S.Y.B.Sc(I.T.) (Sem-IV)

Dec 2019

P4–Exam-2019-2–120

Con. 567–19. Software Engineering

DW–7100

(3 Hours) [Total Marks : 100

N.B. : (1) In Q. **1 All** questions are **compulsory**.
(2) **Internal choices** are there from Q.2 to Q.7.
(3) **Figures** to the **right** indicate **full** marks.

1. Answer the following:
   (a) Write a Note on Quality Control. **5**
   (b) Explain Waterfall model with diagram. **5**

2. Attempt any **three** of the following:
   (a) Explain different types of critical systems. **5**
   (b) What is the need for ER diagram in data modelling? **5**
   (c) What is software? Explain the characteristics of software. **5**
   (d) What are functional and non-functional requirements of software? **5**

3. Attempt any **three** of the following:
   (a) Explain SRS in brief. **5**
   (b) What is the need of feasibility study in software development? **5**
   (c) Explain the importance of system dependability and the causes of failure in system dependability. **5**
   (d) Explain briefly legacy system categories and its assessment with the help of an example. **5**

4. Attempt any **three** of the following :
   (a) What is the use of Data Dictionary in Database? **5**
   (b) Explain user interface design process with the help of diagram. **5**
   (c) Define architectural design and explain the functions of architectural design in software engineering. **5**
   (d) Briefly explain the risk identification and the types of risk in the process of risk management. **5**

5. Attempt any **three** of the following:
   (a) Write a short note on project scheduling. **5**
   (b) Explain Prototype Model in brief. **5**
   (c) Explain the functions of quality assurance and its standards. **5**
   (d) Explain briefly WSDL (web service description language) **5**

6. Attempt any **three** of the following:
   (a) Explain V &V model in detail. **5**
   (b) Write a note on System Testing. **5**
   (c) List and describe the static analysis check points involved in automated static analysis. **5**
   (d) Write a short note on size-oriented metric of software measurement. **5**

7. Attempt any **three** of the following:
   (a) Explain Product Metrics. **5**
   (b) Write a short note on CMMI Process Improvement Framework. **5**
   (c) Explain process and product quality. **5**
   (d) What are the benefit and problem of reusing software? **5**

[TURN OVER

(3 Hours) [Total Marks : 80

N.B. : (1) There are **8** questions in this paper.
(2) **All** questions are **compulsory**.
(3) **Each** question carries **10** marks.
(4) Internal choices are there in **each** question.
(5) **Figures** to the **right** indicate **full** marks.

1. Attempt any **two**:
   (a) Write a note on Quality Control. **5**
   (b) What is Legacy System? Explain its Component. **5**
   (c) Define Software Engineering. Explain the software development life cycle in brief. **5**

2. Attempt any **two**:
   (a) Explain different types of Critical System. **5**
   (b) Explain Component Based Software Engineering **5**
   (c) Explain Risk Management in brief. **5**

3. Attempt any **two**:
   (a) Explain SRS in brief. **5**
   (b) Explain Top down Approach and Bottom up Approach in brief. **5**
   (c) What is the need of feasibility study in Software Development? **5**

4. Attempt any **two**:
   (a) Explain user interface design process with the help of diagram. **5**
   (b) What is use of data dictionery in Database ? **5**
   (c) Write short note on project scheduling. **5**

5. Attempt any **two**:
   (a) Explain the concept of inheritance in short. **5**
   (b) Write a short note on Agile Methodology. **5**
   (c) Define Verification and Validation. Explain software inspection in V&V process. **5**

6. Attempt any **two**:
   (a) Explain COCOMO model in brief. **5**
   (b) Differentiate between Alpha and Beta Testing. **5**
   (c) What are the features of UML? **5**

7. Attempt any **two**:
   (a) Explain the CMMI process improvement framework. **5**
   (b) Explain Product Metrics? **5**
   (c) Explain Staffing in brief. **5**

8. Attempt any **two**:
   (a) Draw a chart to explain ISO 9000 quality management. **5**
   (b) What are the different factors affecting Software productivity. **5**
   (c) Explain the services as a reusable component. **5**

S.Y.B.Sc (I.T.) (Sem IV)

Dec 2019

P4–Exam-2019-2–123

Con. 568–19.

