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END SEMESTER EXAMINATION, JAN-2023
MCA First SEMESTER

COURSE CODE: MCA113	COURSE TITLE: COMPUTER ORGANIZATION & ARCHITECTURE		
MAXIMUM TIME: 3 HRS	MAXIMUM MARKS: 100	DATE OF EXAM:	

Instructions to the candidates:

1. *This question paper contains total three sections.*
2. *All the three sections are compulsory.*
3. *Each question of every section carries equal marks.*

Section (A)

Q. 1. Attempt all questions.

(2 x 10 = 20)

- a. List all the basic computer registers.
- b. What is Speedup?
- c. What is the difference between assembler's first pass and second pass?
- d. What is TRAP?
- e. What is the purpose of IO/M' pin? How it is used?
- f. What is PE?
- g. What is the function of DACK & HLDA?
- h. Define vectored interrupt.
- i. Draw the microinstruction format.
- j. Comment on Optimal Page Replacement Algorithm.

Section (B)

Q.2. Attempt any 5 questions.

(7 x 5 = 35)

- a. Explain the Strobe controlled data transfer using its block diagram and timing diagrams.
- b. Explain the assembler first pass with an example.
- c. Describe the micro programmed control organization.
- d. Write short notes on Vector processors.
- e. List the various Mapping techniques used in cache memory. Explain the Associative mapping.
- f. Write short notes on parallel processing.
- g. Draw the ALU and its function table.

Section (C)

Attempt any 3 questions.

(15 x 3 = 45)

Q.3.

- a. Draw and explain the architecture of 8085 microprocessor. -10M
- b. Draw and explain the memory hierarchy. -5M

Q.4.

- a. Explain the 16-bit basic computer instruction format and its fields. -5M
- b. Draw and explain the flowchart for the addition and subtraction of floating point numbers. -10M

Q.5.

- a. Explain the concept of direct memory access using neat diagram. -9M
- b. List and explain any SIX addressing modes. -6M

Q.6.

- a. Draw and explain the working of memory management hardware. -8M
- b. What are the internal parts of asynchronous communication interface? Write about them. -7M

Q.7.

- a. Explain the virtual memory organization using neat diagrams. -8M
- b. Explain the working of arithmetic circuit and its function table. -7M

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END SEMESTER EXAMINATION, JAN 2023
MCA FIRST SEMESTER

COURSE CODE: MCA114

COURSE TITLE: COMPUTER NETWORKS

[Time allotted: Three hours]**[Max. Marks: 100]****Note:** Attempt all Sections & Questions.

Section (A)

Q. 1. Attempt all questions.**(2 x 10 = 20)**

- a. What are the design issues of Transport layer?
- b. Write two advantages of mesh topology?
- c. How many bits are used in Port addresses?
- d. What is the window size of sender in Go-back N?
- e. Define static routing.
- f. What is a supernet?
- g. Write full form of TCP & UDP.
- h. Draw a frame format of 802.3.
- i. What is the function of TFTP?
- j. Define TelNet.

Section (B)

Q. 2. Attempt any 5 questions.**(7 x 5 = 35)**

- a. If the packet size is 1 KB and propagation time is 15 msec, the bandwidth is 10^9 b/sec, then find the transmission time and utilization of sender in stop and wait protocol?
- b. Define the word topology. Draw ring, bus and tree topology. Write two advantages of each.
- c. Write in detail about the different types of networks.
- d. Explain RIP routing protocol in detail.
- e. How connection is established in TCP? What are the services offered by transport layer to application layer?
- f. Write the function and working of FTP and HTTP.
- g. Why functions of Data Link Layer are repeated in Transport layer. What are the ports? Why are they required?

Section (C)

Attempt any 3 questions.

