M.C.A. DEGREE EXAMINATION,
NOVEMBER 2021.

Second Year

SOFTWARE ENGINEERING

Time : Three hours   Maximum : 70 marks

SECTION A – (3 × 15 = 45 marks)

Answer any THREE questions

1. Discuss the phases of iterative waterfall model for software life cycle and compare Incremental and Waterfall Process Model.

2. Narrate the importance of software specification of requirements. Explain a typical SRS structure and its parts.

3. What are the coupling and cohesion? Explain different types of coupling and cohesion.

4. What are the various testing strategies to software testing? Discuss them briefly.

5. Explain various metrics for software process and software product domains.

SECTION B – (5 × 4 = 20 marks)

Answer any FIVE questions

6. Define software process. State the important features of a process.

7. Describe functional and non — functional requirements.

8. Describe the golden rules for interface design.

9. What do you mean by horizontal and vertical partitioning? Differentiate them.

10. Explain the testing procedures for boundary conditions.

11. What is verification and validation criteria for a software? Explain.

12. Draw the Data Flow Diagram with different levels for withdraw and deposit of money in a bank.

13. Describe unit testing and integration testing.

SECTION C – (5 × 1 = 5 marks)

Answer ALL questions

14. What is meant by SRS review?

15. Define Process Specification.

16. Why software architecture is important in a software process?

17. Define system testing.

18. Define cyclomatic complexity.

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M.C.A. DEGREE EXAMINATION, NOVEMBER 2021.

Second Year

PROGRAMMING WITH JAVA

Time : Three hours   Maximum : 70 marks

SECTION A – (3 × 15 = 45 marks)

Answer any THREE questions.

1. (a)   Explain the declarations of for loop and while loop in java.

    (b)   Write a java program to sum of diagonal elements in two dimensional array.

2.   What is constructor? Discuss different types of constructors with example.

3.   Describe different types of exceptions and how to handle them in Java.

4.   What is package? How to create and access the classes from the packages? List various built in package used in java.

5. (a)   Discuss about java.awt.event.key Eventclass.

    (b)   Write a program to read a file content and extract words using String Tokenizer class.

SECTION B – (5 × 4 = 20 marks)

Answer any FIVE questions.

6. Justify the statement "java is Architecture-Neutral".

7. How do declare variable in java? Also list rules for valid variable names.

8. What is collection in Java? Differentiate between Vector and Array List.

9. Write a program which shows an example of method overloading.

10. Discuss public, private, protected and default access modifier with example.

11. Differentiate Abstract class and interface with suitable example.

12. What is Thread? Draw and explain life cycle of thread.

13. How to pass the parameters to an Applet? Explain with example.

SECTION C – (5 × 1 = 5 marks)

Answer ALL questions.

14. Define object and class.

15. Differentiate between a thread and a process.

16. Define exception.

17. What is use of static keyword?

18. What is an interface?

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(DMCA 203)

M.C.A. DEGREE EXAMINATION,
NOVEMBER 2021.

Second Year

COMPUTER NETWORKING

Time : Three hours   Maximum : 70 marks

SECTION A – (3 × 15 = 45 marks)

Answer any THREE questions from the following.

1. What is multiplexing? Explain different types of multiplexing.

2. (a) Describe the functions of Media Access Control sub layer.

    (b) Compare and contrast Local Area Networks and Wide Area Network technology.

3. Discuss about packet switching and circuit switching in detail.

4. Explain shortest path routing with suitable example.

5. (a) Discuss various consideration for IP address calculation.

    (b) Explain about various threats in the network.

SECTION B – (5 × 4 = 20 marks)

Answer any FIVE questions from the following.

6. Calculate the polynomial checksum for the following frame and generator

    Frame: 1101011011 and Generator : $x^4 + x + 1$

5

7. What is ALOHA? Compare different ALOHA protocols.

8. Write about CSMA/CD mechanism.

9. Write about time division switching and space division switching.

10. Explain IPv4 datagram format and importance of each filed.

11. What is name resolution? Explain in brief.

12. Explain about remote bridges.

13. Write short notes on IP addressing scheme.

SECTION C – (5 × 1 = 5 marks)

Answer ALL questions.