Multimedia

DW–7216

(3 Hours) [Total Marks : 100

N.B. : (1) **Figures** to the **right** indicate **full** marks.
(2) **Mixing** of sub-questions is not **allowed**.

1. Attempt **both** questions :
   (a) Explain the working of digital camera. 5
   (b) List usage of adobe flash in detail. 5

2. Attempt any **three** questions :
   (a) State and explain scope of multimedia. 5
   (b) What is meant by multimedia presentation ? 5
   (c) Explain multimedia database. What is basic approach of data retrieval? 5
   (d) Explain multimedia creation steps. 5

3. Attempt any **three** questions :
   (a) What is digital representation ? What is its need? 5
   (b) What are different steps involved in analog to digital conversion? Explain. 5
   (c) Explain the relation sampling rate and bit depth. 5
   (d) Explain waveform with its types. 5

4. Attempt any **three** questions :
   (a) What are different text file format used in multimedia : 5
   (b) What are different methods of insertion of text in multimedia files ? 5
   (c) Explain RGB color model. 5
   (d) Explain the steps involved in image processing 5

5. Attempt any **three** questions :
   (a) What is Psycho Acoustics. How it is measured? 5
   (b) What are fundamental characteristics of sound ? 5
   (c) What is LCD? What are its advantages and disadvantages? 5
   (d) Write a short note on Raster scanning principle. 5

6. Attempt any **three** questions :
   (a) Explain Huffman coding in brief. 5
   (b) What is compression? What is its need? 5
   (c) Explain ZIP coding in detail. 5
   (d) How to compress image? Explain in brief. 5

7. Attempt any **three** questions :
   (a) What are metaphor? What are its types? 5
   (b) What is the multimedia production? 5
   (c) What are the advantages of multimedia tools? 5
   (d) What is Multimedia authoring? Explain. 5

(3 Hours) **[Total Marks : 80**

N.B. : (1) **Figures** to the **right** indicate **full** marks.
(2) **Mixing** of sub-questions is not **allowed**.

1. Attempt any **two** :
   (a) State and explain scope of multimedia. **5**
   (b) What is meant by multimedia presentation ? **5**
   (c) Explain multimedia database. What is basic approach of data retrieval? **5**

2. Attempt any **two** :
   (a) What is digital representation? What is its need? **5**
   (b) What are different steps involved in analog to digital conversion? Explain. **5**
   (c) Explain the relation sampling rate and bit depth. **5**

3. Attempt any **two** :
   (a) What are different text file format used in multimedia. ? **5**
   (b) What are different methods of insertion of text in multimedia files ? **5**
   (c) Explain RGB color model. **5**

4. Attempt any **two** :
   (a) Explain multimedia creation steps. **5**
   (b) Explain waveform with its types. **5**
   (c) Explain the steps involved in image processing. **5**

5. Attempt any **two** :
   (a) What is Psycho Acoustics? How it is measured? **5**
   (b) What are fundamental characteristics of sound ? **5**
   (c) What is LCD? What are its advantages and disadvantages? **5**

6. Attempt any **two** :
   (a) Explain Huffman coding in brief. **5**
   (b) What is compression? What is its need? **5**
   (c) Explain ZIP coding in detail. **5**

7. Attempt any **two** :
   (a) What are metaphor? What are its types? **5**
   (b) What is the multimedia production? **5**
   (c) What are the advantages of multimedia tools? **5**

8. Attempt any **two** :
   (a) Write a short note on Raster scanning principle. **5**
   (b) how to compress image? Explain in brief. **5**
   (c) What is Multimedia authoring? Explain. **5**

S.Y.B.Sc (I.T.) (Sem IV)

Dec 2019

P4–Exam-2019-2–124

Con. 569–19. Java and Data Structure **DW–7314**

(3 Hours) **[Total Marks : 100**

N.B. : (1) **All** questions are **compulsory.**
(2) Draw **neat** and **labelled** diagram wherever **necessary.**
(3) **Figures** to the **right** indicate **full** marks.

