

# END TERM EXAMINATION

FIFTH SEMESTER [BCA] DECEMBER 2025-JANUARY 2026

Paper Code: BCA-301

Subject: Operating System &amp; Linux Programming

[BATCH 2021-2022 onwards]

Time: 3 Hours

Maximum Marks: 60

Note: Attempt all questions as directed. Internal choice is indicated.

Q 1 Attempt any **four** of the followings :

(4x5 =20)

- (a) What is multithreading? Also, differentiate between a thread and process.
- (b) Describe different file access methods.
- (c) Write the use of ps, pwd, ls, nice and cp commands with an example of each.
- (d) Draw and explain Process State Transition Diagram.
- (e) What are the necessary conditions for a deadlock to occur?
- (f) What are independent and cooperating processes?
- (g) Differentiate fixed and dynamic memory partition schemes.
- (h) Explain deadlock detection and recovery in detail.

- Q2 (a) What are the main functions of an Operating System? Describe real time systems in detail with few application areas. (6)
- (b) Write a shell script to accept three numbers from user and print the largest number. (4)

OR

- Q3 (a) Explain the architecture of Linux with the help of a diagram. (6)
- (b) Explain three modes of vi editor. How can we write, save and execute shell scripts in Linux? (4)

- Q4 (a) Consider the following set of processes with the given burst time and arrival time: (6)

Process	Arrival Time	Burst Time
P1	0	84
P2	2	1
P3	3	95
P4	5	5
P5	5	3

Draw GANTT chart to show the process execution using FCFS, SJF (Non-preemptive) and Round Robin (quantum=4 ms) scheduling algorithms, and calculate average turnaround time and waiting time using each algorithm.

- (b) What are schedulers? Define them. (4)

P1/2

P1/2

OR

- Q5 (a) What is Critical Section problem? How do Semaphores provide solution to producer-consumer problem? (6)  
(b) What is Address Binding? How logical addresses are converted into physical addresses in Paging scheme? (4)

- Q6 (a) What is the difference between first-fit, best-fit and worst-fit allocation schemes? (4)  
(b) Consider following set of processes with three resources A, B and C.

Process	Allocation			Max			Available		
	A	B	C	A	B	C	A	B	C
P1	1	1	2	4	3	3	2	1	0
P2	2	1	2	3	2	2			
P3	4	0	1	9	0	2			
P4	0	2	0	7	5	3			
P5	1	1	2	1	1	2			

- Using Banker's Algorithm, answer the following questions: (6)  
i) Find the total number of resources of type A, B and C  
ii) Find the content of Need matrix  
iii) Is the system in safe state? If yes, then find a safe sequence.

OR

- Q7 (a) Consider the given page reference string with three frames, find number of page faults that may occur with following page replacement algorithms: (6)  
1, 2, 3, 4, 1, 2, 5, 6, 2, 3, 4, 5, 1, 6, 2, 5  
i) Least Recently Used  
ii) Least Frequently Used  
iii) First- In First-Out  
(b) What is Demand Paging? Explain the steps required to handle a page fault? (4)

- Q8 (a) What do you mean by Disk Space Allocation? Differentiate between Linked and Indexed Allocation Methods. (6)  
(b) Explain tree and acyclic directory structures. What are the different operations that can be performed on directories? (4)

OR

- Q9 How does Linux implement File Protection? Explain how we can use chmod command to assign permissions on a file using symbolic and numeric methods. (10)

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# END TERM EXAMINATION

FIFTH SEMESTER [BCA] DECEMBER 2025-JANUARY 2026

Paper Code: BCAT-311 Subject: Machine Learning with Python

Time: 3 Hours Maximum Marks: 60

Note: Attempt all questions as directed. Internal Choice is indicated.

- Q1 Attempt **any four** of the following (4x5=20)
- a) Explain Different types of Machine learning Techniques.
  - b) What is Hebbnet in machine learning?
  - c) Explain with a suitable example about hierarchical clustering.
  - d) Explain curse of dimension and why is it important to reduce dimensions.
  - e) What is a confusion Matrix. Explain all its components with example.
  - f) What do you mean by perceptron.
  - g) Write all the applications of artificial neural networks
  - h) Differentiate in detail about bagging and boosting.

- Q2 Write and explain about linear and logistic regression. Also write the detailed algorithm/ python code for the same. (10)

OR

- Q3 Find linear regression equation for following two sets of data. X is an independent variable and y is a dependent variable (10)

X	2	4	6	8
Y	3	7	5	10

Predict y for x=4.5

- Q4 Explain Support vector machine. Explain hyperplane, kernel, support vectors, hard and soft Margin. (10)

OR

- Q5 Explain in detail about ensemble learning. Explain Bagging and Boosting. Also explain the working of random Forest. (10)

- Q6 What do you mean by unsupervised learning. What are the various unsupervised learning techniques Explain in detail about K means clustering? (10)

OR

- Q7 What is an Artificial neural network. Explain in detail about multilayer neural networks. (10)

- Q8 Given the data in table. Reduce the dimensions from 2 to 1 using principal component analysis. (10)

X1	4	8	13	7
X2	11	4	5	14

OR

- Q9 Explain the concept of back Propagation algorithm. Write a complete example to explain and update weight as required for back propagation Algorithm. (10)

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FIFTH SEMESTER [BCA] DECEMBER 2025

Paper Code: BCA-303

Subject: Computer Graphics

Time: 3 Hours

Maximum Marks: 60

Note: Attempt all questions as directed. Internal choice is indicated.