(15 x 3 = 45)

- Q.3.** What is CRC and Checksum? Calculate the CRC if frame is 1110101001 & divisor is 10011. What type of error are detected by checksum. 15
- Q.4.**
 - a. Explain the working of selective repeat protocol. 8
 - b. Write in detail about IP packet header. 7
- Q.5.** Write in detail about IP addressing. Give examples of each class. What are private address? Why they are required? 15
- Q.6.** Differentiate between following using suitable example 15
- a. IPv4 and IPv6
 - b. TCP and UDP
 - c. NAT and ARP
- Q.7.**
 - a. What do understand by transmission media? Write in short about UTP? In what condition you will prefer optical fiber over copper wire? 8
 - b. What are Hamming code? Calculate the hamming code if the frame is 10011001010. 7

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END SEMESTER EXAMINATION, FEB- 2023

MCA I SEMESTER

COURSE CODE:MCA116 COURSE TITLE: SOFTWARE ENGINEERING & PROJECT MANAGEMENT

[Time allotted: Three hours]

[Max. Marks: 100]

Note: Attempt all Sections & Questions.

Section (A)

Q. 1. Attempt all questions.

(2 x 10 = 20)

- a. What is Phased Development process?
- b. What are various software Engineering problems?
- c. Differentiate verification & validation?
- d. Software testers have sometimes said "errors happen in corners" what could this mean?
- e. Distinguish between objectives & products?
- f. What is cost-benefit analysis?
- g. What is RISK management?
- h. Define Hammock activities.
- i. What are the two methods used to progress of project in picture
- j. What is ACWP and BCWP?

Section (B)

Q. 2. Attempt any 5 questions.

(7 x 5 = 35)

- a. Define software Engineering as per IEEE? Explain Software Crisis in details.
- b. Define Requirement .Explain different types of Requirement.
- c. Difference between Verification and validation.
- d. What is role of Project Manager
- e. Explain different method for Project Evaluation.
- f. Draw ER Diagram for Library management system.
- g. Differentiate Budgeted cost of work scheduled and Budgeted cost of work performed.

Section (C)

Attempt any 3 questions.

(15 x 3 = 45)

- Q. 3.** a. Explain different levels of DFD with suitable Example.
b. Explain Spiral model in details.
- Q. 4.** a. Difference between black box and white box testing.
b. Explain different types of integration testing.
- Q. 5.** a. Explain the Software standard ISO-12207 in details.
b. Explain the Capability Maturity models (CMM) in details
- Q. 6.** a. Explain Framework for Project Management and control
b. Explain different software used in Project management.
- Q. 7.** a. Explain the advantages & disadvantages of fixed price contract model.
b. Explain the types of contract with example.

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END SEMESTER EXAMINATION, JAN 2023**PROGRAM: MCA****FIRST SEMESTER****COURSE CODE: : MCA115 COURSE TITLE: SCRIPTING LANGUAGES****[Time allotted: Three hours]****[Max. Marks: 100]****Note: Attempt all Sections & Questions.****Section (A)****Q. 1. Attempt all questions.****(2 x 10 = 20)**

- a. What is the difference between SOAP and REST?
- b. <audio> is used for?
- c. <source> is used for?
- d. <track> is used for?
- e. <embed> is used for?
- f. What is the use of Canvas in HTML?
- g. What is the difference between Canvas and SVG?
- h. What is CORS?
- i. What is RDW?
- j. What is class selector in CSS?

Section (B)**Q. 2. Attempt any 5 questions.****(7 x 5 = 35)**

- a. Why HTML is the language of Web? Explain HTML basic structure.
- b. What are the advantages of HTML5 over previous versions of HTML?
- c. Explain some advantages of using external CSS and Java Script?
- d. What is X query? How to use it? Explain with the help of a code snippet.
- e. Give a brief description of Perl. Explain for which type of applications Perl should be used.
- f. What is the Ruby and what is Rails? Where to use Ruby on Rails? Explain in detail.
- g. "XSLT is important" why? Explain with the help of a code snippet.