1. Answer **both** the questions:
   (a) Why is Java known as the Object Oriented Programming language? Explain. **5**
   (b) Explain the properties of Java. **5**

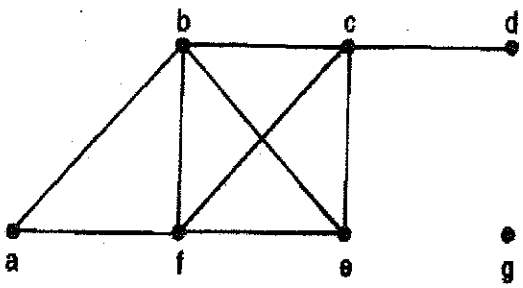
2. Attempt any **three** :
   (a) Design a Java class for implementing the packages. **5**
   (b) Write a short note on multithreaded programming. **5**
   (c) Write a short note on JVM. **5**
   (d) Show the differences between the Data Abstraction and Data Encapsulation with suitable example. **5**

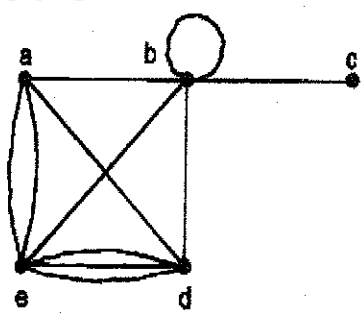
3. Attempt any **three**:
   (a) Explain in detail Method Overloading. Design a java program to find the area of Circle using Method Overloading. **5**
   (b) Explain in detail Constructors in Java with suitable example. **5**
   (c) Design a Java class performing string operations. **5**
   (d) Enlist and explain various methods of exception handlings in java. **5**

4. Attempt any **three**:
   (a) Explain FileInputStream and FileOutputStream. **5**
   (b) What is Finalize Methods in java? **5**
   (c) Discuss PushbackReader with example. **5**
   (d) Explain the Type-casting in Java. **5**

5. Attempt any **three**:
   (a) Discuss best case, average case, worst case, time complexity of an algorithm. **5**
   (b) What is Data Structures? Explain various types of Data Structures in detail. **5**
   (c) What is Hashing? Explain Collision Resolution Techniques. **5**
   (d) Explain the working of stack. Write PUSH and POP operations. **5**

6. Attempt any **three**:
   (a) Give the Sequential representation of the following graphs. **5**





[TURN OVER

(5)

(b) Explain Sorting Technique in data structure. Write the Algorithm of Bubble Sort. **5**

(c) Evaluate the postfix expression: 2 3 1 * + 9- using stack. **5**

(d) Explain Best First Search Traversal of graph with suitable example. **5**

7. Attempt any **three**:-

(a) Explain the following with reference to graph and tree: **5**

(i) Acyclic Graph

(ii) Degree of Vertices

(iii) Regular graph

(iv) Full binary tree

(v) Null graph

(b) Write a short note on B tree. **5**

(c) Explain AVL tree. **5**

(d) Explain Queue in Data Structure. How to implement queue? Write an algorithm of Circular Queue (Insertion and Deletion). **5**

(3 Hours) [Total Marks : 80

N.B. : (1) **All** questions are **compulsory.**
(2) Draw **neat** and **labelled** diagram wherever **necessary.**
(3) **Figures** to the **right** indicate **full** marks.

1. Attempt any **two:** **10**
   (a) What is inheritance? Explain various types of inheritance with suitable example. **10**
   (b) Design a class in Java to add two complex number using constructors. **10**
   (c) Show the differences between the Data Abstraction and Data Encapsulation with suitable example.

2. Attempt any **TWO:** **10**
   (a) Write a short note on JVM. **10**
   (b) Write a short note on multithreaded programming. **10**
   (c) Enlist and explain various methods of exception handlings in java.

3. Attempt any **TWO:** **10**
   (a) Explain in detail SequenceInputStream. **10**
   (b) Write a short note on String Handling with example. **10**
   (c) What is the difference between the Reader and Writer classes?

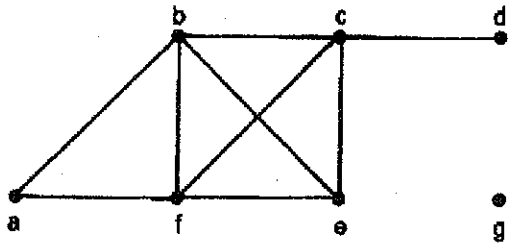
4. Attempt any **TWO:** **10**
   (a) Design a Java class for performing the matrix operations i.e. addition, multiplication and transpose. **10**
   (b) Write a short note on Random AccessFile. **10**
   (c) Discuss in detail the Byte Streams.

