Time Allowed : 3Hrs.   **M.M : 80**

General Instructions:
1. *The question paper contains two parts A and B.*
2. *Both part A and part B have internal choices.*

Part-A:
1. *It consists three sections- I and II.*
2. *Section I has 16 questions of 1 marks each. Internal choice is provided in 5 questions.*
3. *Section II has 4 questions on case study. Each case study has 5 case-based sub-parts. An examinee is to attempt any 4 out of 5 sub-parts.*

Part-B:
1. *Q No.21 to 26 are very short answer type questions of 2 marks each.*
2. *QNo.27 to 33 are short answer type questions of 3 marks each.*
3. *QNo.34 to 36 are Long answer type questions of 5 marks each.*
4. *Internal choice is provided in 2 questions of 2 marks,2 questions of 3 marks and 1 question of 5 marks.*

PART-A
(Section I has 16 questions of 1 mark each. Internal choice is provided in 5s questions)

1. Given that HCF(252, 594)=18, find LCM(252,594)

    OR

    The decimal representation of $\frac{75}{2^4 \times 5^3}$
2. Show that $5 \times 11 \times 13 \times 7 + 11$ is a composite no.
3. Find the polynomial if ($\sqrt{5}$+2) and ($\sqrt{5}$-2) are zero of polynomial.
4. Find the zeroes of the polynomial x2 – 3x – m(m+3).
5. Find the value of k for which the given system of equations has infinitely many solutions:
    Kx+3y=k-3, 12x+ky=k
6. In a cyclic quadrilateral ABCD, it is being given that $< A = (x + y + 10)^0, < B = (y + 20)^0, < C = (x + y - 30)^0 \ and \ < D = (x + y)^0$ then, Find <B.
7. Find roots of quadratic equation : $2x^2 - 2\sqrt{2}$x+1=0
8. Find the values of k, if kx(x-2) + 6 = 0 has two equal roots.
9. Find the 11th term of AP: -3, $-\frac{1}{2}$, 2,.......
10. Find the sum : 34+32+30+.............+10
11. In ΔABC, DE||BC so that AD=(7x-4)cm, AE=(5x-2)cm, DB=(3x+4)cm and EC=3x cm. Find x.
12. A man goes 24m due west and then 10m due north. How far is he from the starting point?
13. Find the distance between M(2a,b) and N(a,2b).
14. Find the ratio in which the y-axis divides the line segment joining the points (5,-6) and   (-1, -4).
15. Evaluate: $\frac{2tan30}{1-tan^2 60}$
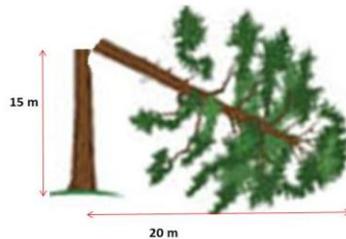16. Find the value of $7cosec^2 \emptyset - \frac{14}{2} cot^2 \emptyset$

17. **Case Study based-1**

Suresh is having a garden near Delhi. In the garden, there are different types of trees and flower plants. One day due to heavy rain and storm one of the trees got broken as shown in the figure.
The height of the unbroken part is 15 m and the broken part of the tree has fallen at 20 m away from the base of the tree.

i) What is the length of the broken part?

    a) 15 m   b) 20 m   c) 25 md)30 m

ii) What was the height of the full tree?

    a) 40 m   b) 050 m   c) 35 md)30 m

iii) In the formed right-angle triangle what is the length of the hypotenuse?

    a) 15 m   b) 20 m   c) 25 md) 30m

iv) What is the area of the formed right angle triangle?

    a) 100 m2   b) 200 m2   c) 60 m2   d) 150 m2

v) What is the perimeter of the formed triangle?

    a) 60 m   b) 50 m   c) 45 m   d) 100 m

18. **Case study based-2**

The Prime Minister's Citizen Assistance and Relief in Emergency situations fund was created on 28 March 2020, following the COVID-19 pandemic in India. The fund will be used for combating, and containment and relief efforts against the corona virus outbreak and similar pandemic like situations in the future. The allotment officer is trying to come up with a method to calculate fair division of funds across various affected families so that the fund amount and amount received per family can be easily adjusted based on daily revised numbers.

The total fund allotted is formulated by the officer is $x^3+6x^2+20x+9$. The officer has also divided the fund equally among families of the village and each family receives an amount of x^2+2x+2. After distribution, an amount of $10x+1$ is left.

On the basis of the above information, answer any four of the following questions:

i)   How many families are there in the village?
        a) X+4   b) x-3   c) x-4   d) x+3
ii)   If an amount of Rs.1911 is left after distribution, what is value of x?
        a) 190   b) 290   c) 191   d) 291
iii)   How much amount does each family receive?
        a) 24490 b) 34860   c) 22540   d) 36865
iv)   What is the amount of fund allocated?
        a) Rs.7272759   b)Rs.7572681   c)Rs.6972846   d) Rs.8274888
v)   How many families are there in the village?
        a) 191   b) 98   c) 187   d) 195

19. Case study based-3

Maximum profit: An barrels manufacturer can produce up to 300 barrels per day. The profit made from the sale of these barrels can be modelled by the function $P(x) = -10x^2+3500x-66000$ where p(x) is the profit in rupees and x is the number of barrels made and sold.

