

**FACULTY OF ENGINEERING****B.E. VI – Semester (CBCS) (Suppl.) Examination, December 2019 / January 2020****Subject: Operating Systems (Elective – I)****Time: 3 Hours****Max.Marks: 70****Note: Answer all questions from Part-A and any five questions from Part-B****PART – A (10x2 = 20 Marks)**

- 1 List the differences between process and thread.
2. State the necessary conditions for the deadlock to occur.
3. Define the following terms
  - a) Throughput
  - b) Turnaround time
  - c) Response time
  - d) Waiting time
4. What is Belady's anomaly?
5. Explain critical section problem.
- 6 Distinguish between semaphore and binary semaphore
7. What is RAG? Where it is used? Give an example
8. What is fragmentation?
9. Define seek time and rotational time
10. List the design goals of LINUX.

**PART – B (5x10=50 Marks)**

11. Consider the following set of processes with the length of the CPU burst time given in milliseconds

Process	BurstTime	Priority
P1	10	3
P2	1	1
P3	2	3
P4	1	4
P5	5	2

The processes are assumed to have arrived in the order p1, p2, p3, p4, p5 all at time 0.

- a) Draw four Gantt charts illustrating the execution of these processes using FCFS, SJF, and pre-emptive priority (a smaller priority number implies a higher priority) and RR (quantum=1) scheduling.

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- b) What is the turnaround time of each process for each of the scheduling algorithms?  
 c) What is the waiting time of each process for each of the scheduling algorithms?  
 Which of the schedules results in the minimal average waiting time?

- 12 a) Write the steps of banker's algorithm for deadlock avoidance  
 b) Consider the following snapshot of a system:

	Allocation				Max				Available			
	A	B	C	D	A	B	C	D	A	B	C	D
P <sub>0</sub>	2	0	0	1	4	2	1	2	3	3	2	1
P <sub>1</sub>	3	1	2	1	5	2	5	2				
P <sub>2</sub>	1	3	1	2	2	3	1	6				
P <sub>3</sub>	1	3	1	2	1	4	2	4				
P <sub>4</sub>	1	4	3	2	3	6	6	5				

Illustrate that the system is in a safe state by demonstrating an order in which the processes may complete.

- 13 Consider that a disk drive has 5,000 cylinders, numbered 0 to 4,999. The drive is currently serving request at cylinder 143, and the previous request was at cylinder 125. The queue of pending requests, in FIFO order, is: 86, 1470, 913, 1774, 948, 1509, 1022, 1750, 130. Starting from the current head position, what is the total distance (in cylinders) that the disk arm moves to satisfy all pending requests for each of the following disk scheduling algorithms?

A. FCFS      B. SSTF      C. SCAN      D. C-SCAN      E. LOOK      F. C-LOOK.

- 14 a) Explain the file allocation methods.  
 b) Write about the implementation of the Access Matrix.
- 15 a) Explain the paging memory management technique.  
 b) What is Virtual memory and explain about demand paging.
16. Explain the process management in LINUX system.
17. Write short notes on any two of the following:  
 a) Monitors  
 b) Segmentation.  
 c) Semaphores.

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**FACULTY OF ENGINEERING****B.E. VI Semester (CBCS)(Suppl.) Examination, December 2019 / January 2020****Subject: OOP Using Java (Elective – I)****Time: 3 Hours****Max. Marks: 70****Note: Answer all questions from Part-A, & Answer any five questions from Part-B.****PART – A (10 x 2 = 20 Marks)**

- 1 Write short notes on Layout managers.
- 2 Differentiate between C++ and JAVA.
- 3 Is JAVA strongly typed language or loosely typed language? Justify.
- 4 List the methods of File class.
- 5 What is Inheritance?
- 6 Differentiate between overloading and overriding.
- 7 Differentiate between Byte Stream and Character Stream classes.
- 8 Give the difference between vector and Array list classes.
- 9 Explain about Random Access Interface.
- 10 Write a code to create login form using Frames.

