

1. Answer the following:

- (a) Explain System engineering in detail. 5
- (b) Differentiate between system software and application software. 5

2. Attempt any **three** from the following :-

- (a) Explain Water Fall model with neat diagram. 5
- (b) Explain Functional and Non-functional requirement. 5
- (c) What are the different types of Critical system ? Explain. 5
- (d) What is Legacy system? Explain its component. 5

3. Attempt any **three** from the following :-

- (a) Explain SRS. 5
- (b) Explain Incremental model in detail. 5
- (c) Explain Component Based Software Engineering. 5
- (d) What is the need for Entity Relationship Diagram in data modelling. 5

4. Attempt any **three** from the following :-

- (a) Explain Client-Server model in detail. 5
- (b) Explain Top-down and bottom-up design modelling. 5
- (c) Write a short note on Data Dictionary. 5
- (d) What are the different types of Task in Requirement engineering. 5

5. Attempt any **three** from the following :-

- (a) Write a short note on Agile method. 5
- (b) Write in brief about Software Testing. 5
- (c) Explain Event processing system. 5
- (d) Define Quality. Explain product quality in detail. 5

6. Attempt any **three** from the following :-

- (a) What are the Different factors affecting software productive. 5
- (b) Explain COCOMO model. 5
- (c) Explain Alpha testing and Beta Testing. 5
- (d) Explain with diagram Verification and Validation model. 5

7. Attempt any **three** from the following:

- (a) Write a short note on ISO 9000 5
- (b) Write a short note on Security Engineering. 5
- (c) Explain Staffing. 5
- (d) What is Quality Assurance ? 5



N.B. : (1) All Questions from question nos. 1 to 7 are compulsory.  
(2) Figures to right indicate the marks.

1. Attempt **both** the questions :- 10
  - (a) Describe in detail Software and hardware requirement of multimedia
  - (b) Explain Huffman Algorithm.
2. Attempt any **three (5 marks each)** :- 15
  - (a) Describe in detail various application of multimedia.
  - (b) Give in detail multimedia creation stages.
  - (c) What is multimedia? Describe its scope.
  - (d) List and explain advantages of multimedia database.
3. Attempt any **three (5 marks each)** :- 15
  - (a) Explain the properties of waves.
  - (b) What is PCM? Explain its type.
  - (c) What is an analog signal? Describe its fundamental properties.
  - (d) What is Bit depth and Quantization error?
4. Attempt any **three (5 marks each)** :- 15
  - (a) Explain formatted and unformatted text.
  - (b) What is image? List different types of images.
  - (c) What do you mean by font and explain different types of fonts?
  - (d) Describe CMYK Color Model. Why it is called subtractive color model?
5. Attempt any **three (5 marks each)** :- 15
  - (a) List and describe the file format for audio storage.
  - (b) What is acoustics and write about its different types?
  - (c) What are different steps in image processing?
  - (d) State difference between Video and Motion Picture and Video and Animation.
6. Attempt any **three (5 marks each)** :- 15
  - (a) Explain Run Length Encoding Technique with example used for compression.
  - (b) Give the difference between Lossy and Lossless Compression.
  - (c) State the necessity of compression technique.
  - (d) List and describe factors to evaluate a compression system.
7. Attempt any **three (5 marks each)** :- 15
  - (a) What is Authoring? Explain issues for Multimedia Authoring.
  - (b) Explain Dreamweaver in detail.
  - (c) What are the types of multimedia presentation?
  - (d) Give advantage and disadvantage of Macromedia flash.



(3 Hours)

[Total Marks : 100]

**N.B. :** (1) All questions are compulsory.

(2) Number to the right indicate marks.

