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INSTITUTE OF COMPUTER SCIENCE

UNIVERSITY QUESTION PAPER (ICS)

EXAM PAPER DEC-2010 (REV)

SEM - I

University of Mumbai

(156)
SECOND HALF 2010

PROGRAMME OF THE MASTER'S DEGREE IN COMPUTER APPLICATIONS (M.C.A.) (SEM I) EXAMINATION

Candidates for the above examination are requested to be in attendance at the place of examination, fifteen minutes before the time appointed for setting of the first paper and ten minutes before the time fixed for setting of each subsequent paper.

THEY ARE FORBIDDEN TO TAKE ANY BOOK OR PAPER INTO THE EXAMINATION HALL.

Seat numbers and places of examination will be announced on the college notice boards four days prior to the date of commencement of the examination.

Smoking is strictly prohibited in the examination hall.

The written examination will be conducted in the following order :-

Days and Dates	Time	Paper
Thursday, December 30, 2010	10:30 a.m. to 01:30 p.m.	Programming with "C".
Monday, January 03, 2011	10:30 a.m. to 01:30 p.m.	System Analysis Design
Wednesday, January 05, 2011	10:30 a.m. to 01:30 p.m.	Computer Organisation and Architecture.
Friday, January 07, 2011	10:30 a.m. to 01:30 p.m.	Discrete Mathematics.
Monday, January 10, 2011	10:30 a.m. to 01:30 p.m.	Principles of Economics and Managerial
Wednesday, January 12, 2011	10:30 a.m. to 01:30 p.m.	Introduction to Web Technology

Mumbai - 400 098
8th October, 2010

Prof. Vilas B. Shinde
Controller of Examinations

MCA Sem I Dec 2010
Programming with 'C'

n. 5993–10.

3

(3 Hours) [Total Marks 100

Note: • Question 1 is compulsory, answer any 4 from the remaining 6 questions
• All questions carry equal marks

1. a) What are preprocessor directives? Provide the differences between macros and functions. (10)
b) Write a function that will scan a character string passed as an argument and convert all uppercase characters into their lowercase equivalents. (10)

2. a) Write a program to read text file and print the number of words in that file. (10)
b) What is the difference between union and structure? Give appropriate examples. (10)

3. a) Write a program to print the following pattern of asterisks up to n lines where n is taken from the user.

```
*
**
***
****
*****
```

(10)

b) What is a pointer? How is a pointer variable declared? What is the purpose of the data type included in the declaration?
'Arrays are always passed by reference'. Explain this statement. (10)

4. a) Exemplify in detail the various decision making constructs available in C (10)
b) Write a program to find the sum of both the diagonals a square matrix of order n x n. The Program must have user defined functions to read and display n x n matrix. (10)

5. a) What are storage classes? Explain the various storage classes with appropriate examples. (10)
b) What is a 2-D array? Write a complete C program to perform matrix multiplication. (10)

6. a) Write a complete C program to simulate a digital clock. (10)
b) State the different Bitwise operators, Give appropriate examples to illustrate the use of each operator. (10)

7. a) Differentiate between the following :
i) Type casting
ii) Relational operators
iii) Binary file and text file
iv) Function pointers . (20)

1st CM - SEM-I - Jan - 2011.
-84U,. GOA.
DATE/. 05/01/2011

Oct- 10 194
Con. 5933–10.

(REVISED COURSE)

(3 Hours) [Total Marks: 100]

Instructions :

- Q.1 is compulsory .
- Attempt any four out of remaining.

Q.1 Attempt any four

A. Explain the working of J-K FF. Explain all its states. [05]

B. What are K-maps ? Explain its use with an example. [05]

C. Discuss 8 to 1 Mux using truth table .Draw its implementation using a appropriate gates. (05)

D. using K-map simplify the Boolean function .
F(A,B,C,D)=sum (0,1,2,5,8,9,10) (05)

E. Compare Sequential Vs combinational circuits (05)

Q.2 A] List and explain different addressing modes with suitable examples [10]

B] What is cache memory ? Explain cache coherence strategies in single and multiprocessor systems . [10]

Q.3 A. What is I/O module. Discuss with the help of diagram functioning of I/O module. (10)

B. Explain fetch cycle, indirect cycle and interrupt cycle along with suitable diagrams . [10]

Q.4 A] Explain different bus arbitration schemes with suitable diagrams . [10]

B] What is pipelining? Explain six stage instruction pipeline with suitable diagram . [10]

Q 5.A] Compare & contrast DMA, Programmed I/O & interrupt driven I/o [10]

B] What is RAID ? Explain different RAID levels in detail. [10]

Q.6 A] Explain RISC and CISC architectures in detail. [10]

B] Explain Flynn's classifications with suitable diagrams . also comment on design issues of pipeline architecture . [10]

Q.7 Write short notes on: ANY FOUR [20]

1. Micro instruction sequencing and execution.
2. loop buffer
3. SRAM Vs DRAM
4. PCI Bus
5. Memory characteristics

160

. 6748–10.

Sub! - S.A.D.

