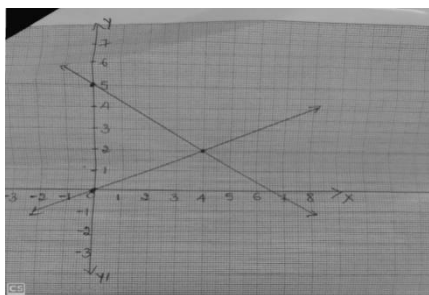


Write the co-ordinates of the vertices of triangle formed between the lines and y-axis.

7. **What is the point of intersection of the line represented by 3x-2y=6 and the y-axis?**

8. **If x=3m-1 and y=4 is a solution of the equation x+y=6, then find the value of m.**

9. **For what value of K does the system of equations x+2y=3 and 5x+KY+7=0 have a unique solution?**

10. **For what value of P for which the equations 2x+3y=5 and 4x+Py=10 have infinitely many solutions?**

11. **If a pair of linear equation is inconsistent, then they have how many solutions?**

## 2 MARK QUESTION

**1. Solve the following pair of linear equations.**
(A) a) x-4y=2      x+3y=9
    b) 3x+y=9      2x+y=7
(B) a) x+y=9       x-y=1
    b) x+y=14      x-y=4
(C) a)10x+3y=75  6x-5y=11
    b) 3x+2y=1    2x-3y=3
(D) a) 7x-5y=2    x+2y=3
    b) x+y=4      3x-2y= -3

**2. For which value of K, the following pair of linear equations has no solution (are inconsistent)?**
     2x+3y=1   and (K-1)x+(2K+1)y=K-1

**3. For what values of a and b does the following pair of linear equations has infinite number of solutions?**

     2x+3y=7 andÛ  (a-b)x+(a+b)y=3a+b-2

**1.** The difference of two numbers is 66.If one number is four times the other .Find the numbers.

**2.** The smaller of the two complimentary angles is $36^0$ smaller than the larger one .Find the angles.

**3.** Reema has some ₹50 and ₹100 notes amounting to a total of ₹.650 .If total number of notes is 9, and then finds how many notes of ₹50 and ₹100 each she has?

**4.** Two chairs and three tables cost ₹ 5650, whereas three chairs and two tables cost ₹7100 .Find the cost of a chair and a table separately.

**5.** The perimeter of a rectangular garden, whose length is 4m more than its width, is 40m .Find the dimensions of the rectangle.

**6.** Solve for x and y,

(a) $\frac{1}{x+1} + \frac{1}{y+1} = 10$ , $\frac{1}{x+1} - \frac{1}{y+1} = 4$

**7.** 2 men and 7 women can together do a piece of work in 4 days .It is done by 4 men and 4 women in 3 days .How long would it take for one man or one woman to do this work?

**8.** The sum of the digits of a two digit number is 12.The number obtained by interchanging the two digits exceeds the given number by 18.Find the number.

**9.** If one is added to both the numerator and denominator of a given fraction, it becomes $\frac{4}{5}$ .If five is subtracted from both the numerator and denominator the fraction becomes $\frac{1}{2}$.Find the fraction.

**10.** Ten years hence a man's age will be twice the age of his son .Ten years ago a man was four times as old as his son .Find their present ages.

**1. Solve each of the following pair of linear equations graphically.**

(a) **3x+y=11   x-y=1**
(b) **2x+y=10   x+y=7**
(c) **x+y=7      3x-y=1**
(d) **x+2y=6     x+y=5**
(e) **2x+3y=4   3x-y= -5**
(f) **2x-5y+4=0  2x+y-8=0**
(g) **2x+y=6      2x-y=2**
(h) **x-2y=0       3x+4y=20**
(i) **y=8-2x       x+2y=1**
(j) **x+y=6        3x-y=10**

## 5 MARK QUESTION

**1. Draw the graph of the equations y=2(x-1) and 4x+y=4.Determine the area of a triangle formed by these lines and the y-axis.**

**2. For Kodagu flood victims two sections A and B of class tenth contributed 1500 .If the contribution of tenth A was 100 less than that of tenth B. Find graphically the amount contributed by both the sections.**

**3. Draw the graph of the equations 4x-y=4 and 3x+2y=14 .Determine the co-ordinates of the vertices of the triangle formed by these lines and the y-axis and shade the triangular region.**

# CIRCLES

## 1 MARK QUESTION

1) **The number of tangents drawn from a point lying inside the circle  [ Zero]**
2) **Number of tangents  drawn to a circle through a point lying on the circle.[One]**

3) Number of tangents drawn to a circle from an external point. [two]

4) Tangents drawn at the ends of a diameter are _____[parallel]

5) The length of the longest chord drawn to a circle of radius 5cm is ____[10cm]

6) The angle formed by radius of a circle and the tangent at the point of contact is _____[$90^0$]

7) A parallelogram circumscribing a circle is _____[Rhombus]

8) Opposite sides of a quadrilateral circumscribing a circle subtends _____ angles at the centre of the circle.[$180^0$]

9) The angle between the two tangents drawn from an external point to a circle is _____ to the angle subtended by the line segment joining the point of contact at the centre.[supplementary or $180^0$]

10) In the figure AP and BP are tangents and $\angle APB = 70^0$ , then $\angle AOB =$
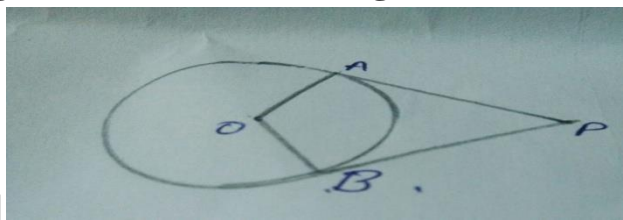


_____[$110^0$]

11) Two tangents drawn from an external point to a circle are _____ [Equal]

12) In the fig, TA and TB are tangents to a circle from an external point T. If $\angle ATB = 60^0$, then the triangle TAB is _____[Equilateral triangle]
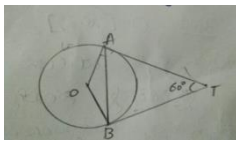


13) The length of the tangent drawn form a point 8cms away from the centre of the circle of radius 6cm is _____ [10 cm]

14) If the angle between two radii of a circle is $130^0$, then the angle between the tangents at their point of intersection is _____[$50^0$]

<p style="background:cyan">2 MARK QUESTION</p>

1. In the adjoining figure, If AP=3cm and PC= 8cm, then find the length of
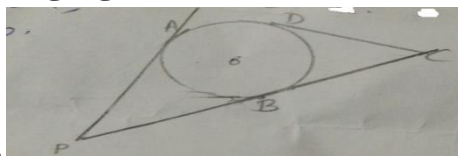


tangent CD.

2. If the radii of two concentric circle are 6cms and 10cms, then the length of each chord of one circle which is tangent to other circle

3. The length of tangent from a point A at a distance of 5cms from the centre of the circle is 4cms. Find the radius of the circle.

## 3 MARK QUESTION

1. Prove that the tangent at any point of a circle is perpendicular to the radius through the point of contact.
2. Prove that the lengths of tangent drawn from an external point to a circle are equal.
3. Prove that the tangents drawn at the ends of a diameter of a circle are parallel.
4. Prove that the perpendicular at the point of contact to a tangent of a circle passes through the centre.
5. Prove that the parallelogram circumscribing a circle is a Rhombus.
6. In the fig, TA and TB are tangents to a circle from an external point T. If $\angle ATB = 50^0$, then prove that the triangle TAB is an Isosceles triangle.
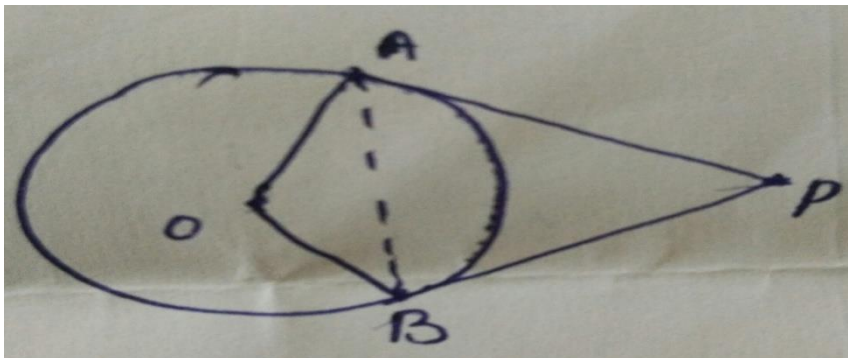


7. In the fig, ABP is a tangent at P to a circle with centre 'O' and

$\angle QPB = 60^0$ . Find $\angle POQ.$

# AREA RELATED TO CIRCLES

1) Length of an arc of a sector of a circle of radius $r$ and angle $\theta$ is

   (A) $\frac{\theta}{360^0} \times \pi r^2$  

   (B) $\frac{\theta}{360^0} \times 2\pi r^2$

   (C) $\frac{\theta}{180^0} \times 2\pi r$  

   (D) $\frac{\theta}{360^0} \times 2\pi r$

2) If the area of a circle is $49\pi$ sq. units then its perimeter is

   (A) $7\pi$ units  

   (B) $9\pi$ units

   (C) $14\pi$ units  

   (D) $49\pi$ units

3) In the figure find the length of an arc AB of a circle centre 'O' if $\angle$ AOB $= 90^0$
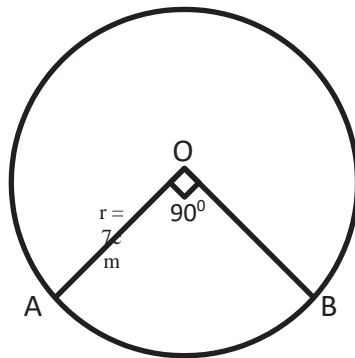


4) Write the formula to find area of a sector of a circle, if angle at the centre is '$\theta$' degrees.