1. (a) Write a brief notes on the following :— 5
  1. Data hiding
  2. Classes and objects
  3. Encapsulation
  4. Polymorphism.
- (b) Java is called the "Platform independent language". Why is it Platform independent? 5
2. Attempt any **three** of the following :—
  - (a) What is package ? How do you create a package ? Explain about the access protection in packages. 5
  - (b) Explain Type Conversion and Type Casting in Java with examples. 5
  - (c) With the help of suitable JAVA programs describe following :— 5
    1. Method (function) Overloading
    2. Constructor Overloading
  - (d) How to create one dimensional array in java ? Explain with an example. 5
3. Attempt any **three** of the following :—
  - (a) Explain briefly about access modifiers in java and their usage. 5
  - (b) Explain about try-catch functionality in Exception Handling. 5
  - (c) What are the two ways for creating a thread ? Explain with an example. 5
  - (d) Write a java program to find factorial of a given number. The number will be provided by user at run time. 5
4. Attempt any **three** of the following :—
  - (a) What is file class in java ? Explain the various types of methods in file object. 5
  - (b) Write Briefly on FileReader and FileWriter classes . 5
  - (c) Write a short note on BufferedReader Class. 5
  - (d) Design and develop a java program that reads a filename from keyboard and display the number of characters, lines, and words in the file. 5
5. Attempt any **three** of the following :—
  - (a) What is data Structure ? Explain the different types of data structure with an example. 5
  - (b) Explain the complexity and the Asymptotic Notation of Algorithms. 5
  - (c) State the steps to implement push and pop operations of a stack. 5
  - (d) Explain the representation of queue and basic operations on queue. 5

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6. Attempt any **three** of the following :- (3 Hours)

- What is linked list ? What are the advantages of linked list over array ? 5
- What do you mean by hashing ? Explain any five popular hash functions. 5
- What is the binary tree ? Write algorithm to construct a binary search tree. 5
- What is a Binary Search Tree (BST) ? Make a BST for the following sequence of numbers 45, 36, 76, 23, 89, 115, 98, 39, 41, 56, 69, 48 5

Traverse the tree in Preorder, Inorder and postorder.

7. Attempt any **three** of the following :-

- Explain the binary heap tree with an example. 5
- Which are the two standard ways of traversing a graph ? Explain them with an example of each. 5
- What is an adjacency matrix ? What are the different ways for implementing it ? 5
- Explain the insertion sort with algorithms. 5



**N.B. :** (1) All questions are compulsory.

(2) From question 2 to 7, sub question (a) is compulsory and attempt any one from (b) & (c).

1. Attempt any one :-

(a) A continuous Random variable has the probability density function

$$f(x) = k(x - x^2), 0 \leq x \leq 1 \text{ find } k, \text{ mean, variance, mode \& median.}$$

(b) Derive relation between  $\Delta$  & E & hence find the missing term of the following table

x	0	1	2	3	4
y	8	12	19	—	42

2. (a) By using Bisection method find positive root of the equation  $x^3 - x = 1$  correct up to 2 decimal places.

(b) Use Lagrange's Interpolation formula to find y at 1 for following data.

x	-1	0	2	3
y	-8	3	1	12

(c) Find approximate value of  $\sqrt{7}$  by using Newton-Raphson method correct up to 3 decimal places.

3. (a) Solve the following equations by Gauss-Seidel method correct upto three decimal places

$$8x - 3y + 2z = 20$$

$$4x + 11y - z = 33$$

$$6x + 3y + 12z = 35$$

(b) Evaluate  $\int_0^6 \frac{1}{1+x} dx$  by Simpson's  $\frac{3}{8}$  th rule take  $h = 1$ .

(c) Use RK Method of fourth order to estimate  $y(1)$  for  $\frac{dy}{dx} = x^2 + y^2, y(0) = 1 \& h = 0.5$

4. (a) Two unbiased dice are thrown. Find the variance of sum of numbers appearing on upper faces of the dice.

(b) Chest measurement of 1200 soldiers was found to be normal with mean of 85 cms and standard deviation 5 cms. How many of them are expected to have their chest measurements exceeding 95 cms ? (Area under the S.N. curve between 0 & 2 is 0.4772 ).

(c) If the probability that an individual suffers a bad reaction from a particular injection is 0.001 by using Poisson distribution determine the probability that more than two individuals will suffer a bad reaction out of 2000.

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5. (a) Given  $6y=5x+90$  and  $15x=8y+130$  &  $\sigma_x^2 = 16$  find (i) means of  $x$  &  $y$  (ii) Coefficient of Correlation between  $x$  &  $y$  & also find  $y$  when  $x=5$ .