Section (C)**Attempt any 3 questions.****(15 x 3 = 45)**

- Q.3. For creating any chat application what type of web tools should be used? Explain in detail.
- Q.4. Explain the importance of XML. What the advantages of it?
- Q.5. What do you mean by CGI? Explain in detail. Explain with the help of block diagram.
- Q.6. What are the advantages and disadvantages of cookies? Why it is important to use cookies now days?
- Q.7. What do you mean by XSS? Explain in detail. Why it is used?

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END SEMESTER EXAMINATION, JAN- 2023

PROGRAM: MCA

SEMESTER: FIRST

COURSE CODE: MCA112

COURSE TITLE: DISCRETE MATHEMATICS

[Time allotted: Three hours]

[Max. Marks: 100]

Note: Attempt all Sections & Questions.

Section (A)

Q1. Attempt all questions.

(2 x 10 = 20)

a. If $A = \{a, b, c, d\}$ and $B = \{a, c, e, f, g\}$. Then determine $A \oplus B$.

b. Let $A = \begin{bmatrix} 1 & 0 & 1 \\ 0 & 1 & 1 \\ 1 & 1 & 0 \\ 0 & 0 & 0 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 1 & 0 \\ 1 & 0 & 1 \\ 0 & 0 & 1 \\ 1 & 1 & 0 \end{bmatrix}$ then find $A \vee B$.

c. Write the contrapositive of implication: If today is Monday, then tomorrow is Tuesday.

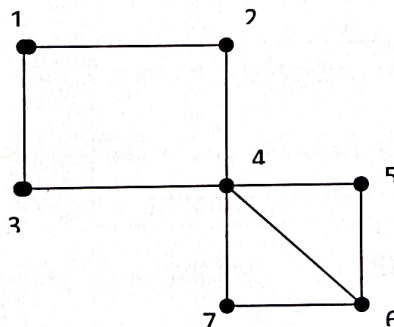
d. Let $R = \{(t, u), (u, w), (u, x), (u, v), (v, z), (v, y)\}$ be a relation defined on a set $A = \{t, u, v, w, x, y, z\}$. Determine if R is a tree, if it is, find the root.

e. If 9 colors are used to paint 100 houses. Ascertain at least how many houses will be of same colors.

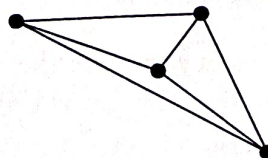
f. Let $A = \{1, 2, 3\}$, and the matrix of relation R on A be given as $M_R = \begin{bmatrix} 1 & 0 & 1 \\ 0 & 1 & 1 \\ 0 & 0 & 0 \end{bmatrix}$. Then determine the matrix of relation R^{-1} .

g. If $A = \{1, 2, 3, 4, 5\}$ and $R = \{(1, 1), (1, 2), (2, 3), (3, 5), (3, 4), (4, 5)\}$ is a relation on A , then calculate R^2 .

h. Examine whether the following graph has a Hamiltonian circuit, a Hamiltonian path but no Hamiltonian circuit, or neither. Give reasons for your answer



i. Determine the chromatic number of the given graph



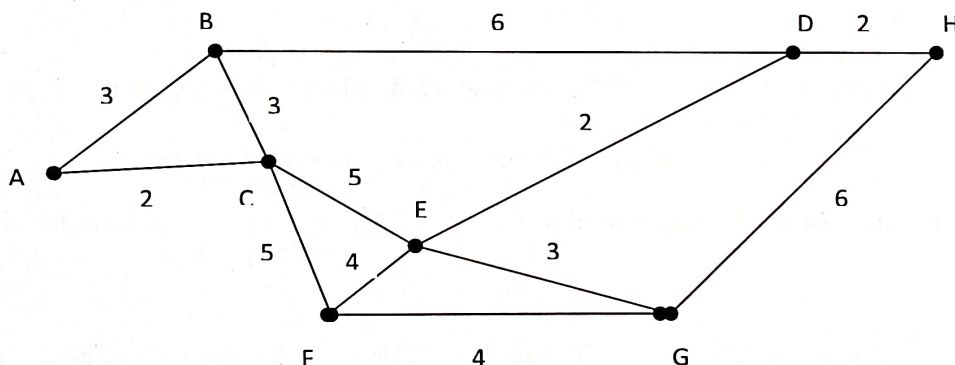
- j. Test whether the integers 5 and 7 are comparable in the poset $(\mathbb{Z}^+, |)$, where $\mathbb{Z}^+$ is the set of positive integers. ? Give reason in support of your answer.

