

11. (a) If  $L$  is accepted by a DFA, then  $L$  is denoted by a regular expression.

Or

- (b) Let  $G = \{V, T, P, S\}$  be a context-free grammar. Then  $S^* \Rightarrow \alpha$  iff there is a derivation tree in grammar  $G$  with yield  $\alpha$ .

**4666/R10**

**MAY 2010**

**MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCES**

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(For those who joined in July 2006 and after)

Time : Three hours

Maximum : 75 marks

**PART A — (7 × 5 = 35 marks)**

Answer ALL questions.

1. (a) Construct the truth table of the following formula

$$\neg(P \vee Q) \not\Rightarrow (\neg P \wedge \neg Q).$$

Or

- (b) Write short notes on Well-Formed Formula and give an example.

2. (a) Test the validity of the argument  $(P \rightarrow Q) \rightarrow R, P \wedge S, Q \wedge \pi, R$ .

Or

- (b) Show that the set  $N$  of natural numbers is a semi-group under the operation  $x * y = \max(x, y)$ .

3. (a) Define Equivalence relation and give an example.

Or

- (b) Prove that the  $\text{Ker}(g)$ , where  $g$  is a homomorphism from a group  $\langle G, * \rangle$  to  $\langle H, \Delta \rangle$  is a subgroup of  $\langle G, * \rangle$ .

4. (a) Draw the Hasse diagram of the poset  $\langle X, \leq \rangle$ , where  $X = \{2, 3, 6, 12, 24, 36\}$ .

Or

- (b) Define Lattice and give an example.

5. (a) Prove that the direct product of any two distributive lattices is a distributive lattice.

Or

- (b) Draw the transition diagram of Finite Automata.

6. (a) Let  $r$  be a regular expression. Then there exists an NDFSA with  $\epsilon$  moves that accepts  $L(r)$ .

Or

- (b) Consider the grammar  $G = \{V, T, P, S\}$  where  $V = \{S\}$ ,  $T = \{a, b\}$  and  $P = \{S \rightarrow ass, S \rightarrow ab\}$  find the language  $L(G)$ .

7. (a) Prove that the regular sets are closed under intersection.

Or

- (b) Show that  $L$  is recursive iff  $L$  is generated in canonical order.

PART B — (4 × 10 = 40 marks)

Answer ALL questions.

8. (a) Obtain the PCNF of  $(P \wedge Q) \vee (\neg P \wedge R)$ .

Or

- (b) Show that  $\neg P$  follows from  $\neg Q \wedge (P \rightarrow Q)$ .

9. (a) A subset  $T \neq \emptyset$  of  $G$  is a subgroup of  $\langle G, * \rangle$  iff  $\forall a, b \in T, a * b^{-1} \in T$ .

Or

- (b) Prove that every chain is a distributive lattice.

10. (a) Let  $\langle L, \leq \rangle$  be a lattice. For any  $a, b, c \in L$ , we have  $b \leq c \Rightarrow \begin{cases} a * b \leq a * c \\ a \oplus b \leq a \oplus c \end{cases}$ .

Or

- (b) If the language  $L$  is accepted by NDFSA with  $\epsilon$ -transitions, then  $L$  is accepted by an NDFSA without  $\epsilon$ -transitions.

**ACCOUNTING AND FINANCIAL MANAGEMENT**

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(For those who joined in July 2006 and after)

Time : Three hours

Maximum : 75 marks

**PART A — (7 × 5 = 35 marks)**

Answer ALL questions.

1. (a) What are the different kinds of Accounts?

Or

- (b) Explain the important principles of Cost Accounting.

2. (a) State the uses of Funds Flow Statement.

Or

- (b) What are the factors determine the profit?

3. (a) Explain the system of Standard Costing.

Or

- (b) State the limitations of Ratio Analysis.

4. (a) What are the characteristics of a company?

Or

(b) Ahamed was carrying on business as a furniture dealer. On 1<sup>st</sup> January, 1995 his assets and liabilities were :

Cash Rs. 5,500

Loan from Y Rs. 500

Stock Rs. 3,000

Amount due from X Rs. 1,000

Show the journal and ledger.

5. (a) Prepare a Trading Account of Aryabhata for the year ending 30<sup>th</sup> June 1995 by using the following information.

Rs.

Opening stock 70,000

Purchase returns 15,000

Sales 2,50,000

Wages 60,000

Sales returns 20,000

Purchases 1,00,000

Carriage 17,000

Closing Stock was valued at Rs. 60,000.

Or

Fixed assets/shareholders net worth 0.80

Reserve and Surplus/capital 0.50

No bank o/d

Draw up the balance sheet of the company.

