Tribhuvan University
Institute of Science and Technology
2073

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Bachelor Level / Second Year/ Third Semester/ Science
Computer Science and Information Technology (CSc. 201)
(Computer Architecture)

Full Marks: 80
Pass Marks: 32
Time: 3 hours.

Candidates are required to give their answers in their own words as for as practicable.
The figures in the margin indicate full marks.

Long Questions:

Attempt any two questions: (2×10=20)

1. Explain the hierarchy of memory system? What are the key characteristics of memory system? Explain.

2. Explain the DMA controller with block diagram.

3. Differentiate between isolated I/O and memory mapped I/O. What are the advantages and disadvantages of each?

Short Questions:

Attempt any ten questions: (10×6=60)

4. Explain the Grey code with example.

5. Explain the logic micro operations with example.

6. What do you mean by input and output interrupt? Explain.

7. Explain the hardwired control unit with its advantages.

8. What do you mean by addressing mode? Explain.

9. Explain the Booth algorithm with example.

10. Explain the data communication processor with example.

11. Explain the virtual memory with example.

12. Differentiate between RISC and CISC architecture.

13. Explain the data transfer and manipulation instruction with example.

14. Why replacement algorithm is used in associative and set associative mapping? Explain. (3+3=6)

15. Write short notes on the following:
    (a) Management Hard ware
    (b) I/O interface

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Bachelor Level / Second Year/ Third Semester/ Science
Computer Science and Information Technology (CSc. 203)
(Operating System)

Full Marks: 60
Pass Marks: 24
Time: 3 hours

Candidates are required to give their answers in their own words as for as practicable.
The figures in the margin indicate full marks.

Section A

(2×10=20)

Attempt any two questions:

1. How semaphore is used for the process synchronization? Do you think semaphore is the best solution for solving critical section problem? Explain using it in Producer-consumer problem.

2. Define the first-fit, best-fit and worst-fit strategies of memory placement. Given memory partitions of 10 k, 4 k, 20 k, 18 k, 7 k, 9 k, 12 k and 15 k (in order). How would each of first-fit best fit and worst fit algorithms place processes of 12 k, 10 k, and 9 k (in order)? Which algorithms make the best use of memory?

3. What do you mean by disk management? Explain the error handling and formatting operation on the disk.

Section B

Short Questions:

(8×5=40)

Attempt any eight questions:

4. Classify the following applications as batch-oriented or interactive and explain the reason
   a) Word processing
   b) Generating monthly bank statements
   c) Computing pi to a million decimal places

5. What is thrashing? Explain the cause and solution for thrashing.

6. Given references to the following pages by a program, 1, 2, 3, 4, 2, 1, 5, 6, 2, 1, 2, 3, 7, 6, 3, 2, 1, 2, 3, 6.
   How many page faults will occur if the program has three page frames available to it and uses FIFO replacement?

7. Discuss in detail the use of translation look aside buffer (TLB) in the process of paging. Support your answer with illustration.

8. What is memory-mapped I/O? Explain with merits and demerits.

9. Write short notes on:
   a) Memory Compaction
   b) Virtual Machines

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10. What do you mean by interrupt? Explain the working mechanism of interrupt controller.

11. A disk queue has the following request to read tracks: 87, 170, 4, 57, 173, 32, 67 and 183. If disk head is initially at cylinder 90 and there are total 200 tracks then calculate total head movement using C-SCAN and C-LOOK algorithm.

12. What are the scheduling criteria? How does preemptive priority scheduling introduce starvation?

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Bachelor Level / Second Year/ Third Semester/ Science
Computer Science and Information Technology (MGT 205)
(Introduction to Management)

Full Marks: 80
Pass Marks: 32
Time: 3 hours.

Candidates are required to give their answers in their own words as for as practicable.
The figures in the margin indicate full marks.

Group A

1. Write specific answer to the following questions: (2×10=20)

(a) Mention any four characteristics of management.

(b) What is business environment? Explain any two components of internal environment.

(c) Mention about specific and flexible plans.

(d) Explain about strategic and operational decision-making.

(e) Define organization and mention any four characteristics of organization.

(f) What is leadership? Explain about autocratic leadership style.

(g) Explain about formal and informal communication.

(h) What is management information system (MIS)?

(i) Define controlling. Explain about Pre-control.

(j) Write the full form of MBO, DSS, HRM and PERT.