Section (B)

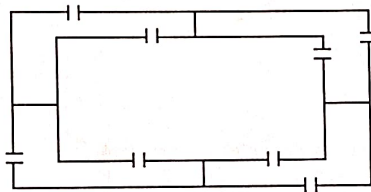
Q2. Attempt any 5 questions.

(7 x 5 = 35)

- a. In a survey of 120 people, it was found that: 65 read Newsweek magazine, 45 read Time and 42 read Fortune. 20 read both Newsweek and Time, 25 read both Newsweek and Fortune, 15 read both Time and Fortune and 8 read all three magazines.
- Calculate the number of people who read at least one of the three magazines,
 - Draw the Venn diagram and fill in the correct number of people in every regions of the Venn diagram,
 - Calculate the number of people who read exactly one magazine.
- b. Show that, for every positive integer n , the expression $9^n - 2^n$ is divisible by 7.
- c. Let $A = \{1, 2, 4, 8\}$ and let $\leq$ be the partial order of divisibility on A . Let $A' = \{0, 1, 2, 3\}$ and $\leq'$ be the usual relation "less than equal to" on integers. Show that $(A, \leq)$ and $(A', \leq')$ are isomorphic posets.
- d. Apply Kruskal's algorithm to calculate the minimum spanning tree of the following graph



- e. At the door of an historical mansion, you receive a copy of the floor plan for the house given below. Is it possible to visit every room in the house by passing through each door exactly once. If so, give sketch of your tour. Explain your reasoning properly.



- f. Out of the letters of the word "COMPUTER" find the number of permutations with following conditions
- begin with C,
 - end with R,
 - begin with C and end with R,
 - C and R occupy the end places.

- g. Construct the labeled tree that represents the Huffman code
A000 S001 C01 D11100 E1101, and use it

- (i) To find the string corresponding to the word **CAES, ESA**
(ii) To decode the messages 1100011101, 1101000001

Section (C)

Attempt any 3 questions.

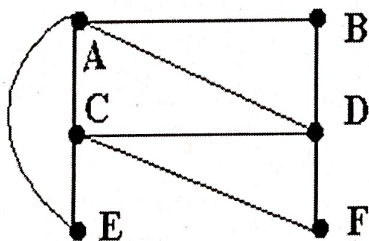
(15 x 3 = 45)

Q3. (a) Let $A = \{a_1, a_2, a_3, a_4, a_5\}$ and R be a relation on set A defined as

$R = \{(a_1, a_1), (a_1, a_2), (a_1, a_4), (a_2, a_3), (a_3, a_3), (a_3, a_5), (a_4, a_4), (a_5, a_2)\}$. Compute the transitive closure of R using Warshall's algorithm. (8)

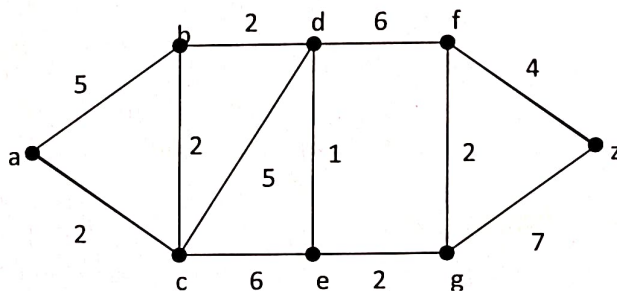
(b) Let $A = R \times R$ (R is the set of reals). Define the relation S on A as $(a, b)S(c, d)$ if and only if $a^2 + b^2 = c^2 + d^2$. Check whether S is an equivalence relation on A . (7)

Q4. (a) Apply Fleury's algorithm, beginning with vertex F, to find an Eulerian Circuit in the following graph.



