11. (a) Let L be a lattice. Then for every a and b in L. Prove that

(i) $a \vee b = b$ if and only if $a \leq b$

(ii) $a \wedge b = a$ if and only if $a \leq b$.

Or

(b) Let L be a distributive lattice. Show that if there exists on a with $a \wedge x = a \wedge y$ and $a \vee x = a \vee y$ then $x = y$.

12. (a) Simplify the following :

(i) $x \vee (x' \wedge y)$

(ii) $(x' \wedge y' \wedge z) \vee (x' \wedge y \wedge z) \vee (x \wedge y')$.

Or

(b) Write the following Boolean expressions in an equivalent sum of products cannonical form in the three variables x_1, x_2, x_3.

(i) $x_1 * x_2^1$

(ii) $x_2 \oplus x_3^1$.

13. (a) Find a Turning machine that recognizes the set $\{0^n 1^n / n \geq 1\}$.

Or

(b) Explain the Chomsky on Greibach Normal forms with suitable examples.

MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE

(For those who joined in July 2002 and 2005)

Time : Three hours Maximum : 100 marks

PART A — (8 × 5 = 40 marks)

Answer ALL questions.

1. (a) Make a truth table for the statement.

$(P \wedge Q) \vee (\sim Q)$

Or

(b) Prove that $\urcorner(P \wedge R) \Leftrightarrow \urcorner P \vee \urcorner Q$.

2. (a) Show that

$(x)(P(x) \vee Q(x)) \Rightarrow (x)P(x) \vee (7x)Q(x)$

Or

(b) For any commutative monoid $(M,*)$ prove that the set of idempotent elements of M forms a submonoid.

3. (a) Show that every finite semigroup has an idempotent element.

Or

(b) If every element of a group G is its own inverse then prove that G is abelian.

4. (a) Define $n!$ recursively and compute 5! recursively.

Or

(b) Let $S = \{a,b,c\}$ and $A = P(S)$. Draw the Harse diagram of the poset A with partial order $\subseteq$.

5. (a) Define lattice and bounded lattice with examples.

Or

(b) Show that the power set of any set is a lattice under union and intersection.

6. (a) Define a Boolean algebra with an example.

Or

(b) Show that in a Boolean algebra, for any a and b, $(a \wedge b) \vee (a \wedge b') = a$.

7. (a) Construct the grammar for the language : $L(G) = \{a^i b^{2i} / i \geq 1\}$.

Or

(b) Is the string $abaa$ accepts by the finite state automata? Explain.

8. (a) Explain the monoid of a machine m.

Or

(b) Derive CNF of the following grammar.

$$G = \{(S,A),(0,1),S',(S' \to OA/01, A \to 1B/10)\}$$

PART B — (5 × 12 = 60 marks)

Answer ALL questions.

9. (a) (i) Compute the truth table for $(P \Rightarrow Q) \Leftrightarrow (\sim Q) \Rightarrow \sim P)$.

(ii) Prove that $(P \Leftrightarrow Q) \equiv ((P \Rightarrow Q) \wedge (Q \Rightarrow P))$.

Or

(b) (i) Prove that $(P \wedge Q) \Rightarrow P$ is a tautology.

(ii) Let n be an integer. Prove that if n^2 is odd, the n is odd.

10. (a) State and prove Lagrange's theorem.

Or

(b) Let G be a group and let $a,b \in G$ then show that if $ab = ba$ then $(ab)^n = a^n b^n$ and $n \in z^+$.

	At 70% capacity Rs.	At 80% capacity Rs.	At 90% capacity Rs.
Semi-Variable overhead :			
Power (30% fixed 70% variable)	—	20,000	—
Repairs and maintenance	—	2,000	—
(60% fixed, 40% variable)	—	11,000	—
Fixed over heads :			
Depreciation	—	3,000	—
Insurance	—	10,000	—
Salaries		62,000	
Estimated direct labour hours :	1,24,000 hrs		

3616/S11

MAY 2009

FINANCIAL MANAGEMENT AND ACCOUNTING

(For those who joined in July 2002 and 2005)

Time : Three hours Maximum : 100 marks

SECTION A — (8 × 5 = 40 marks)

Answer ALL the questions.

1. (a) State the functions of accounting.

Or

(b) Explain the types of accounts and its rule for making entries double entry system.

2. (a) Rectify the following errors :

(i) Purchases book is overcast by Rs. 700 (for the month of January)

(ii) Sales book has been undercast by Rs. 250.

(iii) Purchase returns book has been overcast by Rs. 100.

(iv) Sales returns book has been undercast by Rs. 80.

Or

(b) State the differences between cash book and pass book.