Group B

Answer any two questions, but question no. 4 is compulsory. (2×12=24)

2. What is management? Explain the functions of management.

3. Define business environment. Explain about various components of environmental factors.

4. Read the following case carefully and answer the questions.

Anil Thapa is the sales manager of Surf Tech Company that sales microcomputers to individuals and institutions. Its main office is in New Baneshwor and sales depot at New Road. Over the last three years, the sales volume has decreasing trend. There is increasing evidence that to make their jobs easier, sales people are primarily servicing institutions and ignoring individual customers. Mr. Thapa received complaints that despite several calls, the sales people to not turn up. In addition, the sales people are not dealing promptly with customer questions and queries and this inattention has results in drop in after sales service. Mr. Thapa has talked about these problems wanting a new control system to increase both the amount of sales and the quality of customer service.

Questions:

1. Design a suitable control system that you think will best motivate sales people to achieve these goals.

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Bachelor Level / Second Year/ Third Semester/ Science
Computer Science and Information Technology (CSc. 202)
(Object Oriented Programming)

Full Marks: 60
Pass Marks: 24
Time: 3 hours.

Candidates are required to give their answers in their own words as for as practicable.
The figures in the margin indicate full marks.

Section A

Attempt any two questions: (2×10=20)

1. What is object-oriented approach? How is it different from structured programming approach? Discuss the features of object-oriented languages in detail. (2+2+6)

2. How can we use inheritance for code reusability? Discuss multiple inheritance with suitable example. (3+7)

3. What is function overloading? How is it different from function overriding? Write a program that gives an example of function overriding. (3+3+4)

Section B

Attempt any eight questions: (8×5=40)

4. Explain abstraction with example.

5. Discuss input and output with C in and C out respectively.

6. Discuss relationship between pointers and arrays.

7. Explain the use of inline function with example.

8. What is class? Differentiate it with object.

9. How can you define a member function outside a class? Explain with suitable example.

10. Write a program that increases an integer value by 1 (one) overloading + + operator.

11. Discuss importance of template. Write syntax of function template.

12. Discuss different keywords used in exception handling.

2. What relative importance do you put on:
   i) Sales Control
   ii) Financial Control
   iii) Behavioral Control
   iv) Organizational Culture

Group C

Attempt any six questions: (6×6=36)

5. Describe about the Administrative management theory. Explain its contributions and limitations.

6. Explain about social responsibility of business.

7. Discuss the process of planning.

8. Explain the line organization and functional organization structure.

9. Describe about Human Resource Management and explain any two components of Human Resources Management.

10. What is motivation? Explain about Hierarchy of needs theory.

11. What is communication? Explain the barriers to effective communication.

12. Mention the characteristics of effective control system.

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Bachelor Level / Second Year/ Third Semester/ Science
Computer Science and Information Technology (CSc. 204)
(Numerical Methods)

Full Marks: 60
Pass Marks: 24
Time: 3 hours

Candidates are required to give their answers in their own words as for as practicable.
The figures in the margin indicate full marks.
Assume suitable data if necessary.

Attempt all questions:

1. Explain the idea of the secant method to estimate the root of any equation. Using the secant method, estimate the root of the equation

$$x^2 - 4x - 10 = 0$$

with the initial estimates of $x_1 = 4$ and $x_2 = 2$. Do these points bracket a root? (3+4+1)

2. Given the data

x	1.2	1.3	1.4	1.5
f(x)	1.063	1.091	1.119	1.145

Calculate f(1.35) using Newton's interpolating polynomial of order 1 through 3. Choose base points to attain good accuracy. Comment on the accuracy of results on the order of polynomial. (5+3)

3. How do you find the derivative if the function values are given in a tabulated form? The distance traveled by a vehicle at the intervals of 2 minutes are given as follows. Evaluate the velocity and the acceleration of the

Time(sec)	0	2	4	6	8	10	12	14	16
Distance (km)	0	0.25	1	2.2	4	6.5	8.5	11	13

Vehicle at time T = 5, 10, 13 (3+5)

4. What do you mean by ill-conditioned systems? Solve the following system using Dolittle LU decomposition method.

$$3x_1 + 2x_2 + x_3 = 10$$

$$2x_1 + 3x_2 + 2x_3 = 14$$

$$x_1 + 2x_2 + 3x_3 = 14$$

(2+6)

5. Obtain y(1.5) to the following differential equation using Runge-Kutta 4th order method.

$$\frac{dy}{dx} + 2x^2 y = 1, \text{ with } y(1) = 0$$

taking $h = 0.25$ (8)

6. Write the finite difference formula for solving Poisson's equation. Hence solve the Poisson equation

$$\nabla^2 f = 3x^2 y$$

over the domain $0 \leq x \leq 1.5$ and $0 \leq y \leq 3$ with $f = 0$ on the boundary and $h = 0.5$.

(1+7)

7. Write an algorithm and a C program for the secant method to find the roots of non-linear equation.

(4+8)

OR

Write an algorithm and a C program for the Simpson's $\frac{1}{3}$ rule to integrate a given function.

(4+8)