**PART – B (5 x 10 = 50 Marks)**

11. a) Classify and explain various data types in JAVA. [5M]  
b) Write a program to implement stack functionality with user defined exceptions for stack overflow and underflow. [5M]
12. a) Explain various methods of inter process communication in Threads? [4]  
b) Create a user defined package which contains methods to perform compare, add, and subtraction operations on a Two-dimensional array. Test the package from another class. [6M]
13. a) Define interface? Explain the differences between abstract classes and interfaces? [5M]  
b) Explain the usage of String Tokenizer with example. [5M]
14. a) Write a program to demonstrate various subclasses of Set interface. [5M]  
b) Write a program to display number of characters and number of words in a given file? [5M]
15. a) Explain the concept of Adapter class with an example. [5M]  
b) Write a program to demonstrate mouse events. [5M]
16. a) Create a Student Registration form using various AWT Controls. [5M]  
b) Explain the life cycle of an Applet using the program. [5M]
17. Write short notes on:
  - a) final, finally and finalize keywords [3M]
  - b) nested try/block statements [3M]
  - c) Legacy classes and interfaces [4M]

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**FACULTY OF ENGINEERING****B.E. VI-Semester (CBCS)(Suppl.) Examination, December 2019 / January 2020****Subject: Database Systems (Elective – I)****Time: 3 Hours****Max. Marks: 70****Note: Answer all questions from Part-A & any five questions from Part-B.****PART – A (20 Marks)**

- 1 What is Entity- Relationship Diagram?
- 2 Write a query to retrieve student details (like student ID, Student name, student city) from table with corresponding output.

**Students**

Student ID	StudFirst Name	StudLast Name	StudStreet Address	StudCity	StudState	StudZipcode	<< other fields >>
60001	Zachary	Erlich	1204 Bryant Road	Seattle	WA	98125	.....
60002	Susan	McLain	101 C Street, Apt. 32	Redmond	WA	98052	.....
60003	Joe	Rosales	201 Cherry Lane SE	Redmond	WA	98073	.....
60004	Diana	Barlet	4141 Lake City Way	Woodinville	WA	98072	.....
60005	Tom	Wickerath	2100 Mineola Avenue	Bellevue	WA	98006	.....

- 3 Define Anomalies. Give example.
- 4 Define Recursion. Give example.
- 5 Write about JDBC?
- 6 Define concurrency problem in DBMS.
- 7 Discuss Advantages of NoSQL database.
- 8 List and Explain types of users in Database.
- 9 Differentiate GraphDb and NoSQL.
- 10 Define System Log with example.

**PART – B (50 Marks)**

- 11 (a) Explain different types of cardinality relationship? (5)  
(b) Explain normalization? Give examples for 1NF & 2NF. (5)
- 12 (a) Discuss Relational Calculus. (5)  
(b) Differentiate relational algebra and relational calculus . (5)
- 13 (a) Explain briefly Transactions in DBMS. (5)  
(b) Write about concurrency control in DBMS. (5)
- 14 (a) Describe homogeneous distributed database environment. (5)  
(b) Describe Distributed Query Optimization . (5)
- 15 (a) Explain Relational model with suitable examples. (5)  
(b) Write about Aggregation in Database. List the Aggregation functions with examples. (5)
- 16 (a) Explain different types of languages in database. (5)  
(b) Explain various database application paradigms. (5)
- 17 Write short notes on:
  - (a) Graph database (5)
  - (b) Crash recovery (5)

**FACULTY OF ENGINEERING****BE VI - Semester (CBCS) (Suppl.) Examination, December 2019 / January 2020****Subject : Principles of Embedded Systems (Elective-I)****Time: 3 Hours****Max. Marks: 70****Note : Answer All Questions from Part-A, & Any Five Questions From Part-B****Part – A (10×2 = 20 Marks)**

- 1 Define Embedded Systems
- 2 Give the description of any four basic gates used in digital hardware circuits
- 3 Explain the purpose of watch dog timer in embedded system circuits
- 4 Define the terms: a) Interrupt      b) Critical section
- 5 Explain about Round-Robin software architecture
- 6 What is a scheduler
- 7 Differentiate between host and target systems
- 8 Explain about PROM Programmer
- 9 Mention the functions of Instruction set simulator
- 10 Define assert macro

**Part – B (5×10 = 50 Marks)**

- 11 a) Explain the challenges of embedded system design with the help of examples.      5M  
b) Explain about various types of memories.      5M
- 12 a) Draw the block diagram of a basic microprocessor and explain the possible division of address space.      5M  
b) Explain the operation of DMA with the help of timing diagrams.      5M
- 13 a) Distinguish the characteristics of various software architectures.      6M  
b) Explain about round robin with interrupts architecture with the help of example.      4M
- 14 Draw the block diagram of Native tool chain and explain the software development tools used in the embedded design.      10M
- 15 a) Explain the advantages of Logic analyser and its operation.      5M  
b) Explain the operation of In Circuit Emulator.      5M
- 16 a) What is interrupt latency? Explain the method how the interrupt latency can be Reduced.      5M  
b) Explain the operation of D Flip flop with the help of timing diagram.      5M
- 17 a) Explain the goals of testing process? How is the host system a much friendlier environment for testing than the target system.      5M  
b) Explain how Flash is used in getting the embedded software into the target system.      5M