5) If the perimeter and area of a circle are numerically equal , then find the radius of the circle.

6) The perimeter of a circle with centre 'O' is 24 cm , the angle formed

by an arc of the circle at its centre is $30^0$ . Find the length of the arc AB.
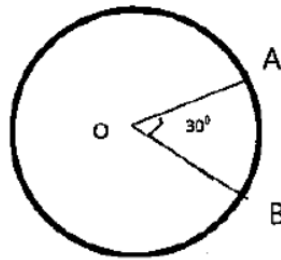
7)

*ABCDisasquareofside14cm.Fourcongruentcirclesaredrawninthesqu areasshowninthefigure.Calculatetheareaoftheshadedregion. (Circlestoucheachotherexternallyandalsosidesofthesquare)*

8) **Inthefigure,*ABCD*isasquareofside14cm.*A,B,C*and*D*arethecentresof**
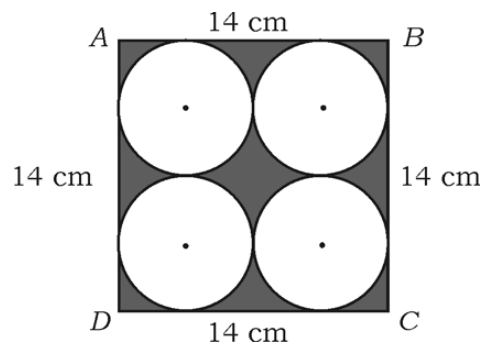


four congruent circles such that e

9) ach circle touches 9) externally two of

theremainingthreecircles.Findtheareaoftheshadedregion.



---
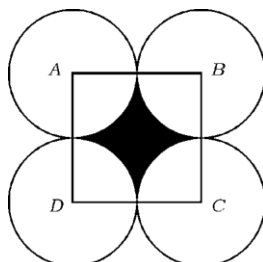
**10)** Find the area of un-shaded region in the given circle of radius 7 cm and sector angle is 300 as in the figure .



7 cm

---
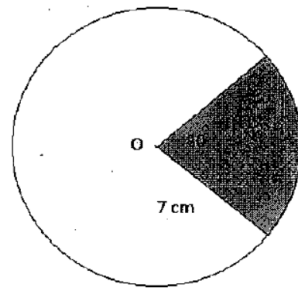
**3 MARK QUESTION**

**11)** *AB* and *CD* are the arcs of two concentric circles with centre '*O*' of radius 21cm and 7cm respectively. If $\angle AOB$ =30° as shown in the figure, find the area of the shaded region.
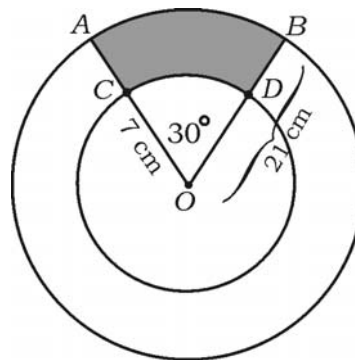


**12)** In the figure, *ABCD* is a square, and two semicircles touch each other externally at *P*. The length of each semicircular arc is equal to 11 cm. Find the area of the shaded region.
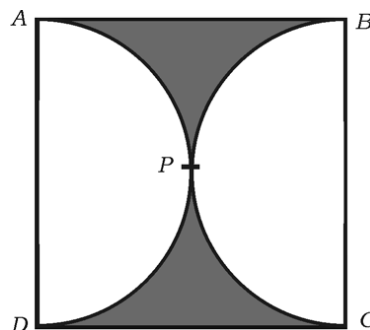
**13)** ABCD is a rectangle of length 20 cm and breadth 10 cm. OAPB is a sector of a circle of radius $10\sqrt{2}$ cm. Calculate the area of the shaded region. [ Take $\pi = 3\cdot14$ ]
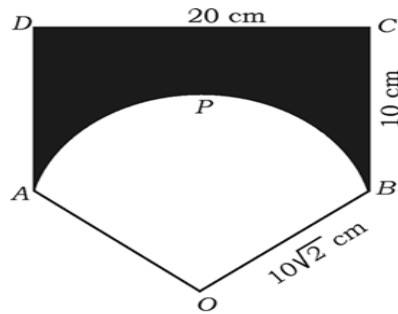
**14)** A hand fan is made up of cloth fixed in between the metallic wires. It is in the shape of a sector of a circle of radius 21 cm and of angle 120° as shown in the figure. Calculate the area of the cloth used and also find the total length of the metallic
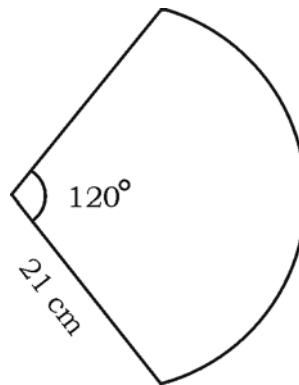
**15)** In the figure ABCD is a square of side 14cm with Centre A,B,C and D four circles are drawn such that each circle touch externally two of the remaining three circles as shown in the figure. Find the area of the shaded region.
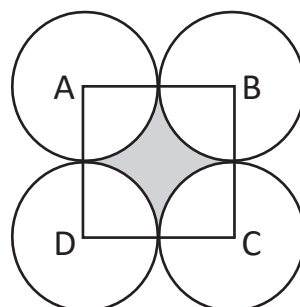
**16)** In the figure ABCD is a square , whose vertices lie on the circle. Find the area of the shaded region , if the perimeter of the circle is 88 cm .
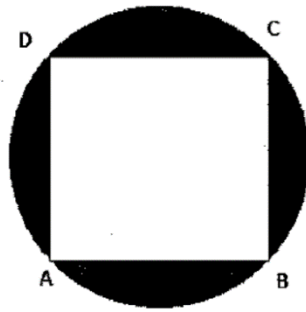


**17)** Δ ABC is right angled at  A . The sides AB , BC and AC are the tangents to the circle  with center 'O' as shown in the figure . If AB = 6 cm, BC = 8 cm, find the area of the shaded region
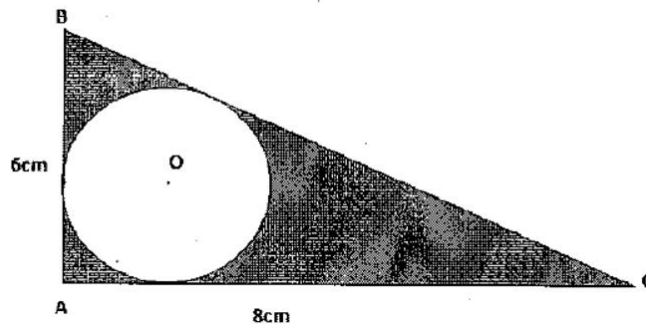


**4 MARK QUESTION**

**18)** In the figure *AXB* and *CYD*  are the arcs of two concentric circles with centre *O*. The length of the arc *AXB* is 11cm. If *OC*=7cm and  ∠*AOB*=30°,then find the area of the shaded region. [Take $\pi=\frac{22}{7}$ ]
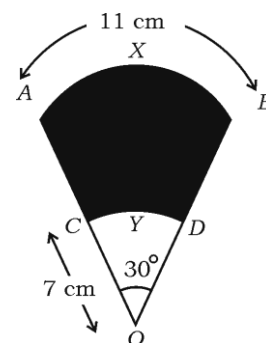
**19)** **ABCD** is a square of side14cm.A circle is drawn inside it which just touches the mid-points of sides of the square, as shown in the figure. If *P,Q,R* and *S* are the mid-points of the sides of the square, and *PQ,QR,RS* and *SP* are the arcs of the circle, then find the area of the shaded region.
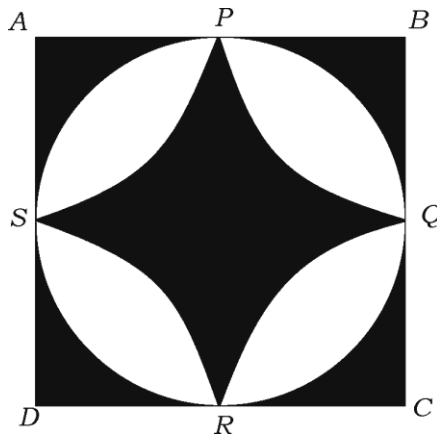


## CONSTRUCTIONS

### 2 MARK QUESTION

1) Draw a line segment of length $6$ cmand divide it in the ratio $6 : 2$ .

2) Draw a line segment of length $7.8$ cmand divide it in the ratio $5:8$.

Measure the parts.

3) Draw a line segment of length $9$ cm and divide it in the ratio $2:1$.

4)Draw a circle of radius$4$ cmand draw a tangent at any point " G " on the circle.

5)Draw a circle of radius$5$ cmand drawtwo tangents at N andM of the diameter "NM" .

6) Draw a circle of radius $4$ cm. Construct a pair of tangents to the circle from a point " P " which is $9$ cm away from its center.

7)Draw a circle of radius $5\,cm$.Construct a pair of tangents to the circle from a point which is 4cm away from the circle.

8)Construct a pair of tangents to the circle of diameter $7\,cm$ where the radii are inclined at an angle of $70°$.

9)Drawa pair of tangents to the circle of radius $5.5\,cm$ which are inclined to each other at an angle of$60°$.

10) Draw a line segment of length $AB = 8\,cm$ and divide itgeometrically in the ratio $3 : 2$.

11) Draw a circle of radius 4 cm and construct a pair of tangents such that the angle between them is 60°.

12) Construct a pair of tangents to the circle of diameter $7\,cm$ where the tangents are inclined at an angle of $60°$

## 3 /4 MARK QUESTION

) Construct a triangle with sides 6 cm, 7 cm and 8 cm and then construct another triangle whose sides are $\frac{3}{4}$ of the corresponding sides of the given triangle.

