Note: All Questions are compulsory

Section 1

Q1 A) Select and write the most appropriate answer from the given alternative for each Question (6)

1) A set where number of elements can be counted is_____

a) Singleton set   b) finite set   c) Infinite set   d)empty set

2) $f(x) \dfrac{3x+4}{x-1}$ when $x \neq 1$ $f(1)=$_____

a) 7   b)0   c)5   d) not defined

3) The complex conjugate of 2-3i=_____

a)1-5i   b)-2+3i   c)2+3i   d)-2-3i

4) If D=2 is the value of the determinant D the value of the determinant D1 obtained by interchanging any two row of D is_____

a)5   b)2   c)-2   d)0

5) If $f(x)=\dfrac{a^{2x}-1}{x}$,for $x \neq 0$ is continuous at x=0 then f(0)=_____

a) 0   b)1   c)log a   d) $\log a^2$

6) The derivative of $\dfrac{1}{x}$ w.r.t x=

a) $\dfrac{1}{x^2}$ b)$-x^2$ c)$-\dfrac{1}{x^2}$ d) x^2

B) State whether the following statements are true or false(1 mark each) (3)

i) In set Builder method the element of the set is not listed.

ii) All real numbers are complex numbers.

ii) If c=f(x) is the total cost function $\dfrac{dc}{dx}$ is the Average cost.

C) Fill in the blanks with appropriate words(1 mark each) (3)

i) For a complex number 3i 3 is called as _____ part of the complex number.

ii) If a,b,c are numbers such that b^2=ac then a,b,c are in _____ progression.

iii) For the line 2x+3y=6 $\frac{-2}{3}$ is called as ___ of the line.

Q2 A) Attempt any two of the following (6)

i) Solve the equation (1-3i)x +(2+5i)y =7+i

ii) Find the equation of the line

    a) parallel to X axis at a distance of 5 units above it

    b) parallel to x axis at a distance of 5 units below it

    c) parallel to y axis at a distance of 4 units from the left of it.

iii) Evaluate $\lim\limits_{x \to 0} \dfrac{\sqrt{6+x+x^2}-\sqrt{6}}{x}$

B) Attempt any two of the following (8)

i) If f(x)= $ax^2 + bx + 2$ and f(1)=3 and f(4)=42 find a and b.

ii) Evaluate the $\lim\limits_{x \to 3}[\dfrac{1}{x-3} - \dfrac{9x}{x^3-27}]$

iii)If for a G.P S_3 =16 and S_6=144 find the first term and common ratio.

Q3.A) Attempt any two of the following (6)

i) If the first term of an G.P is 2 and sum to infinity is 6. Find the common ratio.

ii) In a survey of 425 students in a school, -it was found that 115 drink apple juice,160 drink orange juice and 80 drink both apple and orange juice. How many drink neither apple juice nor orange juice.

iii) Without expanding evaluate the determinant using property $\begin{vmatrix} 2 & 3 & 4 \\ 5 & 6 & 8 \\ 6x & 9x & 12x \end{vmatrix}$

Q3. B) Attempt any one of the following (4)

i)Find the acute angle between the lines y-$\sqrt{3}$x +1=0 and $\sqrt{3}$ y-x+7=0

ii) Test the continuity of the function

$$f(x) = \frac{x^3-27}{x^2-9} \qquad \text{for } 0\le x \le 3$$

$$= \frac{9}{2} \qquad \text{for } 3\le x \le 6 \quad \text{at x=3.}$$

Q3.C) Attempt any one of the following (4)

i)Find the value of k if the equation are consistent by completing the activity?

Kx+3y+4=0, x+ky+3=0,3x+4y+5=0

Solution

$\begin{vmatrix} \square & \square & \square \\ \square & \square & 3 \\ \square & \square & 5 \end{vmatrix}=0$

$5k^2$-24k+$\square$ =0

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k= ☐

or k=☐

ii)The total cost of producing x items is given by $c=x^2+4x+4$. Find the marginal cost when x=4 by completing the activity

Marginal cost $=\frac{dc}{dx}$ [   ] ☐

Marginal cost $=(\frac{dc}{dx})_{x=4}$ [   ] ☐

Section II

Q4. A) Select and write the most appropriate answer from the given alternatives for each question (6)

i) The distribution of daily sales of shoes size wise for 100 days from a certain shop is as follows