Or

- (b) Explain the various types of Subsidiary Books and bring out its advantages.
- 

- (b) The closing balances of Debtors and Bills Receivable amount to Rs. 40,000 classified as follows:

	Outstanding	Total Credit Sales
October sales	Rs. 5,000	80,000
November sales	Rs. 10,000	1,00,000
December sales	Rs. 25,000	1,00,000

Find out the average collection period.

6. (a) A company made credit sales of Rs. 20,000 during the year. If the average collection period 36 days and year is assumed to be of 360 days, calculate :
- (i) Debtors turnover
  - (ii) Average debtors
  - (iii) Debtors at the end when debtors at the end are more than that in the beginning by Rs.4,000.

Or



(b) From the following information prepare statement of source and application of funds for the year ended 30<sup>th</sup> June 1990.

- (i) increase in working capital during the year Rs. 4,500
- (ii) net profit for 1990 Rs. 10,750
- (iii) depreciation of fixed assets charged to profit and loss account Rs. 1,750
- (iv) dividend paid in 1990 Rs. 3,500
- (v) Rs. 10,000 share capital was issued in payment of debentures and Rs. 5,000 loan on mortgage Rs. 15,000 and cash Rs. 10,000

7. (a) The personnel department of a company gives you the following information regarding labour. Calculate labour turnover by using

- (i) Separation method
- (ii) Replacement method

No. of workers on the payroll

At the beginning of the month 900

At the end of the month 1100

(iii) Depreciate plant and machinery 10% and business premises by 20% p.a.

(iv) Commission earned but not received amounts to Rs. 200.

(v) Carry forward unexpired insurance on 30<sup>th</sup> sep.1995 Rs.400.

Or

(b) Define Management Accounting. State its functions.

11. (a) You are given the following figures pertaining to a company.

Current ratio 2.5

Liquid ratio 1.5

Net working capital Rs. 3,00,000

Stock turnover ratio(cost of sales/closing stock) 6 times

Gross profit ratio 20%

Fixed assets turnover ratio(on cost of sales) 2 times

Average debt collection period 2 months

	Rs.	Rs.
Plant and Machinery	17,500	
Sundry Creditors		10,650
Trade expenses	175	
Goods sold		1,34,500
Salaries	2,225	
Carriage outwards	300	
Rent	900	
Bills payable		7,600
Goods bought	1,18,870	
Insurance	1,200	
Business premises	34,500	
Commission		500
Capital		70,000
Carriage inwards	1,000	
	<u>2,32,250</u>	<u>2,32,250</u>

- (i) The stock on 30th sep. 1995 was Rs. 11,000
- (ii) Rent Rs.100 per month for the last quarter is unpaid

During the month 10 workers quit while 40 persons are discharged; 150 workers are recruited during the month, of these 25 workers are recruited in the vacancies of those leaving while the rest were engaged for an expansion scheme.

Or

- (b) What is the main purpose of physical verification of stores?

PART B — (4 × 10 = 40 marks)

Answer ALL questions.

8. (a) What are the importance of Cost Accounting?
- Or

- (b) A manufacturer forecasts his expenses for a normal output of 8,000 units which represents 80% production capacity.

His production in past years ranges from 7,000 to 9,000 units. He expects that the production will not fall outside this range during the ensuing budget period.

Prepare a flexible budget for 10% varying levels of production from the following figures for his normal production.

Raw materials Rs. 40,000

Direct Wages Rs. 10,000

Factory Overhead (60% fixed) Rs. 20,000

Selling and distribution overhead (80% fixed)  
Rs. 10,000

Show in the budget, besides total cost, the unit variable cost unit fixed cost and unit total cost at different levels of production.

9. (a) ABC company limited is manufacturing a consumer products. The necessary data regarding costs and revenue are given below

Sales 5,00,000

(50,000 units

@ Rs. 10 each)

Variable costs 2,00,000

Fixed Costs 1,00,000

After calculating the P/V Ratio and break-even sales, evaluate the effect of the following scheme on profit.

- (i) 20% increase in sales due to 15% decrease in selling price or
- (ii) 15% decrease in sales due to 20% increase in selling price.

Or

- (b) In a manufacturing concern employing 150 workers, standards have been set for direct wages as follows :

Standard wage rate = Rs. 1.00 per hour per worker.

Standard working hours = 35 hours a week

Standard performance = 250 units per hour

Totally 150 employees are engaged in the factory.

During the last week of December 1990 a machine broke down in the assembling department which caused all the 50 employees of that department idle for one hour. The actual production during the remaining month was 9,000 unit, 5 employees were paid @ Rs. 1.20 per hour and the remaining were paid at the standard rate. Calculate the relevant variances.