2) Construct a triangle with sides 5 cm, 6 cm and 7 cm and then construct another triangle whose sides are $\frac{7}{5}$ of the corresponding sides of the given triangle.

3) Draw a triangle ABC with sides$BC = 7\,cm$ , $AB = 6\,cm$ and$\angle ABC = 70°$.Then construct another triangle whose sides are $\frac{3}{4}$ of the corresponding sides of the triangle ABC .

4) Draw a triangle ABC with side $BC = 7\ cm$, $\angle B = 40°$, $\angle A = 100°$. Then construct another triangle whose sides are $\frac{4}{3}$ of the corresponding sides of the triangle ABC .

5) Draw a circle of radius 3 cm.Take two points A and D on one of its extended diameter each at a distance of $4\ cm$ from the circle.Draw two tangents to the circle from these two points.

6) Draw two concentric circles of diameter $8\ cm$ and $12\ cm$ .Construct a pair of tangents to the the circle of diameter $8\ cm$ from a point on the concentric circle of diameter $12\ cm$. Measure the length of tangents.

## CO - ORDINATE GEOMETRY

### 1 MARK QUESTION

1    The distance between a point $(4, -3)$ and the origin is

   A)    1 unit    B)    5unit   C)    7unit    D)    -1unit

2    The distance between a point   A$(x, y)$ and the origin is 5 units, then the co-ordinates of the point 'P' is

   A)    $(-2, 3)$    B)    $(1, 2)$    C)$(3, 3)$    D) $(3, 4)$

3    The perpendicular distance of a point A(3,5) from the x-axis is

   A)    3 unit    B)    5 unit    C)    6 unit    D)    8unit

4    The co-ordinates of the midpoint of the line segment joining the points (-6,5) and    (-2,3) is $(\frac{a}{3},\ 4)$ , then the value of 'a' is

   A) -4            B) -12            C) 12            D) -6

5    The co-ordinates of the midpoint of the line segment joining the points (2, 3) and    (4, 7) is ( 3, b) , then the value of 'b' is

   A) 2            B) 4            C) 5            D) 0

6    The co-ordinates of the midpoint of the line segment joining the points A (-3, b)

     and   B(1, b+4) is $(-1, 1)$. then the value of 'b' is

     A)1                B)-1                C)5                D)10

7    The distance between the points (0, 5) and (-5,0) is

     A)    $5\sqrt{2}$unit    B)5 unit          C)$2\sqrt{5}$unit        D) $\sqrt{10}$unit

8    The co-ordinate of the midpoint of the line segment joining the points A(2,4)

     and   B(4, 6) is

     A) $(3,5)$        B)$(2,5)$          C)$(3,6)$          D) $(3,7)$

9.   What is the distance of a point (6, 8) from the y-axis?

10   Find the distance between the co-ordinates of the point A(2,6) and b(5, 10)

11   Find the distance between a point (5, -5) from the origin.

12   Find the co-ordinates of the midpoint of the line segment joining the points

     $(8, 5)$ and $(6,3)$

## 2 MARK QUESTION

14.  Find the distance between the points (0, 0) and (36, 15)

15.  Find the distance between the points (a, b) and(-a, -b)

16.  The distance between the points P$(2, -3)$ and Q$(10,y)$ is 10 units, then find the

value of y

17.  Find the points on the x-axis which is equidistance from (2, -5) and (-2, 9)

18.  If P (x, y) is equidistance from A(6, 2) and B(-2, 6) then prove that y=2x

20.  Find the distance between the points (-1, 1) and (-4, 4)

21   If the points A(6, 1), B(8, 2), C(9, 4) and D(p, 3) are the vertices of a

parallelogram,     taken in order, find the value of p.

22   Find the coordinates of the point which divides the join of (–1, 7) and (4, –3) in

     the    ratio 2 : 3.

## 3 MARK QUESTION

23. Check whether (5, – 2), (6, 4) and (7, – 2) are the vertices of an isosceles triangle

24. Prove that $(3, 0)$ $(6, 4)$ and $(-1, 3)$ are the vertices of the right angled triangle

25. Show that (9, 0),(9, 6) , (-9, 6) and (-9, 0) are the vertices of the rectangle.

26. Prove that the points ( 1, -1), (5, 2) and (9, 5) are collinear( using distance formula)

27. Find the coordinates of the points of trisection of the line segment joining (4, –1) and (–2, –3).

28. Find the coordinates of the point which divides the join of (-5, 11) and (4, -7) in the ratio 7 : 2.

29. Find the ratio in which the line segment joining the points (8, 2) and (-6, 9) is divided by (2, 5).

30. In what ratio does the point (–6, a) divide the line segment joining the points A(–3,-1) and (-8, 9)? and also find the value of 'a'.

31. Find the coordinates of the points which divide the line segment joining A(–2, 2) and B(2, 8) into four equal parts.

32. Find the area of a triangle whose vertices are A(5, -2), B(6, 4)and C(7, -2)

33. Find the value of 'x' if the points (-3, 12), (7, 6) and (x, 9)are collinear.

## 4 MARK QUESTION

34. Find the area of the triangle formed by joining the mid-points of the sides of the triangle whose vertices are (0, –1), (2, 1) and (0, 3). Find the ratio of this area to the area of the given triangle.

35    In the given figure D, E and F are the midpoints of AB, BC and AC in an order respectively, then find the area of the triangle DEF .

A(2, 2)

D    F

B(4, 4)    E    C(2, 6)
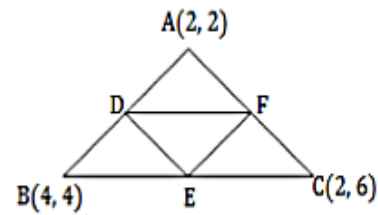
36    In the fig. D(3, 3), E (3,5) and F(2,4 ) are the midpoints of the sides of the triangle AB,    BC and AC respectively, then find the vertices of the triangle ABC .

$A(x_1, y_1)$

D    F

$B(x_2, y_2)$    E    $C(x_3, y_3)$
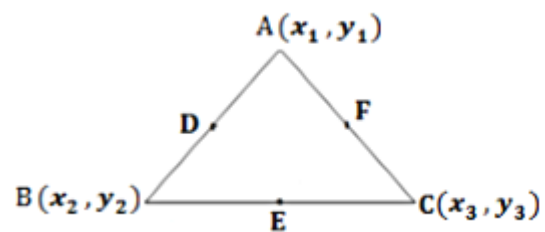
37    'O' be the origin. B(-6,9) and C(12, -3) are the vertices of the triangle ABC. P divides    OB in the ratio 1:2 and  Q divide OC in the ratio 1:2 then show that PQ=$\frac{1}{3}$ BC

38    A(6,1), B(8, 2) and C(9, 4) are the three vertices of a parallelogram ABCD. If E is the    midpoint of DC then find the area of triangle ADE

## REAL NUMBERS

### 1 MARK QUESTION

1) $3 + \sqrt{2}$  is _____ .
A)Integers        B)Rational number      C)Irrational number      D) Natural number
2) H.C.F of the least composite and the least prime number is _____ .
   A) 4                    B) 2                    C) 1                    D) 3
3) For any two positive integers 'a' and 'b'  H.C.F (a,b) × L.C.M (a,b) = _____.
   A) $(a + b)$        B) $(a - b)$        C) $(a \times b)$        D)$(a \div b)$

4) If we express 120 as a product of its prime factors _____ .

A)$2^3 \times 3^2 \times 5^1$    B)$2^2 \times 3^1 \times 5^1$    C)$2^3 \times 3^1 \times 5^2$    D)$2^3 \times 3^1 \times 5^1$

5) If the H.C.F (12,15) is 3.Then the L.C.M (12,15) is _____ .

A) 60            B) 45            C) 36            D) 90

6) Which of the following is an irrational number _____ .

A)$\sqrt{16} - \sqrt{9}$    B)$\frac{3}{4}$            C) 0.333 …            D)$2 + \sqrt{3}$

7) The H.C.F of 95 and 152 is _____ .

A) 57            B) 38            C) 19            D) 8

8) $7 \times 11 \times 13 + 13$ is _____ .

A) Rational numbers    B) Prime numbers    C) Irrational numbers    D) Composite number

9) If $7 = 2 \times q + 1$ then according to Euclid's division algorithm the value of $'q'$

Is _____.

A) 2            B) 3            C) 4            D) 5

10) State the Euclid's division algorithm.

11) Express 140 as product of its prime factors.

12) State fundamental theorem of arithmetic.

13) If the H.C.F of 24 and 36 is 12, then what is the L.C.M ?

14) According to Euclid's division algorithm if $a = 3q + r$ then find all the possible values of 'r' ?

15) verify whether $\frac{18}{7}$ is terminating or non-terminating decimal expansion ?

## 2 MARK QUESTION

16) Prove that $7 + \sqrt{5}$ is irrational.

17) Find the H.C.F of 125 and 55 using Euclid's division algorithm.

18)Prove that $2 + 5\sqrt{3}$ is irrational.

19) Find the H.C.F of 135 and 225 using Euclid's division algorithm.

20) Prove that $\sqrt{3}$ is irrational.

## 3 MARK QUESTION

21) Show that the square of any positive integer is either of the form $3m$ and $3m + 1$ For some integer 'm'.

22) Find the H.C.F and L.C.M of integers 510 and 92 using prime factorisation method.

23) Show that any positive odd integer is of the form $6q + 1$ or $6q + 3$ or $6q + 5$, Where $'q'$ is some integer.

24) Prove that $\sqrt{2} + \sqrt{3}$ is irrational.

25) Find the H.C.F and L.C.M of integers 12,15 and 21 using prime factorisation method.

## POLYNOMIALS

### 1 MARK QUESTION

**1) In the given graph, the number of zeros of the polynomial**
   **$y = p(x)$ is**



   (A) 3   (B) 5   (C) 4   (D) 2.