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**FACULTY OF ENGINEERING****B. E. (CBCS) VI – Semester (Supply.) Examination, December 2019 / January 2020****Subject: Basics of Power Electronics (Elective – I)****Time: 3 hours****Max. Marks: 70****Note: Answer all questions from Part-A. Answer any FIVE questions from Part-B.****PART – A (10 x 2 = 20 Marks)**

1. List the advantages and disadvantages of Power Electronics.
2. Briefly discuss the gate-drive design considerations of the MOSFET.
3. Classify phase controlled rectifiers according to number of pulses in load voltage.
4. Define the following: (i) Input power factor (ii) Total Harmonic Distortion.
5. What do you understand by average capacitor current?
6. Draw the source current waveform of Boost converter.
7. List the advantages of PWM control.
8. What is sinusoidal pulse width modulation?
9. What type of gating is used in single-phase ac voltage controller with RL-load and why?
10. Compare inverters and cyclo-converters.

**PART – B (5 x 10 = 50 Marks)**

11. (a) Importance of Thyristor ratings and explain each rating. 5  
(b) Explain reverse recovery characteristics of a power diode, and derive expression for  $Q_{RR}$ . 5
12. (a) Discuss about protection of an SCR. 5  
(b) A single-phase fully controlled bridge rectifier is supplied at 220V rms and at a frequency of 50Hz. The source inductance  $L_s = 4$  mH and the load current on the DC side is constant at 10A. Calculate (a) firing angle (b) overlap angle. 5
13. (a) Obtain expression for load voltage and input power factor for 1- $\phi$  ac-dc fully-controlled converter supplying R-L load with help of waveforms. Assume constant load current. 6  
(b) Why is power factor of semi-converters is better than that of full-converters? 4
14. (a) Derive filter elements design expressions for Buck-Boost converter with relevant waveforms. 6  
(b) A step up chopper has input voltage of 220 V and output voltage of 660 V. If the non-conducting time of thyristor chopper is 100  $\mu$  s, compute the pulse width of output voltage. In case pulse width is halved for constant frequency operation, find the new output voltage. 4
15. (a) Explain 120<sup>o</sup> conduction mode of 3-phase inverter with R load. 6  
(b) Compare single and multiple pulse width modulation techniques of inverter voltage control. 4
16. (a) Explain single-phase mid-point type step-up cyclo-converter with neat waveforms. 5  
(b) Explain the operation of a 1- $\phi$  AC voltage controller with RL-load. 5
17. Write short notes on  
a) Three phase dual converter. 5  
b) Applications of Switch mode regulators and cyclo-converters. 5

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**FACULTY OF ENGINEERING****B.E. VI-Semester (CBCS)(Suppl.) Examination, December 2019 / January 2020****Subject: Industrial Robotics (Elective – I)****Time: 3 Hours****Max. Marks: 70****Note: Answer all questions from Part-A & any five questions from Part-B.****PART – A (20 Marks)**

- 1 Sketch specification the configuration diagram and shape of workspace of any Robot.
- 2 Give of any Robot used for a Industrial operation.
- 3 Explain the working principle of an Incremental optical encoder.
- 4 What is Triangulation principle? Name its application.
- 5 What is the importance of DH parameters in robotics?
- 6 What is meant by a Redundant Robot?
- 7 Differentiate between Analog and Digital signals.
- 8 Explain any one method Image acquisition.
- 9 What are High level and Low-level Languages?
- 10 Explain Rate of Return method.