- (b) Fit a straight line of the form  $y=ax+b$  for the following data.

x	3	4	5	6	7	8	9
y	10	12	11	13	14	16	15

- (c) Obtain the Rank Correlation coefficient from the following data.

x	2	4	5	6	8	7
y	18	12	10	8	7	11

6. (a) A Coin is Tossed 400 times and was found to result in 'Head' 245 times. Can we conclude that the coin is fair? (At 5% I.o.s table value is 1.96).

- (b) Can it be concluded that the life span of an Indian is more than 70 years, if a random sample of 100 Indians has an average life span of 71.8 years with Standard Deviation of 7.8 years? (At 5% I.o.s table value is 1.645).

- (c) Nine items of a sample had the following values 45, 47, 50, 52, 48, 47, 49, 53, 51. Does the mean of 9 items differ significantly from the assumed population mean 47.5? (At 5% I.o.s table value is 2.306).

7. (a) Solve the following L.P.P by Simplex Method.

Maximize  $Z = x + y + 4z$

Subject to  $x + y \leq 4, 2y + 5z \leq 10$

$3x + 2y + 4z \leq 15$

$x, y, z \geq 0$

- (b) Solve the following L.P.P by Graphical Method.

Minimize  $Z = 5x + 10y$

Subject to  $x + 2y \geq 2, 3x + y \geq 6$

$3x + 2y \leq 6$

$x, y \geq 0$

- (c) A company manufactures two types of products X & Y and sells them at a profit of Rs. 4 on type X and Rs. 4 on type Y. Each product is processed on two machines G and H. Type X requires two minutes on G & three minutes on H, Type Y requires two minutes on G & two minutes on H. The machine G is available for not more than 10 hours and machine H is available for not more than 23 hours per day. Formulate the Problem to maximize the profit.



(3 Hours)

[Total Marks : 100]

1. Attempt following questions :-
  - (a) Draw and explain product life cycle graph in embedded systems. 5
  - (b) Differentiate between Harvard and Von-Neumann architecture. 5
2. Attempt any **three** questions from the following :-
  - (a) Write a short note on watchdog timer. 5
  - (b) Explain SPI bus in embedded system. 5
  - (c) Write a short note on "Brown out protection circuit". 5
  - (d) Explain classification of embedded systems on the basis of generation. 5
3. Attempt any **three** questions from the following :-
  - (a) Explain application specific embedded system in detail with an example. 5
  - (b) Explain following automotive communication buses - 5
    1. LIN
    2. MOST.
  - (c) Explain following characteristics of embedded system in detail. 5
    1. Operates in harsh environment
    2. Distributed
    3. Small size and weight.
  - (d) Explain following non-operational quality attributes of embedded system. 5
    1. Testability and debug-ability
    2. Per unit cost and revenue.
4. Attempt any **three** questions from the following :-
  - (a) Explain build process in embedded system with diagram. 5
  - (b) Explain the concept of device programmer in embedded systems. 5
  - (c) Write short note on host and target platform in embedded system. 5
  - (d) Define following terms - 5
    1. Object file
    2. Relocatable file
    3. Unresolved Symbols
    4. Device Programmer
    5. Hex file.
5. Attempt any **three** questions from the following :-
  - (a) What do you mean by memory testing ? Explain device test in detail. 5
  - (b) Write short note on NVRAM and EEPROM. 5
  - (c) Write short note on direct memory access. 5
  - (d) Why writing to flash memory is difficult ? 5

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6. Attempt any **three** questions from the following :-

(a) Explain following scheduling algorithms -

1. Shortest job first
2. Priority based.

5

(b) Write a short note on device driver.

5

(c) Explain real-time characteristics of embedded operating systems.

5

(d) Explain following terms -

5

1. Task
2. Non-preemptive scheduling
3. Context Switch.

7. Attempt any **three** questions from the following :-

(a) Explain advantages of simulator based debugging.

5

(b) Write short note on Disassembler/Decompiler.

5

(c) Write short notes on emulators.

5

(d) What is EDLC ? Explain with neat diagram.

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