(b) Define Hasse Diagram & write procedure to construct a Hasse Diagram. 7½

Construct a Hasse Diagram for the partial ordering $\{(A,B)|A \subseteq B\}$ on the power set P(S) where S = {a, b, c}.

7. (a) Define Lattice. Also describe it's properties. 7½

(b) Prove that product of two Lattices is a Lattice. 7½

Unit-IV

8. (a) If $u = \sin^{-1}\frac{x^2+y^2}{x+y}$, then show that

$$x\frac{\partial u}{\partial x}.y\frac{\partial u}{\partial y} = \tan u$$ 7½

(b) If u = log $(x^3+y^3+z^3 - 3xyz)$ then show that 7½

$$\left(\frac{\partial}{\partial x}+\frac{\partial}{\partial y}+\frac{\partial}{\partial z}\right)^2 u = \frac{-9}{(x+y+z)^2}$$

9. (a) State & Prove Euler's Theorem. 7½

(b) Solve the following using Chain Rule. 7½

(i) $y = (4x - x^{-5})^{1/2}$

(ii) $y = 2^{\cot x}$

A

Roll No. _____

SFS-4702

B.C.A. (Semester-II) Examination,

May 2015

Mathematics-II

Paper-V

(BCA-S-110)

Time Allowed : Three Hours] [Maximum Marks :100

Note : Answer five questions in all. Question No. 1 is compulsory and attempt one question from each of the four Units I, II, III & IV.

1. Answer the following : 4×10=40

(a) Define Finite set, Infinite Set, Singleton set and Universal set with Examples.

(b) If A = {1, 2, 3, 4, 5, 6}, B=(3, 6, 8, 12, 17, 18), then find

(i) A – B

(ii) B – A

(c) What do you understand by Reflexive relation & Irreflexive relation? Illustrate with an example.

(d) Define Function. Differentiate between onto Function & Into function.

(e) Define Domain & Range of Relation. Give example.

(f) If X= (1, 2, 3, 4, 5, 6}, then / is a partial order relation on χ. Draw the Hasse Diagram of (X,χ).

(g) If $u = x^2y+y^2z+z^2x$, then show that $\frac{\partial u}{\partial x}+\frac{\partial u}{\partial y}+\frac{\partial u}{\partial z}=(x+y+z)^2$

(h) Discuss change of variable?

(i) Define Duality

(j) Differentiate $y=\sqrt{13x^2-5x+8}$ by chain Rule.

Unit-I

2. (a) Define sets. Also discuss it's types & algebric laws of operations of sets. 7½

(b) (i) Show that $(A \cap B)' = A' \cup B'$

(ii) $A \cup B = B \cup A$ where A, B are any set. 7½

3. (a) Define ordered pairs and Cartesian Product. Also discuss the properties of Cartesian Product. 7½

(b) (i) Prove that 7½

$A\times(B\cap C) = (A\times B)\cap(A\times C)$

(ii) If A = {4, 5, 7, 8, 10}, B = {4, 5, 9} and C={1, 4, 6, 9} then verify that

$A\cap(B\cup C) = (A\cap B)\cup(A\cap C)$

Unit-II

4. (a) Define Partial Order Relation. Is the greater or equal ($\geq$) relation on the set of integers z is a Partial Order Relation? Prove it. 7½

(b) If R be a relation in the set of Integers $\not{z}$ defined by $R=\{(x,y): x\in z, y\in z, (x-y)$ is divisible by 6}, then show that R is an equivalence Relation. 7½

5. (a) (i) Discuss functions & it's types. 7½

(ii) Show that the function $f(x)= x^3$ and $g(x) = x^{1/3}$ for all $x\in R$ are inverse of one another.

(b) Show that if $f:A\to B$ & $g:B\to C$ be one to one onto function, then g of is also one to one onto and $(gof)^{-1} = f^{-1}o\ g^{-1}$. 7½

Unit-III

6. (a) (i) Define Poset & chain.

(ii) Show that the set Z^+ for all positive integers under divisibility relation forms a poset. 7½