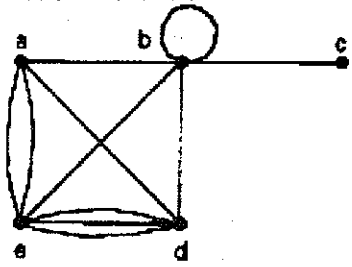
5. Attempt any **TWO:** **10**
   (a) Write a short note on asymptotic notation. **10**
   (b) Discuss the various methods of traversing a Binary tree. **10**
   (c) What is Arrays? Discuss the properties of Arrays.

6. Attempt any **TWO:** **10**
   (a) What is doubly linked list? Write algorithms of insertion and deletion in doubly linked list. **10**
   (b) Explain the working of stack. Write PUSH and POP operations. **10**
   (c) Explain Sorting Technique in data structure. Write the Algorithm of Radix Sort.

7. Attempt any **TWO**: **10**

(a) Represent the following graphs in the form of Adjacency Matrix.





10

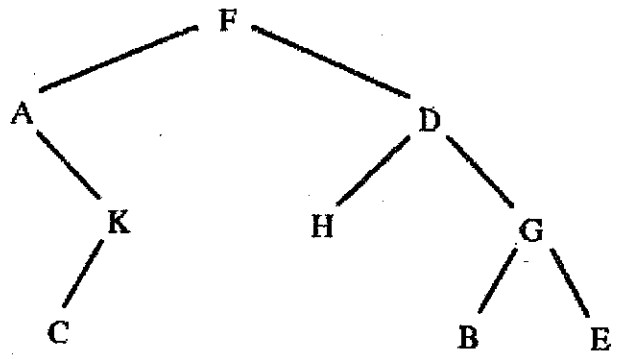
(b) Explain the following with reference to graph and tree:

(i) Acyclic Graph
(ii) Degree of Vertices
(iii) Regular graph
(iv) Full binary tree
(v) Null graph **10**

(c) Discuss the Binary Search Algorithm.

8. Attempt any **TWO**: **10**

(a) Consider the binary tree *T*. Traverse T using the preorder, inorder and postorder algorithm.



10

(b) Write a short note on path matrix of a graph. **10**

(c) Write a short note on AVL tree.

S.Y.B.Sc (I.T.) (Sem-IV) Dec 2019

P4–Exam-2019-2–128
Con. 570–19. Quantitative Techinques DW–7412

(3 Hours) [Total Marks : 100

N.B. : (1) **All** questions are **compulsory**.
(2) From question **2** to **7**, sub question (**a**) is **compulsory** and attempt any **one** from (**b**) and (**c**).

1. Attempt any **one** of the following:
   (a) ABC manufacturing company produces two products P_1 and P_2 processed on 3 machines m_1, m_2 and m_3. Daily time available on these machines is 60, 72 and 48 machine hrs. Product P_1 requires 2, 1 and 1 hours on machine m_1, m_2 and m_3 respectively and product P_2 requires 1, 3 and 1 hrs. on machines m_1, m_2 and m_3 respectively. Profit per units of product P_1 and P_2 are Rs.150 and Rs. 200 respectively. **10**
   Formulate the problem as standard LPP and Solve it by the simplex method.

   (b) Given $\frac{dy}{dx} = y - x$ where $y(0) = 2$, find $y(0.2)$ using Range-Kutta Method second order take $h = 0.1$. **10**

2. Attempt any **three** of the following:
   (a) Find a real root of the equation $x^3 - 2x - 5 = 0$ by method of false position correct to three decimal places. **8**
   (b) Using Langrange's Interpolation formula, Estimate polynomial through the following points. (0, 3), (2, 3), (5, 18) Hence estimate f (4). **7**
   (c) Find f(7) using Newton Backward interpolation. **7**