14. Define Parity Check.

15. What is packet switching?

16. What is the purpose router and switch?

17. What is MANET?

18. Define DNS.

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M.C.A.. DEGREE EXAMINATION,
NOVEMBER 2021.

Second Year

COMPUTER ALGORITHMS

Time : Three hours   Maximum : 70 marks

SECTION A — (3 × 15 = 45 marks)

Answer any THREE questions.

1. What is an algorithm? Discuss algorithm development steps in detail.

2. Write an algorithm for Strassen's matrix multiplication schemes to evaluate the product of n matrices. Find the resulting recurrence relation for the same and analyze its time complexity. Justify that this method is improvement over the conventional matrix multiplication method.

3. For the given graph, construct minimum spanning tree using Kruskal's algorithm and also compute its complexity.
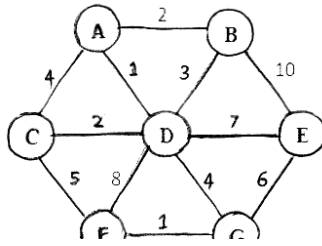
4. Given weight vector $(w_1, w_2, w_3, w_4, w_5, w_6, w_7) = (2,3,5,7,1,4,1)$ and profit vector $(p_1, p_2, p_3, p_4, p_5, p_6, p_7) = (10,5,15,7,6,18,3)$ and Knapsack of capacity 15. Find optimal solution for 0/1 knapsack problem.

5. Give the solution of 8--queens problem using back tracking and branch and bound solution of travelling salesman problem.

SECTION B – (5 × 4 = 20 marks)

Answer any FIVE questions from the following

6. Explain: Worst Case, Best Case and Average Case Complexities of an algorithm.

7. Define time and space complexity. Find the complexity of below recurrence
$$T(n) = \begin{cases} T(n-1) + n(n-1) & if \ n \geq 2 \\ 1, & if \ n = 1 \end{cases}$$

8. What is weighting rule? Discuss about the union algorithm using weighting rule.

9. State and explain about quick hull problem.

10. Constrict Huffman code for the following data:

8

$p(A) = 0.1 = p(B), p(C) = 0.3, p(D) = 0.14,\quad p(E) = 0.12$ and $p(F) = 0.24$. Encode the text CAD AND Decode 10011011011101.

11. What is transitive closure? Give the optimal function to find transitive closure.

12. Find the subset from the given sum using back tracking: S { 1,2,5,7) and $d = 8$.

13. Solve the all pair shortest paths problem for the digraph with weight matrix

$$\begin{bmatrix} 0 & \infty & 3 & \infty \\ 2 & 0 & \infty & \infty \\ \infty & 7 & 0 & 1 \\ 6 & \infty & \infty & 0 \end{bmatrix}.$$

SECTION C — (5 × 1 = 5 marks)

Answer ALL questions

14. Define Omega (Ω) notation of algorithm.

15. Define principle of optimality.

16. What is basic characteristic of greedy algorithm?

17. What is branch and bound method?

18. Define 0/1 knapsack problem.

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M.C.A. DEGREE EXAMINATION,
NOVEMBER 2021.

Second Year

DISTRIBUTED OPERATING SYSTEMS

Time : Three hours   Maximum : 70 marks

SECTION A – (3 × 15 = 45 marks)

Answer any THREE questions.

1. (a)   Discuss some of the guiding principles for designing a scalable distributed system.

    (b)   Explain distributed computing model.

2. Explain about Centralized clock synchronization with example and also describe its merits and demerits.

3. Discuss in detail about distributed deadlock and transaction recovery.

4. (a)   Explain process migration in Heterogeneous system.

    (b)   Explain the implementation of RPC in a distributed system.