(7)

(b) Find the shortest path between the vertices a and z in the following graph by applying Dijkstra's algorithm.



(8)

Q5. (a) What is a tautology in a statement: Show that: $\sim (p \Leftrightarrow q) \equiv ((p \wedge \sim q) \vee (q \wedge \sim p))$. (8)

(b) Test whether the following argument is valid or not. If it is valid, identify the tautology or tautologies on which it is based. (7)

If my plumbing plans do not meet the construction code, then I cannot build my house.

If I hire a licensed contractor, then my plumbing plans will meet the construction code.

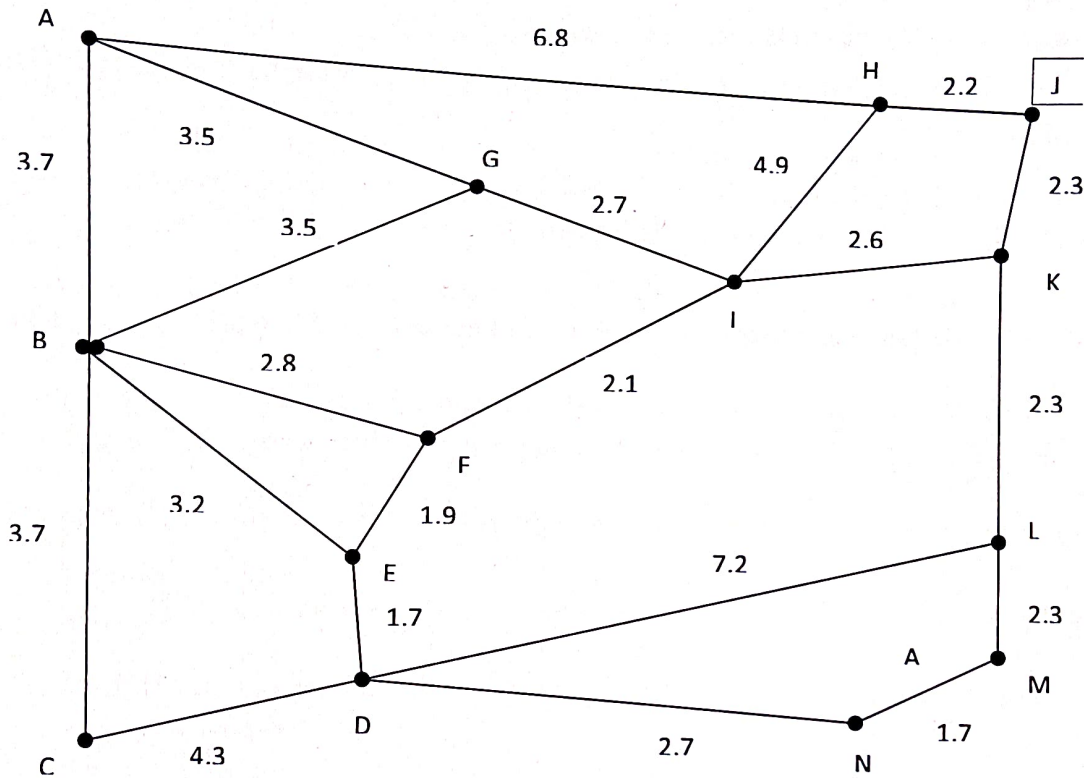
I hire a licensed contractor.