(3 Hours) [Total Marks : 100

N. B. : (1) Question No. 1 is **compulsory**.
(2) Answer any **four** questions Question Nos. 2 to 7.
(3) **All** questions carry **equal** marks.

Q1. (a) Discuss the Six special system tests. [10]

(b) Home Appliances Ltd. Is a retail store selling range of home appliances and consumer items, stocking inventory answering customer queries, demonstrating the products and so forth. For the above system draw CLD, DFD up to 2nd level, ER-diagram and data dictionary of 2 processes, 2 flows, and 2 data stores. [10]

Q2. (a) Define output. What are the analyst's objectives in designing 10 outputs? [10]

(b) Describe how prototyping can be used to augment the traditional systems development life cycle. [10]

Q3. (a) Explain H/S, S/S and which source do you consider the most reliable and why? [10]

(b) Which is the most important and serious system security? Why? [10]

Q4. (a) Explain RAD and waterfall model. [10]

(b) What is deliverable? What is the design book and what is its purpose? [10]

Q5. (a) What are structured walkthroughs and how are they carried out? [10]

(b) Describe component of CASE tools, indicating the function performed by each. [10]

Q6. (a) Compare and contrast White box and Black box testing. [10]

(b) Compare and contrast conventional testing and object oriented testing. [10]

Q7. Write short notes on the following. [20]

(a) Spiral Model
(b) Structure Chart
(c) Warnier or diagram
(d) DFD logical and physical

Sub: Discrete-Mathematics
DATE: 07/01/2011

Con. 5971-10. **AP-5932**

(3 Hours) [Total Marks : 100

N.B. : 1) Question No. 1 is compulsory.
2) Attempt any **four** questions out of remaining six questions.
3) Assume any **necessary** data but justify the same.
4) Figures to the right indicate full marks.

1. (a) (i) Use mathematical induction to prove that n^3-n is divisible by 3 whenever n is a positive integer. 5

(ii) Obtain the Conjunctive Normal Form of 5
$\sim (P \vee Q) \leftrightarrow (P \wedge Q)$

(b) (i) Determine whether the Set Z together with the binary operation 5
$a * b = a + b - ab$ is a Semigroup, Monoid, or neither. If it is a Monoid specify the identity. If it is a Semig oup or Monoid determine if it is Commutative.

(ii) What is the solution of Recurrence Relation $a_n = 7a_{n-1} - 10a_{n-2}$ with initial condition $a_0 = 1$, $a_1 = 8$. 5

2. (a) (i) Construct the truth table of : $(P \rightarrow Q) \leftrightarrow (\sim Q \rightarrow \sim P)$ 5
Determine whether this is tautology, contradiction or neither.

(ii) What is functionally complete set of connectives? Explain with two examples. 5

(b) Let B = {1, 2, 3, 6, 12, 18} & R be defined by xRy if and only if x|y : 10
a. Draw the Hasse diagram of R
b. Determine all minimal elements
c. Determine all maximal elements
d. Is there a greatest element. If yes specify
e. Is there a least element. If yes specify
f. Give upper bounds & LUB of A = {2, 3, 6}
g. Give all lower bounds & GLB of A = {2, 3, 6}

3. (a) (i) Determine the validity of the following argument using deduction method; 5
"If I study then I will pass examination. If I do not go to picnic, then I will study. But I failed examination. Therefore, I went to picnic"

(ii) Show that $(\sim p \wedge (\sim q \wedge r)) \vee (q \wedge r) \vee (p \wedge r)) \equiv r$ 5

(b) (i) Let A(x): x has a white colour, B(x): x is a polar bear, C(x): x is found in cold region, over the universe of animals. Express the following using quantifiers 5
i) There exists a polar bear whose colour is not white
ii) Every polar bear that is found in cold regions has a white colour.

(ii) Find the particular solution of $a_n - 4a_{n-1} + 4a_{n-2} = (n + 1) \times 2^n$ 5

4. (a) (i) Show that the group G is abelian if and only if for a, b $\in$ G, 5
$(a * b)^2 = a^2 * b^2$

(ii) State Tower of Hanoi problem. Obtain its recurrence relation with suitable initial conditions. Solve the recurrence relation 5

(b) (i) The following arrays describe a relation R on the set A = { 1, 2, 3, 4, }. 5
Compute both the digraph of R and the matrix M_R.
VERT = [1, 2, 6, 4]
TAIL = [1, 2, 2, 4, 4, 3, 4, 1]
HEAD = [2, 2, 3, 3, 4, 4, 1, 3]
NEXT = [8 ,3 ,0 ,5 , 7, 0, 0, 0]

(ii) Let A= {1,2,3,4,5,6}. Compute (4, 1, 3, 5) o (5, 6, 3) and (5, 6, 3) o (4, 1, 3, 5) 5

5. (a) (i) Let $\{a_n\}$ and $\{b_n\}$ be sequences of real numbers. Show that 5

$$\Delta(a_n b_n) = a_{n+1}(\Delta b_n) + b_n(\Delta a_n)$$

(ii) Let G be a group. Show that the function $f : G \to G$ defined by $f(a) = a^2$ is a homomorphism iff G is abelian. 5