5. Explain the math components of a distributed file system? What might be the reason for separating the function of Distributed file system into those components?

SECTION B – (5 × 4 = 20 marks)

10

Answer any FIVE questions from the following.

6. Explain the Address space transfer mechanism for process migration.

7. What are the functions of ATM adapter layer?

8. List the desirable features of a good distributed file system.

9. What are the main causes of thrashing in a Distributed Shared Memory system?

10. Differentiate internal synchronization and external synchronization of clocks in distributed systems.

11. Explain polling and Interrupt in message passing.

12. What are the issues in client server binding? Explain how these issues handled in RPC.

13. Explain load balancing approach.

SECTION C – (5 × 1 = 5 marks)

Answer ALL questions.

14. Define distributed scheduling.

15. What is meant by false sharing in a DSM system?

16. What is light weight RPC?

17. Define mutual exclusion.

18. What is meant by logical clock?

11

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M.C.A. DEGREE EXAMINATION, NOVEMBER 2021.

Second Year

COMPUTER GRAPHICS

Time : Three hours   Maximum : 70 marks

SECTION A — (3 × 15 = 45 marks)

Answer any THREE questions.

1. (a)   Write about various input graphic devices with neat sketches.

    (b)   Explain Working principle of Plasma panel display.

2. Clip the line PQ having coordinates A (4,1) and B (6,4) against the clip window having vertices A (3, 2), B (7, 2), C (7, 6) and D (3, 6) using Cohen Sutherland line clipping algorithm. Mention the limitations of algorithm. How it can be overcome?

3. Derive all necessary formulas for Bresenham's line drawing algorithm. Bresenham line drawing algorithm is used to draw a line from (1, 2) to (7, 5). Determine all the pixels which will be on as the line is drawn.

4. What is meant by parallel projections? Derive matrix for parallel projections.

5. (a)   Explain Z-buffer visible surface determination algorithm.

    (b)   Explain Hermit curve with necessary equations.

SECTION B — (5 × 4 = 20 marks)

Answer any FIVE questions from the following.

6.   Explain Working of CRT monitor with neat diagram.

7.   What is aliasing? How to compensate the aliasing?

8.   What is scaling transformation? Prove that two scaling transformation commute that is $S_1.\ S_2 = S_2.\ S_1$.

9.   Write about Boundary fill (4-connected) algorithm.

10.   What are the properties of B- splines?

11.   What is window and view-port? Retrieve equation for the scaling factor to map the window to view-port in 2D viewing system.

12.   Derive transformation matrix for 2D rotation.

13.   Write about the hidden surfaces and line removal methods with their relative merits.

SECTION C — (5 × 1 = 5 marks)

Answer ALL questions.

14.   Define frame buffer.

15.   Define composite transformation.

16.   Define orthogonal projection.

17.   What is shear transformation?

18.   Define curve Clipping.

M.C.A. DEGREE EXAMINATION,
NOVEMBER 2021.

Second Year

E-COMMERCE

Time : Three hours   Maximum : 70 marks

SECTION A – (3 × 15 = 45 marks)

Answer any THREE questions.

1. (a)   Explain about e-commerce framework in detail.

   (b)   How do you make customers come back to you in B2C e-commerce?

2.   What is e-retailing? Explain its advantages to consumer and business.

3.   What type of electronic payment systems are required in E-Commerce? Why are there different types of payment systems? Explain the necessary characteristics of each type of payment system and give an example of each where it is used.

4.   Explain the supply chain management characteristics in electronic commerce.

5.   Discuss the various available strategies of Internet advertisement.

SECTION B – (5 × 4 = 20 marks)

Answer any FIVE from the following.

6.   State how e-commerce differs from traditional commerce.

7.   Explain   Internet   and   WWW   tools   which   aids e-commerce.

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8. Describe the virtual transaction process.

9. Explain about Electronic Commerce Catalogs.

10. What is role of intelligent web design in e – commerce?

11. What is electronic fund transfer? What are the security issues involved in it?

12. Explain different types of smart cards.

13. Write about pull based and push based supply chain management.

SECTION C – (5 × 1 = 5 marks)

Answer ALL questions.

