

2025

M.Sc. 1st Semester Examination

COMPUTER SCIENCE

Paper : COSE404A1/B1/C1

Full Marks : 35

Time : One Hour Thirty Minutes

The figures in the margin indicate full marks.

*Candidates are required to give their answers
in their own words as far as practicable.*

Paper : COSE404A1

(Cloud Computing)

Group - A

Answer any *five* questions : 2×5=10

1. Define the concept of “pay-as-you-go” in cloud computing.
2. What is the role of SLA (Service Level Agreement) in cloud services?
3. What is Virtualization?
4. Define Virtual Desktop Infrastructure (VDI).
5. What is cloud stack?

P.T.O.

(2)

6. What is the role of Utility-Oriented computing in cloud?
7. What is OLTP Benchmark?
8. What is Hypervisors?

Group - B

Answer any *three* questions : $4 \times 3 = 12$

9. Briefly summarize the vision of Cloud computing.
10. Name the major computing technologies that led to cloud computing and explain any two of them. $1+3$
11. How does cloud computing architecture differentiate from traditional computing architecture (client/server)?
12. Explain the deployment model of cloud computing.
13. Briefly discuss the benefits and limitations of cloud computing.

Group - C

Answer any *one* question : $8 \times 1 = 8$

14. Explain overall Cloud Management strategies for an enterprise.
15. Discuss machine reference model of execution virtualization.

Internal Assessment - 5 marks

(3)

Paper : COSE404B1

(Real Time System)

Group - A

Answer any *five* questions : $2 \times 5 = 10$

1. Give and explain an example of stimulus response deadline.
2. What is bin-packing scheme?
3. "A cyclic scheduler is more proficient than a pure time-driven scheduler for scheduling a set of hard real-time tasks" — Justify or falsify the statement.
4. What is Triple Modular Redundancy (TMR)?
5. What do you understand by *scheduling point* of a task scheduling algorithm?
6. What do you understand by pre-emptive and non-pre-emptive tasks?
7. Define Real-Time OS.
8. What is deadlock?

Group - B

Answer any *three* questions : $4 \times 3 = 12$

9. A cyclic scheduler is to be used to run the following set of periodic tasks on a uniprocessor : $T_1 = (e_1 = 1, p_1 = 4)$, $T_2 = (e_2 = 1, p_2 = 5)$, $T_3 = (e_3 = 1, p_3 = 20)$, $T_4 = (e_4 = 2, p_4 = 20)$. Find an appropriate frame size meeting the required constraints.

P.T.O.

10. Consider the following set of three periodic real-time tasks : $T_1 = (20,30)$, $T_2 = (15,60)$, $T_3 = (20,120)$ to be run on a uniprocessor. Determine whether the task set is schedulable under RMA.
11. (a) Explain why hardware fault tolerance is easier to achieve compared to software fault-tolerance.
- (b) What are the main techniques available to achieve software fault-tolerance? 2+2
12. Explain using an appropriate example as to why a critical resource can get corrupted if the task using it is pre-empted, and then another task is granted use of the resource.
13. Assume that the drift rate between any two clocks is restricted to $\rho = 5 \times 10^{-7}$. Suppose we want to implement a synchronized set of six distributed clocks using the central synchronized scheme so that the maximum drift between any two clocks is restricted to $\epsilon = 2\text{ms}$ at any time, determine the period with which the clock need to be re-synchronized.

Group - C

Answer any *one* question : 8×1=8

14. (a) What is Major Cycle of a task set?
- (b) Consider the following set of three independent real-time periodic tasks :

Task	Start time (msec)	Processing time (msec)	Period (msec)	Deadline (msec)
T1	20	25	150	100
T2	40	10	50	30
T3	60	50	200	150

Suppose a cyclic scheduler is to be used to schedule the task set. What is the major cycle of the set? Suggest a suitable frame size. 2+6

15. A set of hard real-time periodic tasks need to be scheduled on a uniprocessor using RMA. The following table contains the details of these periodic tasks and their use of three non-preemptive shared resources. Can the tasks T_2 and T_3 meet their respective deadlines when priority ceiling protocol (PCP) is used for resources scheduling?

Task	p_i	e_i	R_1	R_2	R_3
T_1	400	30	15	20	
T_2	200	25	-	20	10
T_3	300	40	-	-	-
T_4	250	35	10	10	10
T_5	450	50	-	-	5

p_i indicates the period of the task T_i and e_i indicates its computation time. The period of each task is the same as its deadline. The entries in the R_i columns indicate the

P.T.O.

(6)

time duration for which a task needs the named resource in non-preemptive mode. Assume that after a task releases a resource, it does not acquire the same or any other resource.

Internal Assessment - 5 marks

(7)

Paper : COSE404C1

(Mobile Computing)

Group - A

Answer any *five* questions : $2 \times 5 = 10$

1. What is Mobile Computing?
2. Define the limitation of mobile computing.
3. What is AOSP?
4. Why JAVA virtual machine is not used?
5. Write the difference between JVM and DVM.
6. What is Event?
7. What is UI tool kit?
8. What is Bound Service?

Group - B

Answer any *three* questions : $4 \times 3 = 12$

9. Briefly describe aspect of mobility. How to create a successful mobile application? What is Pulse Shaping?
Write down the importance of the radio channel.

$1+1+1+1$

10. (a) What is the Hardware process? Write the different types of hardware processes.
- (b) Explain the code division multiplexing technique briefly with a diagram.

$(1+1)+2$

P.T.O.

11. (a) What do you mean by Wireless LAN?
(b) Explain B Channel and D Channel. 2+2
12. (a) How CDMA process works?
(b) What is LF and MF? What is frequency shift key describing it? 2+(1+1)
13. (a) Explain different types of spread spectrum communication technique.
(b) What is near terminal and far terminal? Define BTS. 2+(1+1)

Group - C

Answer any *one* question : 8×1=8

14. Write short notes on any *two* : 4×2=8

- (a) Packet Framing Process
 - (b) Roaming in wireless network
 - (c) HIPERLAN
 - (d) Synchronous Transmission
 - (e) Transcoder
15. (a) Explain decibel in detail. Define HEO.
(b) Explain DHCP in detail. What is LOS? (2+2)+(2+2)

Internal Assessment - 5 marks