$\therefore$ I can build my house

Q.6 (a) Let n be a positive integer and D_n be a set of all positive divisors of n . Test whether D_{20} is a lattice, give proper reasoning in support of your answer. (7)

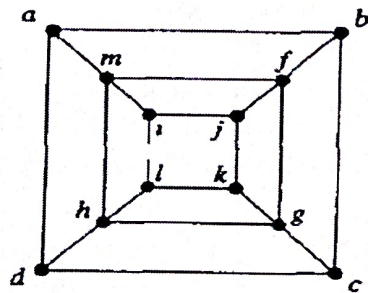
(b) Solve the recurrence relation $a_n = -2a_{n-1} + 2a_{n-2} + 4a_{n-3}$; with initial conditions $a_1 = 0, a_2 = 2, a_3 = 8$. (8)

Q.7 (a) Define is a minimum spanning tree. Apply Prim's algorithm to calculate the minimum spanning tree of the following graph by starting at vertex K . (10)



(b) Let G be the graph given below

(5)



and Let R be the equivalence relation on the set of vertices V , defined as

$R = \{(i,i), (i,j), (i,k), (j,k), (j,l), (k,i), (k,j), (k,k), (f,c), (b,f), (b,b), (b,c), (k,l), (l,i), (l,j), (l,k), (l,l),$

$(a,a), (a,m), (d,d), (g,g), (m,a), (m,m), (i,l), (j,j), (j,i), (f,f), (f,b), (c,f), (c,b), (c,c), (h,h)\}$.

Draw the quotient graph G^R .

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END SEMESTER EXAMINATION, JAN-2023

MCA FIRST SEMESTER

**COURSE CODE: MCA111 COURSE TITLE: COMPUTER FUNDAMENTALS & PROGRAMMING
FOR PROBLEM SOLVING**

[Time allotted: Three hours]

[Max. Marks : 100]

Note: Attempt all Sections & Questions.

Section (A)

Q.1. Attempt all questions.

(2x 10 = 20)

- a. Define Flowchart.
- b. Differentiate between Linker and Loader
- c. Define Variable
- d. Define Enum
- e. Define character array
- f. List out operations on pointers
- g. Differentiate between call by value and call by reference
- h. Explain Union
- i. Define macro
- j. Describe Command Line Argument

Section (B)

Q.2. Attempt any 5 questions.

(7 x 5 = 35)

- a. Discuss components of flow chat, Also draw a flowchart to find the given number is prime or not.
- b. Discuss Global and Extern storage class with example.
- c. Write a program to return sum of all elements in a 5 integer array by passing an array to a function.
- d. Define Array of structure, also Write a C program to store and print student name, course and marks of students using structure
- e. Describe Switch case with example.
- f. Write a recursive program to return sum of n natural numbers.
- g. Write a program to write into the file.

Section (C)

Attempt **any 3** questions.

(15 x 3 = 45)

- Q.3.** Explain do-while, while and for loops in C by taking the same problem to demonstrate it all.
- Q.4.** Do the following for find the sum of all its digits in an integer number and check whether the sum is even or not
1. Algorithm
 2. Flowchart
 3. C program
- Q.5.a.** Describe initialization and declaration of 2 dimensional character Array, Also write the code for display all its elements
- b.** Write a program for implementing strcpy function by using a pointer and function.
- Q.6.** a. Explain Structure of C Language. (3)
b. Solve the following: (12)

Write the value of c after execution of the program? void main() { int a, b, c; a = 8; b = 10; c = (b < a b > a); clrscr(); printf("\n c = %d", c); }	Write the final values of x and y? void main() { int x = 1, y = 1; clrscr(); do while(x <= 7) { x++, y++; } while(y <= 5); printf("\n x = %d y = %d", xy); }
The output of the code below is int x; void main() { if (x) printf("C"); else printf("JAVA"); }	Write the output of this C code? int main() { int a = 1, b = 1; switch (a) { case a*b: printf("1 "); case a-b: printf("0\n"); break; } }
Write the output of this C code? int main() { int a = 0, i = 0, b; for (i = 0; i < 6; i++) { a++; continue; } }	Write the output if you will compile and execute the following c code? int main() { inti=4,x; x=++i + ++i + ++i; printf("%d",x); return 0; }

- Q.7.** a. Explain preprocessor directives in C with example.
b. Define File modes and operations with example.

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