(b) (i) Let $H = \begin{pmatrix} 1 & 1 & 0 \\ 0 & 1 & 0 \\ 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix}$ be a parity check matrix. Determine the group code $e_H : B^2 \to B^5$. 5

(ii) Show that (2, 5) encoding function $e : B^2 \to B^5$ defined by e(00) = 00000 e(01) = 01110, e(10) = 10101, e(11) = 11011 is a group code. Consider this group code & decode following words relative to maximum likelihood decoding function. a) 11110 b) 10011 5

6. (a) (i) Consider (3,8) encoding function $e : B^3 \to B^8$ defined by : 5

e(000) =	00000000	e(100) =	10100100
e(001) =	10111000	e(101) =	10001001
e(010) =	00101101	e(110) =	00011100
e(011) =	10010101	e(111) =	00110001

(ii) Let G = {1, 2, 4, 7, 8, 11, 13, 14} is a group under 'multiplication modulo 15' 5

i) Find the multiplication table of G.

ii) Find 2^{-1}, 7^{-1}, 11^{-1}

Find orders & subgroups generated by 2, 7 and 11

(b) (i) For grammar specified below, describe the language L (G) produced. 5
Also give BNF & syntax diagram for the production of grammar.

$G = (V, S, v_o, |\to)$, $V = \{v_o, a, b\}$, $S = \{a, b\}$.

$v_o |\to aa\, v_o$, $v_o |\to a$, $v_o |\to b$

(ii) Draw State diagram for the following table : 5

State	f		g	
	Input		Input	
	0	1	0	1
S_0	S_1	S_0	0	1
S_1	S_0	S_2	0	1
S_2	S_1	S_1	0	0

7. (a) Determine whether the relation R on a set A is reflective, irreflective, symmetric, asymmetric, antisymmetric, or transitive. 10
A = Set of all positive integers, aRb, iff $a \leq b+1$

(b) Perform the following : 10

(i) $(127.77)_8 = (?)_{10}$

(ii) $(49.25)_{10} = (?)_2$

(iii) $1101 \div 1001$

(iv) 1111×111

(v) $(1011)_2 - (0110)_2$

S

Sub:- Principles of Eco & Managerial.
DATE:- 10/01/201.

n. 5983-10. AP-5940

(3 Hours) [Total Marks : 100

N.B. : (1) Question No. 1 is **compulsory**.
(2) Attempt any **four** questions from remaining **six**.
(3) All question carry **equal** marks.

1. (a) Differentiate between monopoly and perfect competitive markets. 10
(b) Explain Maslow's theory of motivation in detail. 10

2. Explain in detail :—
(a) Quality Control and TQM
(b) Decision making
(c) Planning
(d) Delegation of authority. 20

3. What is organization structure ? List all organization structures. Explain any two organization structures in detail. 20

4. (a) What are assumptions of McGregor's theory X and theory Y ? 10
(b) What is management by objectives ? What are advantages of management by objectives ? 5
(c) Explain the concept of quality circle with example. 5

5. (a) What is the law of demand and why the does the demand curve slopes downwards ? 10
(b) What are Elastic and inelastic product ? Explain with example. 10

6. Write short notes on :— 20
(a) Market equilibrium
(b) Cost control and cost reduction
(c) Government intervention in pricing
(d) Fixed and variable cost

7. What do you mean by managerial economics ? What are the roles and responsibilities of managerial economics ? 20

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Sub: Introduction to Web Technology.
DATE: 12/01/2011.

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n. 5984–10.

AP–5934

(3 Hours)

[Total Marks : 100

Note: 1) Question 1 is compulsory.
2) Solve any four out of remaining questions.

Q-1) a)	What is HTTP? Explain how does it works?	10
b)	Explain in detail with suitable example types & significance of various types of CSS.	10
Q-2) a)	What are Frames? Explain advantages & disadvantages of using frames.	10
b)	Write html program to get following output.	10

Sr. no.	COLLAGE NAME			
	SECTION A		SECTION B	
	X	Y	X	Y
1				
2				
3				
4				

Q-3) a)	Explain types of lists in html with suitable example	10
b)	Write html code to design a form with three radio buttons red, green, blue Write JavaScript code that will change background color of page when user clicks on a particular button.	10
Q-4) a)	Write html code to accept input from user for course registration input includes name, age, course id, email id. Write JavaScript for validating data.	10
b)	Explain with suitable Program all margin & background commands in CSS.	10
Q-5) a)	Differentiate between (any two) 1) get & post Method 2) request & response object 3) client side v/s server side form validation	10
b)	Explain features and advantages of JavaScript	10
Q-6) a)	Explain with suitable program Array as a built in object.	10
b)	Write short note on DHTML. Write a DHTML to demonstrate event handling related to mouse.	10
Q-7 a)	Write short note on built in objects of ASP	10
b)	Write JavaScript to create user defined object BOX with properties length, height, depth.	10