14. Define cyber cash.

15. What is significance of e - governance?

16. What are the E-Commerce Security Threats?

17. What is digital currencies?

18. What is e - strategy?

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(DMCA 208)

M.C.A. DEGREE EXAMINATION, NOVEMBER 2021.

Second Year

PROBABILITY AND STATISTICS

Time : Three hours   Maximum : 70 marks

SECTION A — (3 × 15 = 45 marks)
Answer any THREE questions.

1. (a) Of all the smokers in a particular district. 40% prefer brand A and 60% prefer brand B. Of those smokers who refer brand A. 30% are females and of those who prefer brand B, 40% are female. What is the probability that a randomly selected smoker prefers brand A, given that the person selected is female.

   (b) If $p(\overline{A}) = \dfrac{3}{8}, p(\overline{B}) = \dfrac{1}{2}$ and $p(A \cap B) = \dfrac{1}{4}$, Find $p(A \mid B)$, $p(B \mid A)$ and $p(A \mid \overline{B})$.

2. Let X be the continuous random variable with p. d. f.:

$$F(x) = \begin{cases} ax, & 0 \le x \le 1 \\ a, & 1 \le x \le 2 \\ -ax + 3a, & 2 \le x \le 3 \\ 0, & \text{elsewhere} \end{cases}$$

   (a) Determine the constant 'a'
   (b) Compute $P(X \le 1.5)$

3. (a) Derive the mean and variance of Normal distribution.

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(b) A cigarette manufacturing firm claims that its brand A of the cigarettes outsells its brand by 8%. If it is found that 42 out of a sample of 200 smokers prefer brand A and 18 out of another random sample of 100 smokers prefer brand B, test whether the 8% difference is valid claim.

4. (a) Fit a curve of the form $y = a\,b^x$ from, the following data:

$x:$	2	3	4	5	6
$y:$	144	172.8	207.4	248.8	298.6

(b) For the following data find the line of regression of Y on X and hence estimate the value of Y when X 48.

$X:$	35	40	45	50	55	60
$Y:$	20.2	23.1	23.2	23.6	25.8	26.3

5. The following figures give the number of defectives in 20 samples, each sample containing 2,000 items 425, 430, 216, 341, 225, 322, 280, 306, 337, 305, 356, 402, 216, 264, 126, 409, 193, 326, 280, 389 Calculate the values for central line and control limits for p-chart.

SECTION B — (5 × 4 = 20 marks)

Answer any FIVE questions from the following

6. If A and B are the any two arbitrary events of the sample space, then prove that
$P(A \cup B) = P(A) + P(B) - P(A \cap B)$

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7. The chances of three students A, B and C solving a problem given in mathematics Olympiad are $\frac{1}{2}, \frac{1}{3}$ and $\frac{1}{4}$ respectively. What is the probability of the problem being solved?

8. Fit a Poisson distribution to the following data:

x	0	1	2	3	4	5	6	7
$f(x)$	365	305	210	80	28	9	2	1

9. Fit a straight line $Y = a + bx$ to the data given below by the method of least segment.

$X:$	5	10	15	20	25
$Y:$	16	19	23	26	30

10. Write about type — I and Type — II errors

11. What are the various techniques used for statistical quality control?

12. Explain steps involved in computation of one-way Analysis of Variance?

13. In the production of certain rods, a process is said to be in control if the outside diameters have a mean = 2.5 and standard deviation of 0.002. Construct a control chart for the means of random samples of size 4.

SECTION C — (5 × 1 = 5 marks)

Answer ALL questions.

14. Define random variable.

15. If X is normally distributed with mean 12 and standard deviation 4 then find the probability if $X \geq 20$.

16. What is the general purpose of the ANOVA one-way classification?

17. What are the uses R - control charts?

18. What is the difference between correlation and regression?

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