**PART – B (50 Marks)**

- 11 (a) Explain Repeatability, precision and Accuracy as applied to robots. (3)  
 (b) Explain two different types of Mechanical End effects and Vacuum gripper. (4)  
 (c) Explain the use of Robots in material handling field of application. (3)
- 12 Explain proximity sensors, wrist sensors and compliance sensors. (10)
- 13 (a) Explain forward and inverse kinematics of robots. (5)  
 (b) Draw a line diagram of a planar 2d.o.f. RR type main pulator. If  $l_1$  and  $l_2$  are the link length and  $\theta_1$  and  $\theta_2$  are joint angles, find expressions for end effector location and orientation. (5)
- 14 Explain the procedure for Image processing and analysis of Robot vision. (10)
- 15 Explain any two Robot programming languages. (10)
- 16 (a) Explain selection and design considerations of a Robot gripper. (3)  
 (b) Explain use of specialized tool as an End-effector. (3)  
 (c) Explain desirable features of a Robot sensor. (4)
- 17 Write short notes on the following:
  - (a) Homogeneous Transformation Matrix (3)
  - (b) Image Acquisition devices (3)
  - (c) Teach pendant programming of Robots (4)

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**FACULTY OF ENGINEERING**

**B.E. VI – Semester (CBCS) (Suppl.) Examination, December 2019 / January 2020**

**Subject: Material Handling (Elective – I)**

**Time: 3 Hours**

**Max.Marks: 70**

**Note: Answer all questions from Part-A and any five questions from Part-B**

**PART – A (10x2 = 20 Marks)**

1. State the working of Screw conveyors and its operations.
2. Enlist the features of Bucket Elevators.
3. Briefly explain the types of Pneumatic conveying systems.
4. Write the advantages of Low Velocity Conveying Systems.
5. Explain the term "Bulk handling"
6. Define the terms Voidage and Bulk Density.
7. Explain the Components of AGVS.
8. Briefly explain the objectives of a material handling system.
9. Write a short note on Single-command Cycle.
10. Explain the economic factors of Material Handling Systems

**PART – B (5x10 = 50 Marks)**

11. a) What are the factors you consider in selection of Material Handling Equipment? (5)  
b) Write a brief outline on Bucket Elevators. (5)
12. a) Explain the components of Hydraulic conveying systems. (5)  
b) Explain the working principle of a Reciprocating Air Compressor. (5)
13. Explain with a neat sketch Flow of bulk solids from hoppers. (10)
14. Explain the guiding factors determining the functioning of the AGVS. (10)
15. Discuss AS/RS Components and Terminology. (10)
16. Discuss about Chain and Flight conveyors. (10)
17. Discuss the advantages & disadvantages of Barcode & Radio Frequency-Identification technology (RFID) Systems. (10)

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**FACULTY OF ENGINEERING****B.E. VI – Semester (CBCS) (Suppl.) Examination, December 2019 / January 2020****Subject: Disaster Management (Elective – I) (Except CE)****Time: 3 Hours****Max.Marks: 70****Note: Answer all questions from Part-A and any five questions from Part-B****PART – A (10x2 = 20 Marks)**

- |  |   |
|--|---|
| 1 Explain the meaning of Disaster mitigation.                          | 2 |
| 2 Explain the causes of landslides.                                    | 2 |
| 3 What is vision of NDMA?  | 2 |
| 4 Explain classification of disasters.                                 | 2 |
| 5 What is vulnerability?   | 2 |
| 6 Explain about Flood prevention technology from Indigenous Knowledge. | 2 |
| 7 Write disaster response after Droughts.                              | 2 |
| 8 Explain about Heat waves as disaster.                                | 2 |
| 9 Define Hazard?   | 2 |
| 10 Discusses urban economic imbalances?                                | 2 |

**PART – B (5x10 = 50 Marks)**

- |  |   |
|--|---|
| 11 a) Write what are steps to be taken health and sanitation programmes after floods.  | 5 |
| b) Mention some objectives of ISDR Programme.  | 5 |
| 12 a) How do you plan for evacuation when a disaster is a disaster is predicted?   | 5 |
| b) Explain link between drought and desertification use appropriate case studies?  | 5 |
| 13 a) Spational information technology is best tool how discusses with suitable example.   | 5 |
| b) What is Disaster management cycle, explain each step?   | 5 |
| 14 a) What is cyclone and discuss preventive measure for cyclone?  | 5 |
| b) Explain the role of mass communication during disaster.   | 5 |
| 15 a) Discuss responsibilities/duties of local, state and central government disaster risk reduction.  | 5 |
| b) What are the causes of floods and how do you mitigate floods.   | 5 |
| 16 a) Write causes of Road hazards in India and how to mitigate  | 5 |
| b) Write about impacts of climate change as disaster   | 5 |
| 17 a) What is risk mapping and vulnerability analysis explain the role of GIS in the above.  | 5 |
| b) Formulate and explain the types of warning systems that are available to alert the people in the case of predicted disaster such as floods, cyclones etc. | 5 |

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