10. (a) From the following Trial balance and adjustment prepare final accounts :

	Rs.	Rs.
Sundry debtors	32,000	
Stock (1 <sup>st</sup> Oct 1994)	22,000	
Cash balance	1,580	
Bank overdraft		9,000



PROGRAMMING IN C

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(For those who joined in July 2006 and after)

Time : Three hours

Maximum : 75 marks

PART A — ( $7 \times 5 = 35$  marks)

Answer ALL questions.

1. (a) State the data types in C and explain briefly.

Or

- (b) Explain the various types of constants in C with example.

2. (a) How to initialize a variable? Explain.

Or

- (b) Explain the while statement with suitable example.

3. (a) Explain the uses of the external and static variables with example.

Or

- (b) Differentiate arrays and strings.

4. (a) Explain branching control structure in C.

Or

- (b) Write the differences between opening a file in W+ mode and a a+ mode.

5. (a) How to processing an array explain with example?

Or

- (b) Write a C program to add two matrices. Illustrates the handling two dimensional matrices.

6. (a) Define structures. Explain with examples.

Or

- (b) Define Union. Illustrate with examples.

7. (a) Explain the command line parameters with an example.

Or

- (b) Explain how pointers used in C.

PART B — (4 × 10 = 40 marks)

Answer ALL questions.

8. (a) What is the use of a switch statement? Give its syntax. Explain with an example.

Or

- (b) What are bitwise operators available in C? Explain.

9. (a) Explain with examples of control statements in C.

Or

- (b) Write a C program to find the largest number of a set of numbers in an array using pointers.

10. (a) Explain different types of storage class in C.

Or

- (b) Write a program to sort a list of strings into alphabetical order.

11. (a) Discuss about any 5 file operation function in C.

Or

- (b) Write a program to create a file of students information with their mark details.

10. (a) Briefly explain the stack organization in detail.

Or

- (b) Discuss PDP-11 addressing modes with example.

11. (a) Explain how the memory mapped I/O differs from isolated I/O.

Or

- (b) (i) Discuss memory interleaving.  
(ii) Write a short note on memory management hardware.
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**4669/R13**

**MAY 2010**

**DIGITAL PRINCIPLES AND COMPUTER  
ORGANIZATION**

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(For those who joined in July 2006 and after)

Time : Three hours

Maximum : 75 marks

**PART A — (7 × 5 = 35 marks)**

Answer ALL questions.

1. (a) (i) List the advantages of complements of a binary number.  
(ii) Represent the following octal number in decimal form 1234.56.

Or

- (b) What are the basic rules and properties of Boolean Algebra?
2. (a) What is negative logic? Give the truth table negative logic NOR gate.

Or

- (b) (i) Discuss the use of Don't cares.  
(ii) Represent NAND gate using NOR gate alone.

10. (a) Give a brief account of the parts of speech.

Or

- (b) Discuss the various types of clauses.

11. (a) Write an essay on syllables.

Or

- (b) Explain how to prepare a resume and also give a sample resume.
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**4670/R14**

**MAY 2010**

**COMMUNICATION SKILLS**

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(For those who joined in July 2006 and after)

Time : Three hours

Maximum : 75 marks

Answer ALL questions.

**PART A — (7 × 5 = 35 marks)**

1. (a) Explain Intonations and its uses.

Or

- (b) What are the advantages and disadvantages of groups?

2. (a) Explain the following

- (i) Role play at an election to office
- (ii) Role play at speaking to a press.

Or

- (b) How will you classify the types of interview information?



3. (a) What are the important steps to improve reading skills?

Or

- (b) What are the difficulties in reading?

4. (a) Write a note on Basic sentence patterns.

Or

- (b) Explain direct and indirect speeches with examples.

5. (a) How does adverb work in sentences?

Or

- (b) Write a short note on prefixes.

6. (a) Write the synonyms and Antonyms for the following words :

- (i) lack
- (ii) heat
- (iii) defence
- (iv) effect
- (v) idle.

Or

- (b) Use the following idioms in sentences.

- (i) keep an eye on
- (ii) bring to light
- (iii) cut a sorry figure
- (iv) burn the midnight oil
- (v) flying colours.

7. (a) What are the features of a good paragraph?

Or

- (b) What are the steps involved in note making?

PART B — (4 × 10 = 40 marks)

8. (a) Describe in details about the sounds of English.

Or

- (b) Write an essay on seminar and its uses.

9. (a) Explain oral and silent reading. Also give the disadvantages of oral reading and advantages of silent reading.