**2) The degree of a linear polynomial is**

     (A) 0                  (B) 1

     (C) 2                  (D) 3.

**3) If one root of the equation $2x^2 + ax + 6 = 0$ is 2 , then the value of 'a' is**

     (A) 7                  (B) $\dfrac{7}{2}$

     (C) $-7$              (D) $-\dfrac{7}{2}$

**4) In the given graph of $y = P(x)$, the number of zeros is**



     (A) 4                  (B) 3

     (C) 2                  (D) 7

5) If one of the zeros of the polyomial $p(x) = x^2 - x + k$ is 2 then the value of k is

        (A) 2                  (B) - 2

        (C) - 6             (D) 6

6) If the polynomial $p(x) = x^2 - x + 1$ is divided by $(x - 2)$ then the remainder is

        (A) 2                 (B) 3

        (C) 0                 (D) 1

7) If $P(x) = 2x^3 + 3x^2 - 11x + 6$, then find the value of $P(1)$.

8) The following graph represents the polynomial $y = p(x)$. Write the number of zeroes that $p(x)$ has.
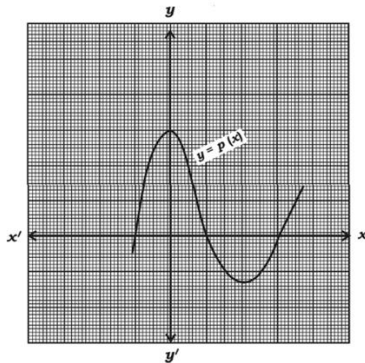


9) Find the degree of the polynomial $P(x) = x^3 + 2x^2 - 5x - 6$.

10) Find the zeroes of the polynomial $P(x) = x^2 - 3$.

11) Write the degree of the polynomial $P(x) = 2x^2 - x^3 + 5$.

12) Write the number of zeros of the polynomial $p(x) = x^3 + 2x^2 + x + 6$.

13) If $(x + 3)$ is one of the factor of $f(x) = x^2 + 5x + 6$, find the other factor.

14) Write the degree of the polynomial $f(x) = x^2 - 3x^3 + 2$.

15) Find the value of k of the polynomial $P(x) = 2x^2 - 6x + k$, such that the sum of zeros of it is equal to half of the product of their zeros.

16) If one zero of the polynomial $p(x) = x^2 - 6x + k$ is twice the other, then find the value of k.

17) Find the polynomial of least degree that should be subtracted from $p(x) = x^3 - 2x^2 + 3x + 4$ so that it is exactly divisible by $g(x) = x^2 - 3x + 1$.

18) Sum and product of the zeroes of a quadratic polynomial $P(x) = ax^2 + bx - 4$ are $\frac{1}{4}$ and $-1$ respectively. Then find the values of a and b.

19) Find the quotient and remainder when $P(x) = 2x^2 + 3x + 1$ is divided by $g(x) = x + 2$.

20) Find the value of k, in which one of its zeros is $-4$ of the polynomial $P(x) = x^2 - x - (2k + 2)$.

21) The sum and product of the zeroes of a quadratic polynomial $P(x) = ax^2 + bx + c$ are $-3$ and 2 respectively. Show that

$b + c = 5a$.

22) Find the quotient and the remainder when $P(x) = 3x^3 + x^2 + 2x + 5$ is divided by $g(x) = x^2 + 2x + 1$.

23) Write the general form of the following
   a) Linear polynomial

   b) Cubic polynomial

24) 21. If α and β are the zeros of the polynomial $p(x) = 3x^2 - 12x + 15$, find the value of $\alpha^2 + \beta^2$.

25) Find the quotient and remainder by using synthetic division : $(3x^3 - 2x^2 + 7x - 5) \div (x - 3)$

26) Verify whether $(x - 2)$ is a factor of $f(x) = x^3 - 3x^2 + 6x - 20$ by using factor theorem.

27) Find the remainder when $P(x) = x^3 + 3x^2 - 5x + 8$ is divided by $(x - 3)$ by remainder theorem.

28) Find the quotient and the remainder when $f(x) = 2x^3 - 3x^2 + 5x - 7$ is divided by $g(x) = (x - 3)$ using synthetic division.

29) Find the zeros of the polynomial $p(x) = x^2 - 15x + 50$.

## 3 MARK QUESTION

30) If 3 and $-3$ are two zeros of the polynomial $p(x) = x^4 + x^3 - 11x^2 - 9x + 18$, then find the remaining two zeros of the polynomial.

31) If p and q are the roots of the equation $x^2 - 3x + 2 = 0$, find the value of $\dfrac{1}{p} - \dfrac{1}{q}$

## QUADRATIC EQUATIONS

## 1 MARK QUESTION

**I.** Choose the correct answer from the options given for each of the following.

1) The standard form of the equation $\dfrac{x+1}{x} = \dfrac{1}{x}$ is

a. $x^2 + x - 2$.

b. $x^2-x+2$

c. $x^2-x-12$

d. $x^2+x+2$

2) If one of the roots of the equation $2x^2+ax+3=0$ is 2 then the value of a is

a. 7

b. $\frac{7}{2}$

c. -7.

d $\frac{-7}{2}$

3) Discriminant of the equation $2x^2-3x-4=0$

a.-21.          b.√21

c.√41.          d. 41

4) Roots of the equation $x^2-16=0$ are

a.0 and 8.

b.0 and 16

c.4 and 0

d.16 and 4

5) If the sum of the two consecutive integers is 27 then the integers are

a. 7 and 2

b. 13 and 14

c. 1 and 26

d. -13 and -14

6) If the roots of the equation $x^2 + 6x + k = 0$. are equal then the value of k is

    a. 9

    b. -9

    c. 8

    d. 5

1) Write the following equation in its standard form $x(x-3) = 6$

2) Find the discriminant of the quadratic equation $Px^2 + qx + r = 0$

3) Discriminant of the quadratic equation is -15. find the nature of the roots of the equation.

4) Length of a rectangle is 2 times of the breadth and exceeds more than one write its area in standard form of quadratic equation.

5) $(2x+5)(4x-5)$ write positive roots of the equation

6) If the roots of the quadratic equation $ax^2 + bx + c = 0$. are equal then what is the value of discriminant.

## 2 MARK QUESTION

1. Find the roots of the equation $2x^2 - x + \dfrac{1}{8} = 8$ using factorization method.

2. Solve the quadratic equation $5x^2 - 6x - 2 = 0$ by completing square method.

3. Solve using the formula $2x^2-2\sqrt{2}x+1=0$

4. Find the nature of the roots of the equation $x^2-x+1=0$

5 Frame the quadratic equation whose roots are 2 and 1.

6. Sum of the squares of two consecutive even positive integers is 340 then find those two numbers.

7. If the roots of the quadratic equation $2x^2+Kx+3=0$ are equal then find the value of k.

8. The length of a rectangular field is 3 times its breadth and its area is 147 square metre find the sides of the field

## 3 MARK QUESTION

1.Solve $\dfrac{1}{x+4} - \dfrac{1}{x-7} = \dfrac{11}{30}$ [ x ≠ -4.7 ]

2. The sum of reciprocals of Rehaman's ages (in years) 3 years ago and 5 years from now is $\dfrac{1}{3}$. Find his present age.

3. The difference of squares of two numbers is 180. The square of the smaller number is 8 times the larger number find the two numbers.

4. The altitude of a right angle triangle is 7 cm less than its base.If the hypotenuse is 13 cm find the other two sides.

5. Find two numbers whose sum is 27 and product is 182.

6. Find two consecutive odd positive integers sum of whose squares is 290.

7. The diagonals of a rectangular field is 60 m more than the shorter site if the longer side is 30 m more than the shorter side. Find the sides of the field.

8. If the roots of the quadratic equation $(b-c)x^2+(c-a)x+(a-b)=0$ are equal then prove that $2b = a + c$.

9. The altitude of the triangle is 6 cm more than its base and its area is 108 square cm. find its base and altitude.

## 4 MARK QUESTION

1. A motor boat whose speed is 18 km per hour in still water takes 1 hour more to cover a distance of 24 km upstream than its return downstream to the same spot.Find the speed of the stream

2. An express train takes 1 hour less than a passenger train to travel 132 km between Mysore and Bangalore full stop if the average speed of the express train is 11 km per hour more than that of the passenger train. Find the average speed of the two trains.

3. Find the roots of the following quadratic equations. If they exist by the method of completing the square

   a.$2x^2-7x+3=0$           b.$4x^2+4\sqrt{3}x+3=0$

## VI. Solve the following problems

1. Solve the following quadratic equation by using formula $x^2 - 3x - 10 = 0$

2. A train travels 360 km at a uniform speed. If the speed had been 5 km per hour more it would have taken 1 hour less for the same journey. Find the speed of the train.

2. A rectangular park is to be designed whose breath is to be four sq metres more than the area of a park that has already been made in the shape of an isosceles triangle with its base as the breath of the rectangular park and altitude 12 m. Find the length and breadth.