Sized shoes	2	4	3	5	7	6	8
No of days	14	13	20	19	13	13	8

P_{95} is_____

   a)3   b) 5   c)7   d)8

ii)If $Q_1=5$, $Q_3 = 16$ Q.D = _____

   a)5   b)6   c)5.2   d) 5.5

iii)The relation between mean, median and mode is_____

   a) Mean-Mode=2(Mean-Median)   b) Mean-Mode=Median
     c) Mean-Mode=3(Mean-Median) d) Mode-Median=3(Mean-Mode)

iv) covariance (x,y)=_____

   a)$\frac{\sum xy}{n}$ - $\bar{x}\bar{y}$ b)$\frac{\sum xy}{n}$ - $\sum xy$ c) $\sum(x-\bar{x})(y-\bar{y})$ d)$\frac{\sum xy}{n}$

v) The number of straight lines obtained by joining 5 points in a plane where no three points are collinear=_____

   a) 10   b)20   c) 5   d)20

vi)The solution set of |x -1|<3=____

   a)x< 4   b) x> −2   c) -2< x < 4   d)x< −2 or x > 4

B) State whether the following statements are true or false (3)

i) Partition values divides the data into equal parts.

ii) Skewness is the lack of symmetry of the frequency distribution.

iii)The value of Chi square statistics is always negative.

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C) Fill in the blanks with appropriate words (3)

i) Variance of x is _____ of S.D(x)

ii)_____ divides all observations in to hundred equal parts.

iii)When the correlation coefficient r=1 then correlation is_____

Q 5 A) Attempt any two of the following (6)

i)Calculate D_4 of the following data

Class interval	0-5	5-10	10-15	15-20	20-25
f	7	18	25	30	20

ii)For a distribution Bowleys coefficient of skewness is 0.6 .The sum of the upper and lower Quartiles is 100 and median=38. Find the upper and lower Quartiles.

iii)Given r=0.4 σ_y=3, $\sum(x - \bar{x})(y - \bar{y})$=108 $\sum(x - \bar{x})^2$=900 find the number of pair of observation.

Q 5 B) Attempt any two of the following (8)

i)The data gives the height in cm(X) and weight in kg(Y) of 20 boys prepare a bivariate frequency table taking class intervals 150-154,155-159,..........165-169etc for X and 35-39,40-44,.........,50-54 for Y also Find Marginal distributions of X and conditional distribution of Y when X≥ 155

(152,40),(160,54),(163,52),(150,35),(154,36),(160,49),(166,54),(157,38),(159,43),(153,48),(152,41),(158,51),(155,44),(156,47),(156,43),(166,53),(160,50),(151,39),(153,50),(158,46)

ii)The Mean and Variance of 5 observations are 3 and 2 respectively .If three of the five observations are 1,3 and 5 .Find the value of other two observations.

iii)A party has 5 participants and a host. Find then number of different ways for the host to sit with them around a circular table? How many of these arrangement have two specified persons on other side of host?

Q6 A) Attempt any two of the following (6)

i)Find n and r if nP_r =720 and nC_r=120

ii)A room has three sockets for lamps.From a collections of 10 light bulbs of which 6 are defective a person selects 3 bulbs at random and put them in socket what is the probability that room is lighted.

iii)Solve the inequation $\frac{x+5}{x-3} < 0$

Q 6 B) Attempt any one of following (4)

i)Find the graphical solutions of the following system of linear inequations

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$$\frac{x}{60} + \frac{y}{90} \leq 1, \frac{x}{120} + \frac{y}{75} \leq 1, x \geq 0, y \geq 0$$

ii)Three persons Ram,Shyam and Laxman invest in a partnership in the ratio $\frac{7}{2}, \frac{4}{3}, \frac{6}{5}$ after 4 months Ram increases his share by 50%. If the total profit at the end of the year is 21,600 what is Laxman's share in the profit.

C) Attempt any one of the following (4)

 i) Chitra furnishing purchased curtain cloths for ₹28,00,000 and sold for ₹44,80,000 Rate of a SI is 5% Find a)ITC b) output tax c) GST d)CGST,SGST by completing the activity

Solutions:

Input tax=$(\frac{5}{100})$(28,00,000)

$\qquad$ = 1,40,000

∴ ITC= [   ]

Output tax [   ]

GST payable=output tax-ITC

[   ]

CGST=SGST [   ]

ii)A card is drawn from a pack of 52 playing cards what is the probability that Card is red card or face card by completing the activity

Solutions:

Let A be the event that Red card is drawn

Let B be the event that face card is drawn

n(s)=52

n(A)=26

∴ $P(A)=$ [   ]

n(B)= [   ]

$p(B)=\frac{3}{13}$

n(A∩ B)= [   ]

p(A∪ B)=p(A)+p(B)-p(A∩ B)

[   ]

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