Or

- (b) Explain in details about the types of sentences.

9. (a) Prove that any circuit has an even number of edges in common with any cutset.

Or

- (b) A complete graph of 5 vertices is non-planar. prove it.
10. (a) State and prove Euler's formula.
- Or
- (b) Prove that every planar graph is 5-colourable.
11. (a) Prove that in a strongly connected tournament on  $n$  vertices there exists a directed circuit of length  $m$  for each  $m$ ,  $3 \leq m \leq n$ .

Or

- (b) Prove that the number of labeled trees on  $n$  vertices is  $n^{n-2}$ .
- \_\_\_\_\_

**4671/R15**

**MAY 2010**

**GRAPH THEORY**

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(For those who joined in July 2006 and after)

Time : Three hours

Maximum : 75 marks

**PART A — ( $7 \times 5 = 35$  marks)**

Answer ALL questions.

1. (a) There are 5 books on Mathematics, 4 on Physics and one on Economics. In how many ways can they be placed on a shelf, if books on the same subject are to be together?

Or

- (b) In how many ways can a total of 16 be obtained by rolling 4 dice once.

2. (a) Define

(i) Union

(ii) Intersection of two graphs

Give an example.

Or

(b) If  $G$  is  $K$ -connected prove that  $E(G) \geq \frac{K\gamma(G)}{2}$ .

3. (a) If there exists a unique path between every pair of vertices of a graph  $G$  prove that  $G$  is a tree.

Or

(b) Prove that a graph with  $n$  vertices and  $n-1$  edges and no circuits is connected and hence is a tree.

4. (a) Prove that every connected graph  $G$  has atleast one spanning tree.

Or

(b) Prove that the vertex connectivity of any graph  $G$  can never exceed the edge connectivity of  $G$ .

5. (a) Write any four common properties of  $K_5$  and  $K_{3,3}$ .

Or

(b) For any simple connected planar graph with  $f$  regions,  $n$  vertices and  $e$  edges prove that

(i)  $e \geq \frac{3}{2}f$

(ii)  $e \leq 3n - 6$ .

6. (a) Prove that every tree with 2 or more vertices is 2-chromatic.

Or

(b) Define strongly connected and weakly connected. Give an example.

7. (a) Given a sequence (4, 4, 3, 1, 1). Construct a seven vertex tree.

Or

(b) Explain the counting series for  $u_n$ .

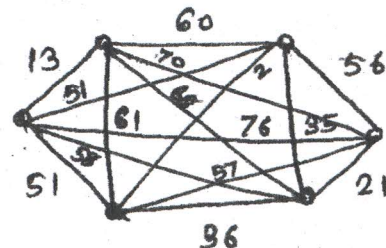
PART B — (4 × 10 = 40 marks)

Answer ALL questions.

8. (a) Prove that a graph is bipartite if and only if all its circuits are even.

Or

(b) Using Kruskal's algorithm, determine an optimal tree in the weighted graph given by



SOFTWARE ENGINEERING

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(For those who joined in July 2006 and after)

Time : Three hours

Maximum : 75 marks

PART A — ( $7 \times 5 = 35$  marks)

Answer ALL the questions.

1. (a) Give the various definitions of software engineering.

Or

- (b) List some of the management problems.

2. (a) What is system definition? Write down its format.

Or

- (b) What are the factors to consider in setting project goals?

3. (a) Write short notes on programming team structure.

Or

- (b) What are called the 'other planning activities'? Explain.



4. (a) Explain Delphi cost estimation technique.

Or

(b) What does WBS stands for? Explain.

5. (a) What is SSA? Explain.

Or

(b) Estimate the software maintenance cost.

6. (a) Write a note on abstraction.

Or

(b) Analyse the importance of test plan.

7. (a) What is static analysis? Explain.

Or

(b) Discuss the traditional debugging techniques.

PART B — (4 × 10 = 40 marks)

Answer ALL the questions.

8. (a) Discuss the size categories of software projects.

Or

(b) Explain the phased life cycle model.

9. (a) Discuss the steps required to plan a software project.

Or

(b) Explain COCOMO cost model in detail.

10. (a) Explain state oriented rotations.

Or

(b) What is petri net? Explain in detail.

11. (a) Discuss modules and modularization criteria.

Or

(b) What are the two source code metrics? Explain in detail.

**RELATIONAL DATABASE MANAGEMENT SYSTEM**

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(For those who joined in July 2006 and after)

Time : Three hours

Maximum : 75 marks

**PART A — ( $7 \times 5 = 35$  marks)**

**Answer ALL questions.**

1. (a) Explain the various categories of data models.