X	0	2	4	6	8
f(x)	2	5	10	17	26

3. Attempt any **three** of the following:
   (a) Solve $3x + 2y = 4.5$, $2x + 3y - z = 5$, $-y + 2z = -0.5$ taking initial value $x_0 = 0.4, y_0 = 1.6, z_0 = 0.4$ by Gauss Seidel method. **8**
   (b) $\frac{dy}{dx} = 2x + 3xy$ With $y(0) = 2$ estimate $y(2)$ by Euler's method taking $h = 0.5$. **7**
   (c) Evaluate $\int_0^{\pi} \frac{\sin^2 x}{5 + 4\cos x}\, dx$ by taking 5 ordinates by Simpson's $\left(\frac{1}{3}\right)^{rd}$ rule. **7**

4. Attempt any **three** of the following:
   (a) Calculate Spearman's correlation coefficient between advertisement cost and sales from the following data: **8**

Advertisment cost (' 000 Rs)	39	65	62	90	82	75	25	98	36	78
Sales	47	53	58	86	62	68	60	91	51	84

[TURN OVER

(b) Find the regression equations for the following data and hence estimate X when Y=18 andY when X= 20. 7

X	10	12	14	19	8	11	17
Y	20	24	25	21	16	22	20

(c) Find stander deviation and variance of the data given below. 7

X	10	20	30	40	50	60	70	80	90	100
F	12	19	31	38	46	44	37	23	13	7

5. Attempt any **three** of the following:

(a) 300 out of 550 people in a survey were men and 220 out of 400 were found to be men in an another survey. Does this survey represent the same population? (5% LOS) 8

(b) A manufacturer claims that 10% ofhis product is defective. A sample of 300 items selected at random had 32 defective items. Test his claim at 1% level of significance. 7

(c) A pay commission is appointed to study the wages of government employees. It was provided with the information that the average salaries of thc cmployccs are Rs.8,400 with standard deviation Rs.3,000. But the commission selected 100 employees at random and found that average salary is Rs.8,800. Test at 5% level of significance, whether the sample chosen is a representative of the population? 7

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

(a) It is observed that the average number of phone calls per minute coming into switchboard of a company is 3. Find probability that during a particular minute there will be (i) no phone calls, (ii) exact 2 phonc calls, (iii) At least 3 phone calls. 8

(b) If 8% of the mobiles are produced by a Nokia a defective, the production of the company are 50 mobiles per day. Find the probability that, (i) None of the defective mobile (ii) 4 mobiles are defective. 7

(c) Two unbiased dice are thrown at random. Find the expected value and variance of the total number of points shown up. 7

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

(a) Solve the following linear programming problem using graphical method. 8
Maximize $Z = 20x_1 + 10x_2$
Subject to $x_1 + 2x_2 \leq 40$, $3x_1 + x_2 \geq 3$, $x_1, x_2 \geq 0$

(b) Following are 10 observations in a random sample from normal population. Can we say that population standard deviation is o.208 ? $\alpha = 0.025$. 7
12.1, 12.3, 11.8, 12.0, 12.4, 12.0, 12.1, 11.9, 12.2, 12.2.

(c) Fit Poisson distribution to following data and test goodness of fit at 5% LOS. 7

X	0	1	2	3	4	5	6	7	8
F	52	151	130	102	45	12	5	1	2

(3 Hours) **[Total Marks : 80**

N.B. : (1) **All** questions are **compulsory**.
(2) **Figures** to the **right** indicate **full** marks for **each** question.

1. Attempt any **two** of the following:
   (a) Find a real root of the equation $x^3 - 2x - 5 = 0$ by method of false position. (only 3 iterations) **5**
   (b) Using Langrange's Interpolation formula, Estimate polynomial through the following points. **5**
   (0, 3), (2, 3), (5, 18)
   (c) Find f(7) using Newton Backward interpolation : **5**

X	0	2	4	6	8
f(x)	2	5	10	17	26

2. Attempt any **two** of the following:-
   (a) Solve $3x+2y=4.5$, $2x+3y-z = 5$, $-y+2z = -0.5$ taking initial value $x_0 = 0.4, y_0 = 1.6, z_0 = 0.4$ by Gauss Seidel method. (only 2 iterations) **5**
   (b) Evaluate $\int_0^{\pi} \frac{\sin^2 x}{5+4\cos x} dx$ by taking 5 ordinates by Simpson's $\left(\frac{1}{3}\right)^{rd}$ rule. **5**
   (c) $\frac{dy}{dx} = 2x + 3xy$ With y (0) = 2 estimate y (1) by Euler's method taking h=0.5. **5**