# INTRODUCTION TO TRIGONOMETRY

## 1 MARK QUESTION

1) $9sec^2A - 9tan^2A = $ _____

    a) 1          b) 9          c) 8          d) 0

2) $\frac{1+ tan^2A}{1+ cot^2A} = $ _____

    a) $sec^2A$        b) -1        c) $cot^2A$      d) $tan^2A$

3) $1 - cos^2A = $ _____

    a) $sin^2A$ b) $tan^2A$ c) $1 - sin^2A$    d) $sec^2A$

4) sin60°.cos30° + sin30°.cos60°= _____

a) 0          b) 1          c) 2          d) 4

5) sin2A = 2sinA is true only if, A = _____

a) 30°          b) 45°          c) 0°          d) 60°

6) $sec^2\theta - 1 = $ _____

a) $tan^2\theta$          b) $tan^2\theta + 1$     c) $cot^2\theta - 1$    d) $cos^2\theta$

**One Mark questions:**

1) If sinx $=\frac{1}{3}$ then, cosec x = _____

2) If $cos\theta =\frac{24}{25}$ then, $sec\theta$ = _____

3) If $tan\,\theta=\frac{7}{24}$ then, $cot\,\theta=$ _____

4) If cosec x = $\frac{25}{15}$ then, sin x = _____

5) If sin A = $\frac{3}{5}$ and cos A=$\frac{4}{5}$ then, tan A= _____

6) $\frac{sin\,18^0}{cos\,72^0}$ = _____

7) $\frac{tan\,26^0}{cot\,64^0}$ = _____

8) $cos48^0 - sin\,42^0$ = _____

9) $cosec\,31^0 - sec\,59^0$ = _____

10) $tan\,48^0.\,tan\,42^0$ = _____

11) $sin\,60^0.\,cos30^0 + sin\,30^0.cos\,60^0$ = _____

12) $1-tan^2\,45^0$ = _____

13) $1 + tan^2\,45^0=$ _____

14) If $A=30^0$, then, sin3A = _____
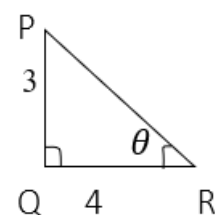
## 2 MARK QUESTION

1) If $\theta$ is acute, then write all the trigonometric ratios

     with respect to $\theta$.

2) If sin A = $\frac{3}{4}$then, calculate cos A and tan A.

3) If 15cot A = 8 then, calculate sin A and sec A.

4) If $\sec\theta = \frac{13}{12}$ then, Find the values of $\sin\theta$ and $\tan\theta$.

5) Find the value of: $2\tan^2 45^0 + \cos^2 30^0 - \sin^2 60^0$

6) Find the value of: $\frac{2\tan 30^0}{1+\tan^2 30^0}$

7) $\tan 2A = \cot (A-18^0)$ and $2A$ is acute, then find the value of A.

8) If $\tan A = \cot B$ then, prove that $A+B = 90^0$.

9) If $\sec 4A = \csc(A-20^0)$ and $4A$ is acute, then find the value of A.

10) Find the value of: $\sin 25^0 . \cos 65^0 + \cos 25^0 . \sin 65^0$

11) Find the value of: $\tan^2 60^0 + 2\tan^2 45^0$

12) Find the value of: $\csc 60^0 - \sec 45^0 + \cot 30^0$

## 3 MARK QUESTION

1) Prove that $(\csc\theta - \cot\theta)^2 = \frac{1-\cos\theta}{1+\cos\theta}$

2) Prove that $\frac{\cos A}{1+\sin A} + \frac{1+\sin A}{\cos A} = 2\sec A$

3) Prove that $\sqrt{\frac{1+\sin A}{1-\sin A}} = \sec A + \tan A$

4) Prove that $(\sin A + \csc A)^2 + (\cos A + \sec A)^2 = 7 + \tan^2 A + \cot^2 A$

5) Prove that $(\csc A - \sin A)(\sec A - \cos A) = \frac{1}{\tan A + \cot A}$

6) Prove that $\sqrt{\frac{1+\cos A}{1-\cos A}} = \csc A + \cot A$

7) Prove that $(1 + \cot A - \csc A)(1 + \tan A + \sec A) = 2$

8) Prove that $\frac{\tan A - \sin A}{\tan A + \sin A} = \frac{\sec A - 1}{\sec A + 1}$

# APPLICATIONS OF TRIGONOMETRY

## 1 MARK QUESTION

1. Find the length of the shadow of 10 m height tree of the angle elevation of the sun is 30°
 A) 10Mm   B)10√3m   C)10/√3m   D)20m

2. The angle of elevation of the top of tree from a point at a distance of 200 m from its base is 60° the height of the tree is
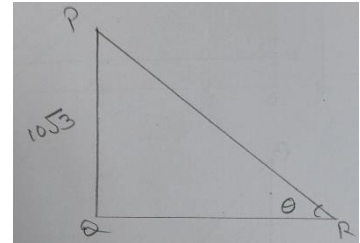 A)50√3m.   B)100√3m.   C)200√3m.     D)200/√3m

3. The height of the tower is 10 M what is the length of it Shadow when Suns altitudes 45°.
 A) 20m      B)10m        C) 5m        D) 15m

4.  In the figure QR=10 then  θ is......
A)30°        B)45°        C)60°        D)90°



5. A tall building casts  a shadow of 300 m long when the sun's altitude is 45°. find the height of the tower
 A)300m     B)100m      C)200m      D)500m

## 2 MARK QUESTION

6. The angle of elevation of the top of a vertical tower on a level ground from point at a distance of 9 √3m from its foot on the ground is 60°. Find the height of the tower?

7. A circus artist is climbing a 20 m long rope which is tightly stretched and tied from the top of a vertical pole to the ground.  Find the height of the pole if the angle made by the rope with the ground level is 30°.
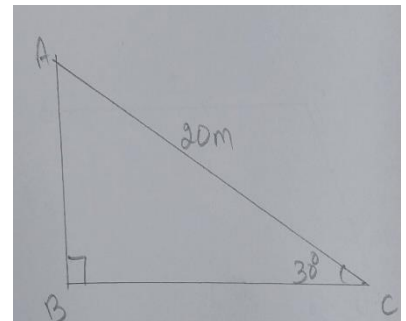


8. A tree breaks due to storm and the broken part bends so that the top of the tree touches the ground making  an angle 30° with it. The distances between foot of the tree to the point where the top touch the ground in 8m. Find the height of the tree.

9. A tower stands vertically and the ground from a point on the ground which is 15m away from the foot of the tower, the angle of elevation of the top of the tower is found to be 60°, Find the height of the tower.

10. The angle of elevation of the top of a tower from a point on the ground which is 30m away from the foot of the tower is 30°. Find the height of a height of the tower.

## 3 MARK QUESTION

11. The angle of elevation of the top of an unfinished vertical building on a ground at a point which is 100m from the base of the building is 45°. How much height the building must be raised, so that its angle of elevation from the same point be 60°.
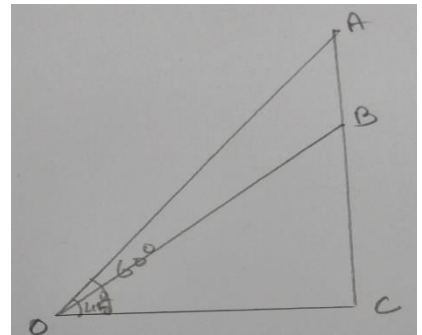


12. An aircraft flying parallel to the ground in the sky from the point A through the point B is observed, the angle of elevation of aircraft at A point on the level ground is 60°, after 10 seconds it is observed that the angle of elevation of aircraft at B is found to be 30° from the same point. Find at what height the aircraft is flying if the velocity of aircraft is 648 km/h. ( use √3=1.73)
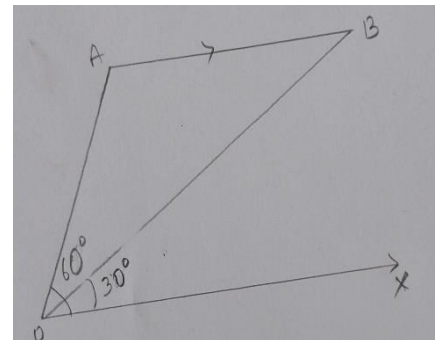


13.A tower and a pole stand vertically on the same level ground. It is observed that the angle of depression of the top and foot of the pole from the top of the tower of height  60m is 30° and 60° respectively. Find the height of the pole.
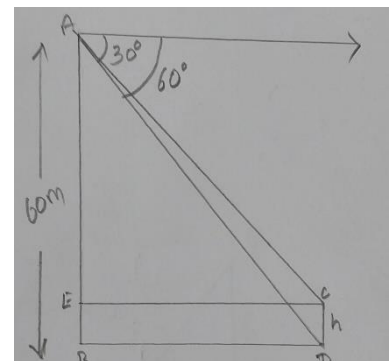


14. A person standing on the bank of a river observes that the angle of elevation of top of a tree from your point on the opposite bank is 60°. when he moves 20m away from the bank, he finds the angle to be 30° find the height of the tree and width of the river .
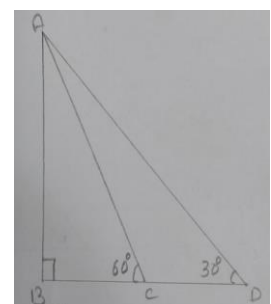
15. Two poles of equal heights are standing opposite each Other an either side of the road, which is 80m wide from a point between hi them on the road, the angle of elevation of the top of the poles are 60° and 30° respectively. Find the height of the poles and the distance of the point from the poles.
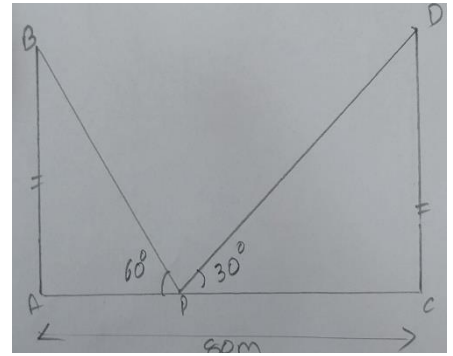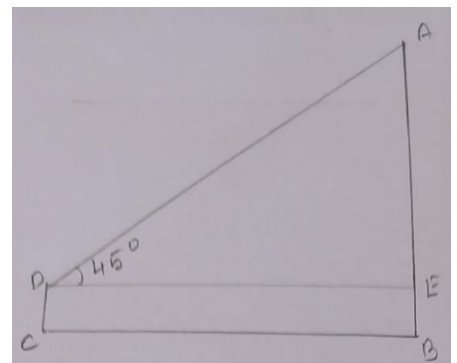


16. The angles of elevation of the top of a tower from two points at a distance of 4m and 9m from the base of the tower and in the same straight line with it or complementary . Prove that the height of the tower is 6m.