Q1 Attempt **any four** of the following questions: (4x5=20)

~~(a)~~ Discuss the disadvantages of Digital Differential Analyzer algorithm for scan converting line.

~~(b)~~ Differentiate between Raster and Random scan display.

~~(c)~~ Consider two different raster system with resolution of 640 x 480 and 2560 x 2048.

Find the size of frame buffer (in bytes) for each of these system to store 24 bits per pixel?

~~(d)~~ What is video controller. Explain the working of a video controller.

~~(e)~~ Discuss characteristics of Bezier curve. Explain Convex hull in detail.

~~(f)~~ What do you understand by parametric continuity? How is it different from geometric continuity, explain?

~~(g)~~ Write down matrix equation of 3D Rotation and Scaling with homogeneous coordinate.

~~(h)~~ Write a short note on Aliasing and Antialiasing.

Q2 ~~(a)~~ Explain Bresenham Line Drawing Algorithm with its derivation.

~~(b)~~ Explain different application areas of Computer Graphics.

(10)

OR

Q3 (a) Find out all valid coordinates from (12,21) to (17,25) using Bresenham Line Drawing Algorithm.

(b) What is eight-point symmetry of a circle. Explain with the help of example.

(10)

Q4 What do mean by Clipping. Explain Cohen Sutherland Line Clipping Algorithm with the help of suitable example.

(10)

OR

Q5 Explain Composite Transformation.

(10)

Perform 90° counter clockwise rotation of a triangle with vertices A(0,0), B(5,1) and C(3,5) by keeping C(3,5) fixed.

Q6 Given a Bezier curve with 4 control points -  $P_0(1,1)$ ,  $P_1(3,5)$ ,  $P_2(6,4)$ ,  $P_3(8,2)$ . Find 5 points lying on the curve and draw a rough sketch of the curve for  $(U = 0, 0.25, 0.50, 0.75, 1)$ .

(10)

OR

Q7 (a) Write notes on:

(i) Hermite curve

(ii) Spline Curve

(10)

(b) Distinguish between Gourard shading and Phong shading.

Q8 Give any five difference between Parallel and Perspective projection.

(10)

OR

Q9 Write notes on:

(a) Painter's Algorithm

(b) Orthographic projection

(c) Z- buffer

(d) Perspective projection

(10)

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# END TERM EXAMINATION

FIFTH SEMESTER [BCA] DECEMBER-2025

Paper Code: BCA-305

Subject: Cloud Computing

Time: 3 Hours

Maximum Marks: 60

Note: Attempt five questions in all including Q.no.1 which is compulsory. Select one question from each unit.

Q1 Answer the following:

(4x5=20)

- a) What is SLA. Give life cycle of SLA, also write in detail importance of SLA.
- b) Discuss in brief cloud computing vision, advantages, and challenges.
- c) Explain IDaaS in terms of Cloud Computing security.
- d) Give the difference between Full Virtualization, Partial Virtualization and Para Virtualization.

### UNIT-I

- Q2 a) The Cloud Reference Model defines multiple layers such as IaaS, PaaS, and SaaS, each with different responsibilities and user control. Evaluate how the separation of these layers impacts security, application development, and system administration. (5)
- b) Which layer would you recommend for a startup focusing on rapid application deployment, and why? (5)

Q3 Apply your understanding of cloud computing by categorizing real world applications under public, private, hybrid, and community cloud models. Justify with suitable examples. (10)

### UNIT-II

Q4 Explain Cloud Computing Architecture and Economics in Cloud computing. (10)

Q5 Elaborate on economy of scale in terms of software productivity of cloud. (10)

### UNIT-III

Q6 What are the approaches to Distributed and Parallel Programming. List and explain any twotypes in detail. (10)

Q7 What is Law of Caution in terms of Parallel Programming. Explain Amdahl Law, Gustafson's Law and Brevity Law. (10)

### UNIT-IV

Q8 a) What is virtualization in cloud? Elaborate Taxonomy of Virtualization in detail. (5)

b) Differentiate between VMware and Hyper - V. (5)

Q9 A system administrator must support a legacy Windows-only application on a Linux server. Evaluate which implementation level of virtualization is most appropriate for this scenario, justify your choice, and name a software tool that supports this approach. Evaluate the effectiveness of different types of hypervisors in managing virtual machines. Which type would you recommend for enterprise use and why? (10)

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