3. Attempt any **two** of the following:
   (a) Calculate Spearman's correlation coefficient of the following data: **5**

X	39	65	62	90	82	75	25	98	36	78
Y	47	53	58	86	62	68	60	91	51	84

   (b) Find stander deviation of the data given below : **5**

X	10	20	30	40	50	60	70	80	90	100
F	12	19	31	38	46	44	37	23	13	7

   (c) Find the regression equation for the following data and hence estimate X when Y = 18. **5**

X	10	12	14	19	8	11	17
Y	20	24	25	21	16	22	20

[TURN OVER

(11)

4. Attempt any **two** of the following:-
   (a) Solve the equation $x - \cos x = 0$ using Newton-Raphson method. (only 3 iterations). **5**
   (b) Fit a straight line trend for the following data giving the annual profits (in lakhs Rs.) of a company. Estimate the profit for year 2015. **5**

Year	1992	1993	1994	1995	1996	1997	1998
Profit	30	34	38	36	39	40	44

   (c) Using Taylor's series method the solution of $\frac{dy}{dx} = \frac{2y}{x}$ with $y(1) = 2$ **5**
   estimate y (2).

5. Attempt any **two** of the following:
   (a) A pay commission is appointed to study the wages of government employees. It was provided with the information that the average salaries of the employees are Rs.8,400 with standard deviation Rs.3,000. But the commission selected 100 employees at random and found that average salary is Rs.8,800. Test at 5% level of significance, whether the sample chosen is a representative of the population? **5**
   (b) A manufacturer claims that 10% of his product is defective. A sample of 300 items selected at random had 32 defective items. Test his claim at 1% level of significance. **5**
   (c) 300 out of 550 people in a survey were men and 220 out of 400 were found to be men in an another survey. Does this survey represent the same population? (5% LOS) **5**

6. Attempt any **two** of the following:
   (a) It is observed that the average number of phone calls per minute coming into switchboard of a company is 3. Find probability that during a particular minute there will be (i) no phone calls, (ii) exact 2 phone calls **5**
   (b) If 8% of the mobiles are produced by a Nokia a defective, the production of the company are 50 mobiles per day. Find the probability that, i). None of the defective mobile. ii). 4 mobiles are defective. **5**
   (c) Two unbiased dice are thrown at random. Find the expected value of the total number of points shown up. **5**

7. Attempt any **two** of the following:
   (a) Solve the following linear programming problem using graphical method. **5**
   Maximize $Z = 20x_1 + 10x_2$ Subject to $x_1 + 2x_2 \leq 40$, $3x_1 + x_2 \geq 3$, $x_1, x_2 \geq 0$
   (b) A sample from normal population has mean 50 and variance 24. If sample size is 25, can we say that the population variance is 27 or longer? **5**
   (c) Following are 10 observations in a random sample from normal population. Can we say that population standard deviation is o.208 ? $\alpha = 0.025$. **5**
   12.1, 12.3, 11.8, 12.0, 12.4, 12.0, 12.1, 11.9, 12.2, 12.2.

8. Attempt any **two** of the following:

(a) Fit Poisson distribution to following data and test goodness of fit at 5% LOS. **5**

X	0	1	2	3	4	5	6	7	8
F	52	151	130	102	45	12	5	1	2

(b) For a Poisson distribution if $P(3) = P(4)$ find mean and hence find P(5) **5**
$[e^{-4} = 0.018]$.

(c) The different kinds of foods A, B and C are to be considered to form a weekly diet. The minimum weekly requirements for fats, carbohydrates and proteins are 12, 30 and 20 units respectively. One kg of food A has 2, 16 and 4 units respectively of these ingredients and one kg of food B has 6, 4 and 3 units respectively whereas one kg of food C has 1, 5 and 7 units of these ingredients, if the cost per kg of food A is Rs.75 per kg, food B is Rs.80 and per kg of food C is Rs.60, construct the problem of minimize the cost. **5**

S.Y.B.Sc (I.T.) (Sem-IV)

Dec 2019

P4–Exam-2019-2-145
Con. 575–19.