Or

- (b) What are the different types of database end users? Discuss the main activities of each.

2. (a) Explain the difference between an attribute and a value set.

Or

- (b) Explain the various categories of storage media.

3. (a) Discuss the techniques for allocating file blocks on disk.

Or

- (b) Explain the structure of extendible hashing scheme.

4. (a) Explain the types of single level ordered indexes.

Or

- (b) Write short note on B-trees.

5. (a) Explain the formal specification of tuple relational calculus.

Or

- (b) Explain the various subsystems of DB2.

6. (a) Explain the referential integrity in DB2.

Or

- (b) Explain the null value and dangling tuple problems.

7. (a) Explain about functional dependency.

Or

- (b) Discuss the factors that influence the choice of a DBMS package for the information system of an organization.

PART B — ( $4 \times 10 = 40$  marks)

Answer ALL questions.

8. (a) Explain the characteristics of database approach.

Or

- (b) Explain the architecture of DBMS in detail.

9. (a) Explain the operations that are performed on sorted files.

Or

- (b) Explain the relational model constraints in detail.

10. (a) Explain the various parts of SQL language.

Or

- (b) Explain the view processing in DB2 with example.

11. (a) Explain the storage anomalies of 2nd normal form.

Or

- (b) Explain the main phases for database design process.

**OBJECT ORIENTED PROGRAMMING AND C++**

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(For those who joined in July 2006 and after)

Time : Three hours

Maximum : 75 marks

**PART A — ( $7 \times 5 = 35$  marks)**

**Answer ALL questions.**

1. (a) Discuss the various features of C++.

Or

- (b) Write benefits and application of OOPs.

2. (a) Write short notes about Tokens and scope of variable.

Or

- (b) Explain Reference Operator and Dereference operation in C++.

3. (a) Explain if and Switch Control Structure.

Or

- (b) Explain inline functions.



4. (a) Member function inside the class and outside the class.

Or

- (b) What difference between static and non-static member function?

5. (a) Explain constructor overloading.

Or

- (b) Write the rules of overloading operators and what are the operators are not suitable for overload.

6. (a) Explain Abstract classes.

Or

- (b) Explain this pointer.

7. (a) Write the example for formatted I/O operations

Or

- (b) Explain error handling in file operations.

PART B — (4 × 10 = 40 marks)

Answer ALL questions.

8. (a) What are the symbolic constants and explain data types?

Or

- (b) Write down the application of object oriented programming.

9. (a) Explain function overloading with example.

Or

- (b) Explain array of class objects with example code.

10. (a) Explain dynamic constructors.

Or

- (b) Discuss about hybrid inheritance.

11. (a) Explain type conversion between Objects and Basic Types.

Or

- (b) Explain virtual function with example.

11. (a) (i) Explain the different types of architectures in Embedded systems.

(ii) Draw the lifecycle of an Embedded system and explain.

Or

(b) Describe the Architecture design of a sample Embedded application.

**4675/R19**

**MAY 2010**

## **MICROPROCESSORS AND EMBEDDED SYSTEMS**

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(For those who joined in July 2006 and after)

Time : Three hours

Maximum : 75 marks

**PART A — (7 × 5 = 35 marks)**

Answer ALL the questions.

1. (a) Explain Bus Interface Unit.

Or

(b) Write a note on Read Bus Cycle and Write Bus Cycle.

2. (a) Write a note on Program Control Instructions.

Or

(b) Write a note on Subroutines.

3. (a) Explain the Pin out configuration for INTEL 8086 microprocessor.

Or

(b) Write a note on Main RAM.

4. (a) Explain Internal I/O of IBM PC.

Or

(b) Explain five main timing signals of IBM PC systems.

5. (a) Mention the Tools for Embedded system design.

Or

(b) Write a note on operating system in Embedded system, start-up code in an Embedded system and Built-in Self-Test.

6. (a) Give the examples of Embedded systems.

Or

(b) Write a program for Multiplication of two numbers using subroutines.

7. (a) Write a note on Web Services Operation.

Or

(b) Explain challenges in using XML based WEB Services in Embedded system.

PART B — (4 × 10 = 40 marks)

Answer ALL the questions.

8. (a) Briefly explain memory in a Microcomputer system.

Or

(b) Draw the Pin out of 8088 MPU and explain the functionalities of all the pins.

9. (a) Explain the function and operation of 8284A chip with its Pin out diagram.

Or

(b) Briefly explain 8237A DMA Controller, Block diagram and Pin configuration.

10. (a) Describe the functionalities of 8255 PPI with its Pin out diagram.

Or

(b) Briefly explain 8253 programmable interval Timer.