17. The angle of depression from the top of a vertical Tower to a point on the ground is found to be 60° and from a point 50m above the foot of the tower the angle of depression to the same point is found to be 30° has shown in the figure. Find the height of the tower.
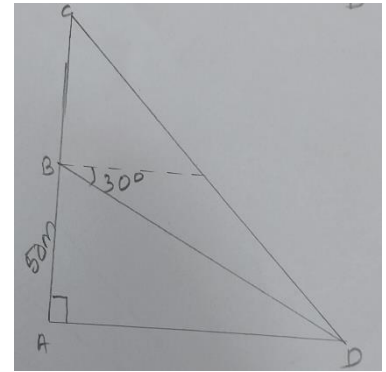


18. An observer 2.5m tall is 20.5m away from a Chimney. The angle of elevation of the top of the chimney from her ice is 45°. what is the height of the chimney?



19. From a point P on the ground the angle of elevation of the top of a 10m tall building is 30°. A flag is hoisted at the top of the building and the angle of elevation of the top of the flagstaff from P is 45°. Find the length of the flagstaff and the distance of the building from the point P ?
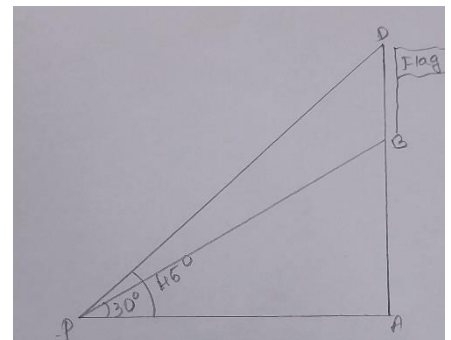
20. A kite is flying at a height of 60 m above the ground. The string attached to the kite is temporarily tide to a point on the ground. The inclination of the string with the ground is 60°. Find the length of the string, assuming that there is no slack in the string ?

21. A statue of 1.6 tall stands on the top of a pedestal, From a point on the ground, the angle of elevation of the top of the Statue is 60° and from the same point the angle of elevation of the pedestal is 45 degree. Find the height of the pedestal ?

22. A 1.5 m tall boy is standing at some distance from a 30m tall building. The angle of elevation from his eyes at the top of the building increases from 30°to 60° as a walks towards the building. Find the distance he walked towards the building?

23. A straight highway leaves to the foot of a tower. A man standing at the top of the tower observes a car at an angle of depression of 30°, which is approaching the foot of the Tower with a uniform speed. 6 seconds later, the angle of depression of a car is found to be 60°. Find the time taken by the car to reach the foot of the tower from this point ?

24. A contractor plans to install to slides for the children's to play in a park. For the children below the age of 5 years, she prefers to have a slide who stop is at a height of 1.5 m and is inclined at an angle of 30°to the ground, where as for elder children, she wants to have a step slide at a height of 3m and inclined at an angle of 60° to the ground. What should be the length of the slide in each case ?
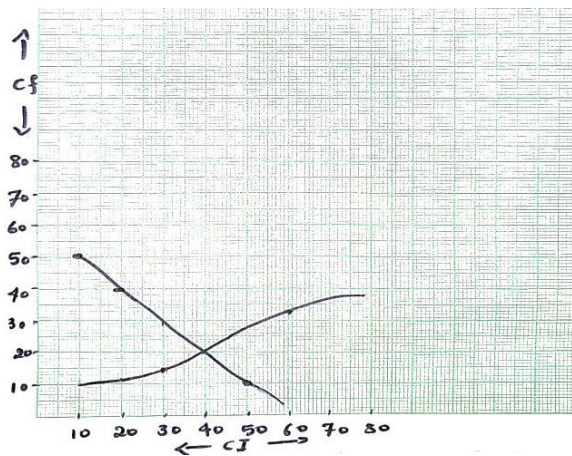
25. A cable tower and a building or standing vertically on the same level Ground. From the top of the building which is 7m. High, the angle of elevation of the cable Tower is 60° and the angle of depression of its foot is 45° .Find the height of the tower ? (Use √3= 1.73)
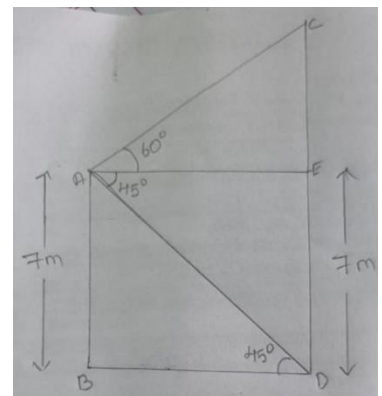
## 1 MARK QUESTION

1) The mean of 2, 7, x, 11 and 12 is 8, then the value of 'x' is-------

2) Median of the given Statistical data is ------



3)

| C-I | 0-5 | 5-10 | 10-15 | 15-20 | 20-25 |
|-----|-----|------|-------|-------|-------|
| Frequency | 13 | 10 | 15 | 8 | 12 |

What is the upper limit of the Median class for the above frequency distribution table?

4)

| C-I | 100-120 | 120-140 | 140-160 | 160-180 | 180-200 |
|-----|---------|---------|---------|---------|---------|
| Frequency | 02 | 22 | 19 | 14 | 13 |

The highest cumulative frequency of the above frequency distribution table is ----

5) Median and mean of a data is 4.3 and 4.2 respectively. What is the mode of this data?

6)

| C-I | 1-3 | 3-5 | 5-7 | 7-9 | 9-11 |
|-----|-----|-----|-----|-----|------|
| Frequency | 07 | 08 | 02 | 02 | 01 |

The value of $f_0$ of the modal class for the above mentioned frequency distribution table is ----

## 3 MARK QUESTION

1.  Draw a more than ogive for the following distribution

| Marks | 0-10 | 10-20 | 20-30 | 30-40 | 40-50 | 50-60 |
|---|---|---|---|---|---|---|
| No. of students | 5 | 8 | 6 | 10 | 6 | 6 |

Also find median from the graph

2.  The mean of the following distribution is 18. Find the frequency of the class 19-21

| Class | 11-13 | 13-15 | 15-17 | 17-19 | 19-21 | 21-23 | 23-25 |
|---|---|---|---|---|---|---|---|
| Frequency | 3 | 6 | 9 | 13 | F | 5 | 4 |

3.  The mode of the following distribution table is 15 find the mean of this data and then find the median value by using empherical formula relating mean, median and mode

| C.I | No of workers |
|---|---|
| 1-5 | 7 |
| 5-9 | 2 |
| 9-13 | 2 |
| 13-17 | 8 |
| 17-21 | 1 |

4.  If the median for the following data is 525. Total frequency is 100. Then find the value of x and y

| C.I | Frequency |
|---|---|
| 0-100 | 2 |
| 100-200 | 5 |
| 200-300 | X |
| 300-400 | 12 |
| 400-500 | 17 |

| | |
|---|---|
| 500-600 | 20 |
| 600-700 | Y |
| 700-800 | 9 |
| 800-900 | 7 |
| 900-1000 | 4 |

5.  The following distribution given the state wise teacher-student ratio in higher secondary school in India.  Find mean and mode from the table

| Number of teacher students/teacher | Number of state/uts |
|---|---|
| 15-20 | 3 |
| 20-25 | 8 |
| 25-30 | 9 |
| 30-35 | 10 |
| 35-40 | 3 |
| 40-45 | 0 |

# PROBABILITY

## 1 MARK QUESTION

1. The probability of an event E + probability of the event 'not E' = _____.
   a. 1             b. 0             c. $\frac{1}{2}$             d. $\frac{1}{4}$

2. Which of the following cannot be probability of an event ?
   a. $\frac{1}{2}$             b. $-1.5$             c. 15%             d. 0.75

3. If P(E) = 0.05, then probability of 'not E' is _____.
   a. 0.05             b. $-0.05$             c. 0.95             d. $-0.95$

4. The sum of the probabilities of all the elementary events of an experiment is _____.
   a. 1             b. 0             c. $\frac{3}{2}$             d. $\frac{1}{2}$

5. Which of the following is correct related to probability of an event.
   a. $0 \leq P(E) \geq 1$             b. $0 \geq P(E) \leq 1$   c. $0 \geq P(E) \geq 1$   d. $0 \leq P(E) \leq 1$

6. Faces of a cubical die numbered from 1 to 6 is rolled once. The probability of getting an even number on the top face is
   a. $\frac{1}{6}$             b. $\frac{2}{6}$             c. $\frac{4}{6}$             d. $\frac{3}{6}$

7. 26 English alphabet cards (without repetition) are put in a box and shuffled well. If a card is chosen at random then the probability that the card getting not an vowel is
   a. $\frac{21}{26}$             b. $\frac{1}{26}$             c. $\frac{5}{26}$             d. $\frac{2}{26}$

8. The probability of an event that cannot happen is called _____.

9. If E is an event of an random experiment . such that P(E) : P(not E) = 2 : 1 find the value of P(E).

10. Harpreeth tosses two different coins simultaneously. What is the probability that she gets at least one head?

11. A lot of 20 bulb contains 4 defective ones. One bulb is drawn at random from the lot. What is the probability that the bulb drawn is defective ?

---

1. A box contains 90 discs numbered 1 to 90 (without repeating any number). If one disc is drawn at random from the box, find the probability getting same a cube number ?
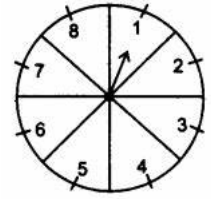
2. A game of chance consists of rotating an arrow which comes to rest pointing at one of the numbers 1,2,3,4,5,6,7,& 8 and these are equally possible outcomes. Find the probability that it will point an prime number .

