SBCS—(2.2)

2018

Time : 3 hours

Full Marks : 80

Answer **all** questions

All questions carry equal marks

Candidates are required to answer in their own words as far as practicable

(OPERATING SYSTEM)

1. (*a*) Explain different types of operating system with example.

   (*b*) Explain different types of function of operating system.

   Or

   (*c*) What is an Interrupt ? Define the type of interrupts in operating system

   (*d*) What is a Real time operating system ? Explain it with details.

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2. (*a*) Discuss the details of different types of file attributes in operating system.

(*b*) Explain the different method to access a file.

Or

(*c*) Discuss the details of file Directories structure in operating system.

(*d*) Discuss how a file is protected and accessed in operating system.

3. (*a*) Briefly discuss types of schedular ? What is a process scheduling, explian it with details ?

(*b*) What is a deadlock ? What are the necessary condition to deadlock occur ?

Or

(*c*) Explain the detection of deadlock by the of banker's algorithm.

(*d*) Calculate the average turn around time for the

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following process using FCFS CPU scheduling algorithm :

Process	CPU burst time	Arrival time
P_1	3	0
P_2	6	2
P_3	4	4
P_4	5	6
P_5	2	8

4. (*a*) What is page fault ? Find out page fault rate of following string according FIFO page replacement algorithm. Assume the no of frames = 3.

reference string : 7 0 1 2 0 3 0 4 2 3 0 3 2 1

(*b*) Explain with details dynamic partition memory management system. How does it support compaction technique ?

Or

(*c*) Define Paging. Explain the basic method of paging for memory management.

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(*d*) **Define page fault. Explain how does the page fault occur in a page replacement algorithm.**

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SBCS—(2.1)

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(NUMERICAL ANALYSIS AND STATISTICAL METHOD)

1. (*a*) Find a root of the equation $x^3 - x - 11 = 0$, correct to 2-decimals using Bisection method.

(*b*) Solve the system of equations :

$$3x + y - z = 3$$
$$2x - 8y + z = -5$$
$$x - 2y + 9z = 8$$

Using Gauss-Elimination method.

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Or

(*c*) Find an approximate value of the root of the equation $x^3 + x - 1 = 0$ near $x = 1$ using the method of false position.

(*d*) Solve the system of equations by Gauss-Seidal iteration method :

$$8x - 3y + 2z = 20$$
$$4x + 11y - z = 33$$
$$6x + 3y + 12z = 35$$

2. (*a*) Using Newton's forward interpolation formula. Find y at $x = 8$ from the following table :

x :	0	5	10	15	20	25
y :	7	11	14	18	24	32

(*b*) Use trapezoidal rule to evaluate

$$\int_0^1 x^3 dx,$$

considering five sub-intervals.

(*Continued*)

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Or

(*c*) Using Lagrange's interpolation formula. Find the values of y when $x = 10$, from the following table :

x :	5	6	9	11
y :	12	13	14	16

(*d*) Use Simpson's $\frac{1}{3}$rd rule, to find approximate value of

$$\int_{-3}^{3} x^4 \, dx$$

by taking six equal sub intervals.

3. (*a*) A can hit a target 4 times in 5 shots, *B* can 3 times in 4 shots, *C* twice in 3 shots. They fire a volley. What is the probability that at least two shots hit ?

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(*b*) Ten coins are tossed Simultaneously. Find the probability of getting at least seven heads.

Or

(*c*) An urn contains 10 white and 3 black balls, while another urn contains 3 white and 5 black balls. Two balls are drawn From 1st urn and put into the second urn and then a ball is drawn from the latter. What is the probability that it is a white ball?

(*d*) If the variance of the poisson distribution is 2, find the probabilities for $r = 1, 2, 3, 4$ from the recurrence relation of the poisson distribution.

4. (*a*) (*i*) If $a \equiv b \pmod{m}$ and c is any interger then $a + c \equiv b + c \pmod{m}$

(*ii*) Prove that number primes is infinite.

(*b*) Solve the Linear congruence $290x = 5 \pmod{357}$.

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Or

(*c*) For any positive integer m and n, prove that $gcd(m, n).\ Lcm(m, n) = mn.$

(*d*) Determine $gcd(a, b)$. Find s & t such that $gcd(a, b) = s.a + t.b$
where (*i*) $a = 90, b = 252$

(*ii*) $a = 56, b = 72$

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SBCS—(2.3)

2018

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(COMPUTER ORGANISATION AND ARCHITECTURE)

1. (*a*) Write the need for addressing modes. Explain various addressing modes supported by a general purpose CPU.

   (*b*) What is an Instruction Set ? Explain the various elements of an Instruction.

   Or

   (*c*) Explain about various types of instruction formats with an example.

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(*d*) What are Instructions ? Explain the factors considered while deciding the instruction length.

2. (*a*) What is an Interrupt ? Explain the step-by-step procedure to process an interrupt.

(*b*) Discuss the Direct Memory Access (DMA) using a suitable diagram. Explain the use of Data Register and Address Register in DMA.

Or

(*c*) Discuss the method of handling prioritised interrupt and justify Daisy chain priority is useful in priority interrupt.

(*d*) What is interfacing ? Explain the structure of I/O module.

3. (*a*) Simplify the following function using K-map :

$$F(A, B, C, D) = \sum(2, 6, 10, 14).$$

Draw the resultant logic-diagram.

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(*b*) What are Logic Gates ? Show how NOT, AND OR operations can be implemented using NAND gates.

Or

(*c*) Synthesize an AND-OR network for the following Boolean function :

$$F = \overline{\overline{\overline{(A + \overline{B})} + \overline{B}}}$$

(*d*) Simplify the following function using Karnaugh map and draw the circuit using AND, OR and NOT gates :

$$F(A,B,C,D) = \Sigma(1, 3, 5, 7, 9, 11, 13, 15)$$

4. (*a*) What are flip-flops ? Describe the construction of a master-slave flip-flop using R-S flip-flops.

(*b*) What are counters ? Draw the logic diagram and truth table of a 3-bit ripple counters.

Or

(*c*) Compare between J-K flip-flop and J-K master

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slave flip-flop with its all operations and diagram.

(*d*) Draw and explain 4-bit shift register.

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