



Doon University, Dehradun
Final Examination, 2016
School of Social Science
MSc Semester – 1st (Economics)
Course—SSEI-112
Mathematical Economics-1

Time Allowed: 3hrs

Maximum Marks: 50

Section - A

(5x2 = 10 Marks)

Attempt all questions

1. Evaluate: $\lim_{x \rightarrow a} \frac{\sqrt{x-a} - \sqrt{2a}}{x-a}$
2. Show that the following points are collinear P(3,-2), Q(-1,1), R(-5,4).
3. Find the coordinates of the point which divides the points P(8,9) and Q(-7,4) internally in the ratio 2:3.
4. Solve: $\frac{9x-2}{3} + \frac{4x^2-7}{4x^2+3} = \frac{6x-1}{2}$
5. If $A=\{1,2,3\}$ & $B=\{2,3\}$, prove that $A \times B \neq B \times A$

Section - B

Attempt any Five questions

(5x3=15 Marks)

1. Find the coordinates of the circumcentre of a triangle whose coordinates are (3,-2), (4, 3), (-6, 5). Hence find the circum-radius.
2. Find the area of a quadrilateral whose vertices are A(1,1); B(3,4); C(5,-2) and D(4,-7).
3. Evaluate the following limit: $\lim_{x \rightarrow 1} \frac{x^3 - 5x^2 + 2x + 2}{x^3 + 2x^2 - 6x + 3}$
4. A function $f(x)$ is defined in the interval (0,3) in the following way:
 $f(x) = x^2$; when $0 < x < 1$
 $f(x) = x$; when $1 \leq x < 2$
 $f(x) = \frac{1}{4}x^3$; when $2 \leq x < 3$
Show that the $f(x)$ is continuous at $x=2$ & $x=1$
5. Solve the equation $4x^3 - 24x^2 + 23x + 18 = 0$
Given that the roots are in arithmetical progression.
6. In a class of 25 students, 12 students have taken economics; 8 have taken economics but not politics. Find the number of students who have taken economics but not politics. Find the

number of students who have taken economics and politics and those who have taken politics but not economics.

Section-C

Attempt any five questions

(5x5=25marks)

1. State the values of a and b if the equation: $ax^2+2bxy-2y^2+8x+12y+6=0$, represents a circle. Substituting the values of a and b in the equation, find the centre and radius of the circle.
2. Find the equation of the straight line through p(-4,3) such that the portion between the axis is divided by P in the ratio 5:3.
3. Complaints about work canteen fell into three categories. Complaints about (1)Mess, (M) (2)Food,(F) (3)Service, (S). Total complaints 173 were received as follows:
 $n(M)=110$, $n(F)=55$, $n(S)=67$, $n(M \cap F \cap S') = 20$, $n(M \cap S \cap F') = 11$, $n(F \cap S \cap M') = 16$. Determine the complaints about (a)all the three, (b)about two or more than two.

4. (a) Show that $\lim_{n \rightarrow \infty} \frac{2^{-n}(n^2+5n+6)}{(n+4)(n+5)} = 0$ (2+3)

(b) Find the limit: $\lim_{x \rightarrow \infty} \frac{\sqrt{3x^4-5x^3+7x+5}}{4x^2}$

5. Let $V=\{0,1,2,3,4,5,6,7,8,9\}$

$X=\{0,2,4,6,8\}$

$Y=\{3,5,7\}$

$Z=\{3,7\}$

Find (a) $Y \cup Z$

(b) $(V \cup Y) \cap X$

(c) $(X \cup Y) \cap Z$

(d) $(X \cup Y) \cap Z$

(e) $(\emptyset \cup V) \cap \emptyset$

6. A horse and cow were sold for ₹3040 making a profit of 25% on the horse and 10% on the cow. By selling them for ₹3070, the profit would have been 10% on the horse and 25% on the cow.

Find the cost price of each.