3. A bag contains 3 red balls, 5 white balls and 8 blue balls. One ball is taken out of the bag at random. Find the probability that the ball taken out is not a white ball.

4. Two cubical dices whose faces are numbered 1 to 6 are rolled simultaneously. Find the probability that the sum of two numbers occurring on their top faces is a square number.

5. A game consists of tossing a one rupee coin 3 times and noting its each outcome. Hanif wins if all the tosses give the same result ie., three heads or three tails and loses otherwise. Calculate the probability that Hanif will lose the game.
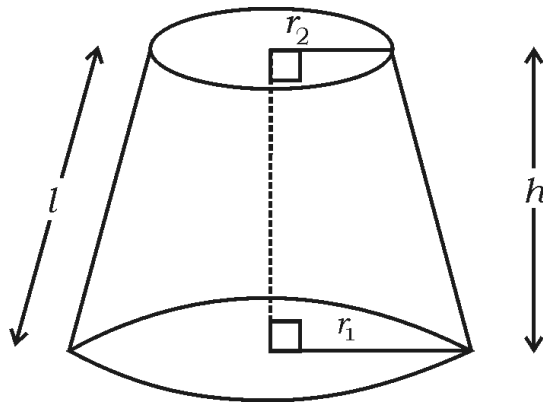
# SURFACE AREA AND VOLUME

## 1 MARK QUESTION

1) Surface area of a sphere of radius 'r' unit is

   (A) $\pi r^2$ sq.units    (B) $2\pi r^2$ sq.units

   (C) $3\pi r^2$ sq.units     (D) $4\pi r^2$ sq.units.

2) In the given figure, the volume of the frustum of a cone is



   (A) $\pi (r_1 + r_2)l$         (B) $\pi (r_1 - r_2)l$

   (C) $\frac{1}{3} \pi h (r_1^2 + r_2^2 - r_1 r_2)$    (D) $\frac{1}{3} \pi h (r_1^2 + r_2^2 + r_1 r_2)$

3) Volume of a sphere of radius 'r' unit is

   (A) $\frac{2}{3}\pi r^2$ cubicunits     (B) $\frac{2}{3}\pi r^3$ cubicunits (C) $\frac{4}{3}\pi r^3$ cubicunits    (D) $\frac{4}{3}\pi r^2$ cubicunits.

4) A cylinder made of wax is melted and recast completely into

---

e. Then the volume of the sphere is

    (A)  twotimesthevolumeofthecylinder

    (B)  halfthevolumeofthecylinder

    (C)  3timesthevolumeofthecylinder

    (D)  equaltothevolumeofthecylinder

5) The surface area of a sphere is 616 sq.cm. Then the radius of the same sphere is

    (A)  9cm             (B)    14cm

    (C)  21cm          (D)    7cm

6) The formula to find the total surface area of a right circular based cylindrical vessel of base radius r cm and height h cm opened at one end is

    (A) $(\pi r^2 + 2\pi rh)\text{cm}^2$    (B) $2\pi rh\,\text{cm}^2$

    (C)  $\frac{1}{3}\pi r^2 h\,\text{cm}^3$         (D)  $\pi r^2 + h\,\text{cm}^2$

7) To find the curved surface area of a frustum of a cone as shown in the figure the formula used is
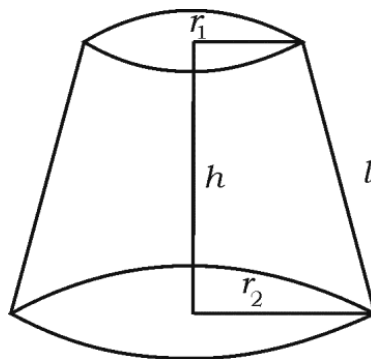


    (A) $\frac{1}{3}\pi l\,(r_1 + r_2)$        (B) $\frac{1}{3}\pi h(r_1^2 + r_2^2 + r_1 r_2)$

(C) $\pi l(r_1+r_2)$          (D) $\pi l(r_1-r_2)$

8) The total surface area of solid hemisphere is 462 cm 2 . If the curved surface area of it is 308 cm 2 , then the area of the base of the hemisphere is
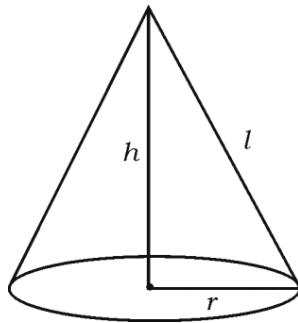
(A) $308cm^2$          (B) $231cm^2$

(C) $154cm^2$          (D) $1078cm^2$

9) The volume of a cone as shown in the figure is



(A) $\pi r^2 h$                    (B) $\pi r(r+l)$
(C)$\frac{1}{3}\pi r^2 h$                    (D) $\pi rl$

10) The surface area of a sphere of radius 7 cm is
(A) $154cm^2$          (B) $616cm^3$

(C) $616cm^2$          (D) $308cm^2$.

11) If the area of the circular base of a cylinder is 22 cm$^2$ and its height is 10 cm, then the volume of the cylinder is

(A) $2200cm^2$          (B) $2200 \ cm^3$
(C) $220 \ cm^3$          (D) $220 \ cm^2$ .

12) A cone is cut by a plane parallel to its base and the small cone that

**obtained is removed then the remaining part of the cone is**

        (A) a frustum of cone     (B) a frustum of cylinder

        (C)    a Sphere        (D)   a right circular cone

13) **The formula used to find the curved sarface area of a cone of radius (r) , height (h) and slant height ( l ) is**

        (A) CSA $=\pi r l$        (B) CSA $= 2\pi ( r + l )$

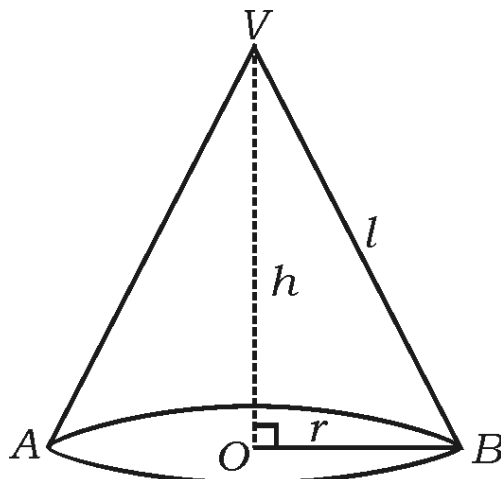        (C) CSA $= 2\pi r( r + h )$    (D) CSA $= \dfrac{\pi r^2 h}{3}$

14) **Formula used to find the surface area of a sphere whose radius 'r' units is**

        (A) $\pi r^2$        (B) $2\pi r^2$

        (C) $3\pi r^2$        (D) $4\pi r^2$

15) **The surface area of a sphere of radius 7 cm is**

        (A) $88 cm^2$        (B) $616 cm^2$

        (C) $661 cm^2$        (D) $308 cm^2$

16) **In the given figure, write the formula used to find the curved surface area of the cone.**

17) Write the formula to find the volume ( V ) of the frustum of a cone of height $h$ and radii of two circular ends $r_1$ and $r_2$.

18) Write the formula to find the total surface area of a right-circular cone whose circular base radius is '$r$' and slant height is '$l$'.

19) Write the formula to find the volume of a cone.

20) Find the surface area of a sphere of radius 7cm

21) Write the formula to calculate the curved surface area of the frustum of a cone.

22) A solid piece of iron is in the form of a cuboid of dimensions 10 cm $\times$ 5 cm $\times$ 2 cm . Find its volume .

23) Write the formula to find the volume of the sphere .

24) Write the formula used to find the total surface area of a right circular cylinder.

## 2 MARK QUESTION

25) A metallic sphere of radius 9 cm is melted and recast into the shape of a cylinder of radius 6 cm. Find the height of the cylinder.

26) The faces of two cubes of volume 64 cm 3 each are joined together to form a cuboid. Find the total surface area of the cuboid.

27) The radii of two circular ends of a frustum of a cone shaped dustbin are 15 cm and 8 cm. If its depth is 63 cm, find the volume of the dustbin.

28) Curved surface area of the right circular cylinder is 440 cm3 and the radius of its circular base is 7 cm . Find the volume of the cylinder .

29) The volume of a solid right circular cylinder is 2156 cm 3 . If the height of the cylinder is 14 cm, then find its curved surface area   ( Take $\pi = \frac{22}{7}$ )

30) The slant height of a frustum of a cone is 4cm and the perimeters of its circular ends are 18cm and 16cm, then find the curved surface area of the frustum of the cone.

31) A Toy is in the form of a hemisphere surmounted on a cylinder of height 10cm as shown in the figure. If the radius of the cylinder is 3.5cm find the volume of the toy.

r=3.5cm

h=10cm
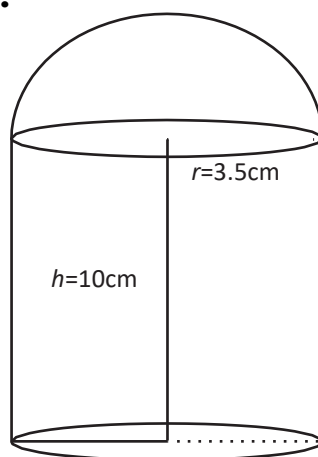
32) A cone is having its base radius 12 cm and height 20 cm. If the top of this cone is cut in to form of a small cone of base radius 3 cm is removed, then the remaining part of the solid cone becomes a frustum. Calculate the volume of the frustum.