Embedded ~~Sys~~ Systems

DW–7146

(3 Hours) [Total Marks : 80

N.B. : **All** questions are **compulsory**.

1. Attempt any **two** : **10**
   (a) Explain the SPI communication interface with suitable block diagram.
   (b) Differentiate between 'General Purpose operating system' and 'Embedded operating systems.
   (c) Write a note on Big Endian and Little Endian Processors.
   (d) Write and explain any three purposes of Embedded systems.

2. Attempt any **two** : **10**
   (a) Explain any three operational quality attributes of embedded systems.
   (b) Write the Non-operational quality attributes of Embedded systems.
   (c) Explain the structure of washing machine. Write its types.
   (d) Explain any three characteristics of embedded systems

3. Attempt any **two** : **10**
   (a) Explain Preprocessor directives and its types.
   (b) Explain the role of linker and locator.
   (b) What is Debugging? Explain remote Debugging.
   (d) Explain compiler and cross compiler.

4. Attempt any **two** : **10**
   (a) Draw & explain I2C Bus.
   (b) Differentiate between Microprocessor and Microcontroller.
   (c) Explain the concept of device programmer in embedded system.
   (d) Write a short note on PLD's.

5. Attempt any **two** : **10**
   (a) Explain I/O mapped I/O with suitable diagram.
   (b) Explain CRC method of validating memory contents.
   (c) What is ROM? Explain its types.
   (d) What is Interrupt service routine? Explain interrupt vector table.

6. Attempt any **two** : **10**
   (a) Explain the real time characteristics of embedded operating system.
   (b) Explain the concept of 'Watchdog Timer' in embedded system.
   (c) Explain the concept of device driver.
   (d) Explain the functions of embedded operating system.

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7. Attempt any **two** : **10**
   (a) Explain the role of Integrated Development Environment (IDE) for embedded software development
   (b) Write a note simulator.
   (c) Write a note on Assembler.
   (d) Explain different phases of Embedded product development life cycle?

8. Attempt any **two** : **10**
   (a) Explain memory mapped I/0 with suitable diagram.
   (b) Explain control and status registers of peripherals.
   (c) Explain the role of emulator and debugger in ES.
   (d) Explain the following scheduling algorithm –
      (i) first in first out
      (ii) Priority based

(3 Hours) [Total Marks : 100

N.B. : **All** questions are **compulsory**.

1. Answer the following : **10**
   (a) What is an embedded system? Write any two applications of embedded system.
   (b) Write a short note on flash memory.

2. Attempt any **three** : **15**
   (a) What is DSP? Write any two differences between microprocessor and microcontroller.
   (b) Write a note on UART.
   (c) Draw and explain I2C BUS.
   (d) Differentiate between RISC and CISC.

3. Attempt any **three** : **15**
   (a) Explain following automotive communication buses: -
   (i) CAN (ii) LIN
   (b) Write and explain Testability and debug ability, Time to prototype and market and Per unit cost and revenue attributes of Embedded systems.
   (c) Explain operational quality attributes Embedded systems.
   (d) Explain any three characteristics of Embedded systems.

4. Attempt any **three** : **15**
   (a) Draw and explain the embedded software development process.
   (b) Explain role of infinite loop in embedded system.
   (c) What is debugging? Explain remote debugging.
   (d) Explain the function of compiler and linker.

5. Attempt any **three** : **15**
   (a) Explain Interrupt Map and Interrupt service routine.
   (b) What is memory testing? Write different memory faults.
   (c) Write a short note on direct memory access.
   (d) What is ROM, PROM and EPROM.

6. Attempt any **three** : **15**
   (a) Explain following scheduling algorithm
   (i) first in first out (ii) round robin
   (b) Explain the concept of 'Device Driver' in embedded system.
   (c) Explain the Real Time Characteristics of embedded operating system.
   (d) What is the function of Watchdog timer in embedded system.

7. Attempt any **three** : **15**
   (a) Explain need and requirement phases of EDLC.
   (b) What is meant by simulator-based debugging? Explain in detail.
   (c) Write a note on Disassembles and Decompiler.
   (d) Explain the role of Integrated Development Environment (IDE) for embedded software development.