Based on this model answer the following questions:

i)   When no barrels are produce what is a profit loss?
        a) 22000 b)66000   c) 11000   d)33000
ii)   What is the break even point?(Zero profit point is called break even)
        a) 10 barrels   b) 30 barrels   c) 20 barrels   d) 100 barrels
iii)   What is the profit/loss if 175 barrels are produced
        a) Profit 26200   b) Loss 266200   c) Profit 240250   d) Loss 240250
iv)   What is the profit/loss if 400 barrels are produced
        a) Profit 266200 b) loss 266200   c) profit 342000   d) loss342000
v)   What is the maximum profit which can manufacturer earn?
        a) Rs.240250   b) Rs.480500   c) Rs.680250   d)Rs.240250

20. Case study based-4

Dipesh bought 3 notebooks and 2 pens for Rs.80. His friend Ramesh said that price of each notebook could be Rs.25. Then three notebooks would cost Rs.75, the two pens would cost Rs.5 and each pen could be for

Rs.2.50. Another friend Amar felt that Rs.2.50 for one pen was too little. It should be at least Rs.16. Then the price of each notebook would also be Rs.16.

Lokesh also bought the same types of notebooks and pens as Dipesh. He paid 110 for 4 notebooks and 3 pens.

i) Let the cost of one note book be x and that of pen be y. Which of the following set describe the given problem?

a) 2x+3y=80 and 3x+4y=110   b)3x+2y=80 and 4x+3y=110

c) 2x+3y=80 and 4x+3y=110   d) 3x+2y=80 and 3x+4y=110

ii) Whether the estimation of Ramesh and Amar is applicable for Lokesh?
   a) Ramesh's estimation is wrong but Amar's estimation is correct.
   b) Ramesh's estimation is correct but Amar's estimation is wrong.
   c) Both estimation are correct.
   d) Ramesh's estimation is wrong but Amar's estimation is also wrong.

iii) What is the exact cost of the notebook?
   a) Rs. 10   b) Rs.20   c) Rs.16   d) Rs.24

iv) What is the exact cost of the pen?
   a) Rs.10   b) Rs.20   c)Rs.16   d)Rs.24

v) What is the total cost if they will purchase the same type of 15 notebooks and 12 pens.

a) Rs.410   b) Rs.200   c)Rs.420   d) Rs. 240

PART-B
All questions are compulsory. In case of internal choices, attempt any one.

21. 3 bells ring at an interval of 4, 7 and 14 minutes. All three bell rang at 6am, when the three ells will the ring together next?

22. Find the relation between x and y such that the point (x,y) is equidistant from the points (7,1)and (3,5)

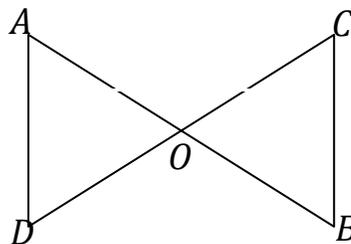23. If the sum of the first 14 terms of an AP is 1050 and its first terms is 10, find the 20th term.

24. In a right triangle ABC, right angled at B, if tanA=1, then verify that 2.sinA.cosA=1

OR

   Simplify (secA + tanA) (1 – sinA)

25. If OA.OB = OC.OD then
   prove that <A=<C and <B=<D

26. For what value of k for which each of following systems of linear equations ha infinite number of solutions: $2x+3y=7$; $(k-1)x+(k+2)y=3k$

27. Prove that $3 - 2\sqrt{5}$ is irrational number. [3]

28. Obtain all zeroes of the polynomial $p(x) = x^4 - 3x^3 - x^2 + 9x - 6$, if two of its zeroes are $-\sqrt{3}$ and $\sqrt{3}$. [3]

29. The age of the father is twice the sum of the ages of his two children. After 20 years, his age will be equal to the sum of the ages of the ages of his children. Find the age of father.

OR

Two men start from two points P and Q, 8 km apart and walk towards each other. They meet in 80 minutes. If they walk in the same direction , they meet in 2 hours. Find their speeds. [3]
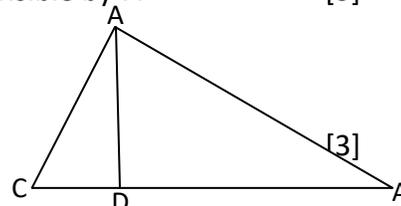
30. Solve: $\dfrac{x+1}{x+4} - \dfrac{x-3}{x} = \dfrac{1}{8}$ [3]

OR

Solve : $x^2 + 4x - (a^2 + 2a - 3) = 0$

31. Find the sum of all three digit natural numbers which are divisible by 7. [3]

32. The perpendicular from A on side BC of a triangle ABC Intersects BC at D such that BD = 3CD. Prove that $2AB^2 = 2AC^2 + BC^2$. [3]

33. Find the ratio in which the point P(m,6) divides the join of A(-4,3) and B(2,8). Also, find the value of m. [3]

34. Prove that : $\dfrac{cos\theta}{1-tan\theta} + \dfrac{sin^2\theta}{sin\theta - cos\theta} = sin\theta + cos\theta$

OR

Prove that: $\dfrac{tanA}{1-cotA} + \dfrac{cotA}{1-tanA} = 1 + secA.cosecA$ [5]

35. Solve : $\dfrac{1}{2(2x+3y)} + \dfrac{12}{7(3x-2y)} = \dfrac{1}{2}$ [5]

$\dfrac{7}{2x+3y} + \dfrac{4}{3x-2y} = 2$

36. The 26th, 11th and the last term of an AP are 0, 3 and -1/5 respectively. Find the common difference and the number of terms. [5]