A

Height 20 cm

Radius 3 cm

O'

Radius 12 cm

B    O    C
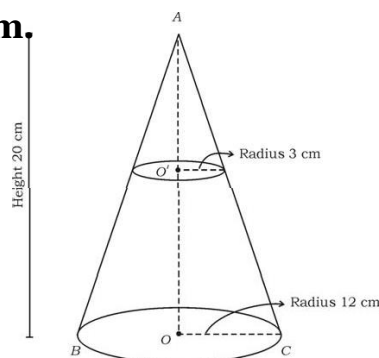
**33)** A milk tank is in the shape of a cylinder with hemispheres of same radii attached to both ends of it as shown in figure. If the total height of the tank is 6 m and the radius is 1 m, calculate the maximum quantity of milk filled in the tank in litres. ($\pi = \frac{22}{7}$ )

**34)** A flower vase is in the form of a frustrum of a cone . The perimeters of its bases are 44cm and 8.4 $\pi$ cm. If the depth is 14 cm , then find how much soil it can hold.



14 cm
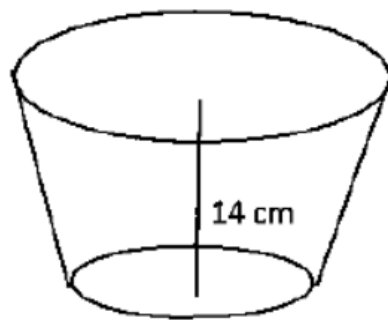
**35)** A toy is in the form of a cone mounted on a hemisphere both are of same radius . The diameter of the conical portion is 6 cm and its height is 4 cm . Determine the surface area of the solid . ( Take $\pi = 3.14$ )
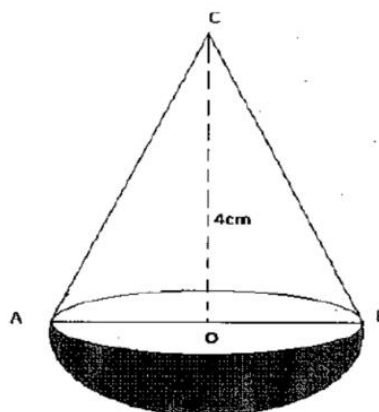


**36)** A solid is in the form of a cone mounted on a right circular cylinder, both having same radii as shown in the figure. The radius of the base and height of the cone are 7 cm and 9 cm respectively. If the total height

**of the solid is 30 cm, find the volume of the solid.**

37)     **The slant height of the frustum of a cone is 4 cm and the perimeter of its circular bases are 18 cm and 6 cm respectively. Find the curved surface area of the frustum.**
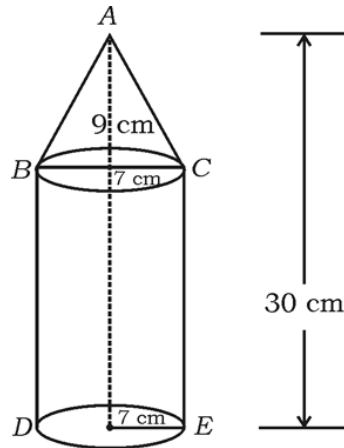


**4 MARK QUESTION**

38)     **Sand is filled in a cylindrical vessel of height 32 cm and radius of its base is 18 cm. This sand is completely poured on the level ground to form a conical shaped heap of sand. If the height of the conical heap is 24 cm. Find the base radius and slant height of the conical heap.**
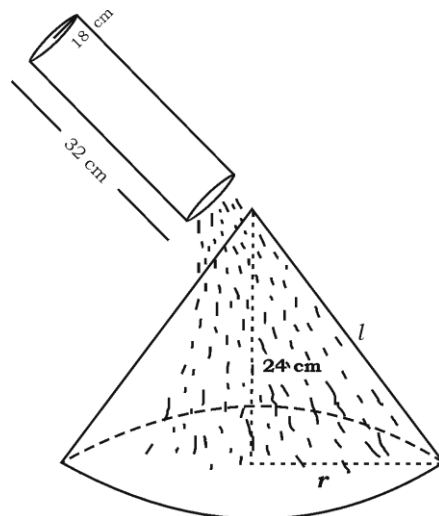
**39)** A medicine capsule is in the shape of a cylinder with hemispheres stuck to each of its ends. The length of the entire capsule is 14 mm and the diameter of the capsule is 5 mm. Find its surface area.
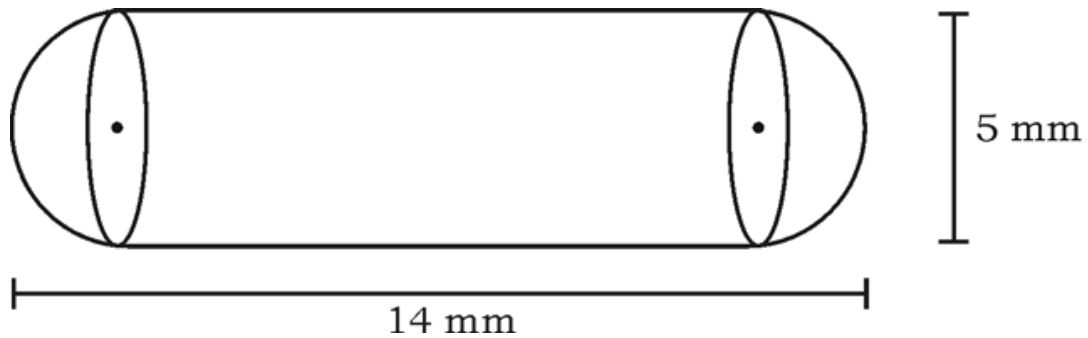


**40)** A right circular cone of height 30 cm is cut and removed by a plane parallel to its base from the vertex. If the volume of smaller cone obtained is $\frac{1}{27}$ of the volume of the given cone, calculate the height of the remaining part of the cone.

**41)** A toy is in the form of a cone of radius 21 cm, mounted on a hemisphere of same radius, as shown in the figure. The total height of the toy is 49 cm. Find the surface area of the toy.
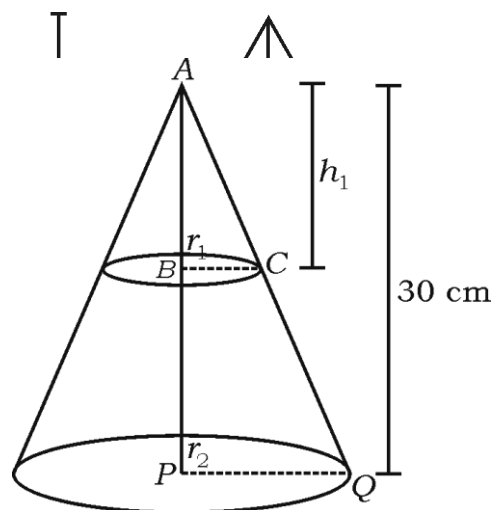
42) A container opened from the top is in the form of a frustum of a cone of height 16 cm with radii of its lower and upper ends are 8 cm and 20 cm respectively. Find the cost of the milk which can completely fill the container at the rate of Rs. 20 per litre. ( Take π = 3·14 )

43) The bottom of a right cylindrical shaped vessel made from metallic sheet is closed by a cone shaped vessel as shown in the figure. The radius of the circular base of the cylinder and radius of the circular base of the cone are each is equal to 7 cm. If the height of the cylinder is 20 cm and height of cone is 3 cm, calculate the cost of milk to fill completely this vessel at the rate of Rs. 20 per litre.
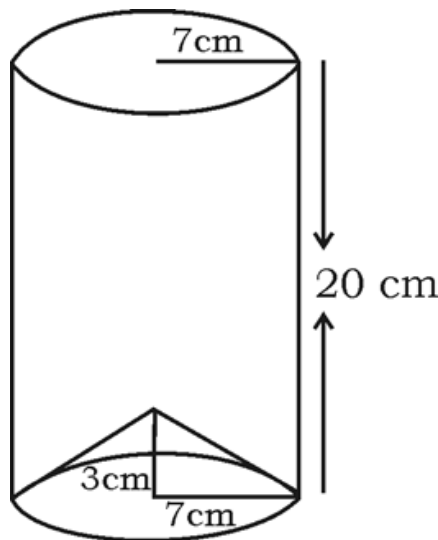


44) A hemispherical vessel of radius 14 cm is fully filled with sand. This sand is poured on a level ground. The heap of sand forms a cone shape of height 7 cm. Calculate the area of ground occupied by the circular base of the heap of the sand.

45) A solid is in the shape of a cylinder with a cone attached at one end and a hemisphere attached to the other end as shown in the figure. All of them are of the same radius 7 cm. If the total length of the solid is 61

**cm and height of the cylinder is 30 cm, calculate the cost of painting**
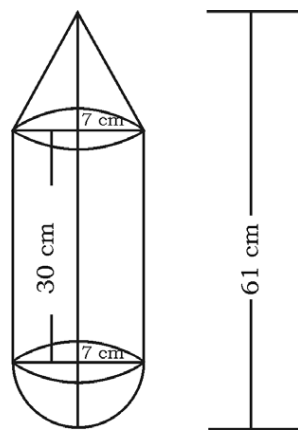


**the outer surface of the solid at the rate of Rs. 10 per 100 cm $^2$ .**

46)  **A solid metallic cylinder of diameter 12 cm and height 15 cm is melted and recast into toys in the shape of right circular cone mounted on a hemisphere as shown in the figure. If radii of the cone and hemisphere are each equal to 3 cm and the height of the toy is 7 cm, calculate the number of such toys that can be formed.**
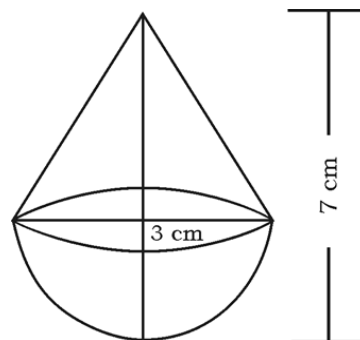


47)  **A cone of radius 10 cm  is cut into two parts by a plane through the mid-point of its vertical axis parallel to the base . Find the ratio of the volumes of the smaller cone and frustum of the cone .**