b. Perform the following page replacement policy for given page sequence:

2 3 2 1 5 2 4 5 3 2 5 2

(i) Optimal

(ii) LRU

(iii) FIFO

Find page faults for all three page replacement policies.

32. a. Discuss operating system design issues in detail.

(OR)

b. Describe file allocation methods with suitable examples.

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Reg. No.															

B.Tech. DEGREE EXAMINATION, MAY 2018

1st to 6th Semester

15CS302J – OPERATING SYSTEMS

(For the candidates admitted during the academic year 2015 – 2016 onwards)

Note:

(i) **Part - A should be** answered in OMR sheet within first 45 minutes and OMR sheet should be handed over to hall invigilator at the end of 45th minute.

(ii) **Part - B** and **Part - C** should be answered in answer booklet.

Time: Three Hours Max. Marks: 100

PART – A (20 × 1 = 20 Marks)

Answer **ALL** Questions

1. _____ gives a program access to the hardware resources and services available in system through user.
   (A) Instruction set architecture (B) Application binary interface
   (C) Application program interface (D) Instruction program interface

2. Magnetic disk is a type of _____ memory in memory hierarchy.
   (A) Inboard memory (B) Outboard storage
   (C) Off-line storage (D) Reference storage

3. Select a pair that is responsible for suspending user program and resuming it.
   (A) Operating system and memory (B) Processor and operating system
   (C) Interrupts and memory (D) Processor and interrupts

4. Monitor executes in _____ mode.
   (A) Kernel (B) Bios
   (C) User (D) Interrupt

5. When the operating system creates a process at the explicit request of another process, the action is referred to as?
   (A) Process creation (B) Process extension
   (C) Process interaction (D) Process spawning

6. Ability of an operating system to support multiple concurrent paths of execution within a single process is called
   (A) Multithreading (B) Multiprocessing
   (C) Two way threading (D) Two way processing

7. In five state process model, processor operates in _____ fashion.
   (A) Round-robin (B) Last in first out
   (C) Shortest process first (D) Largest process first

8. _____ program switches the processor from one process to another.
   (A) Tracer (B) Instruction
   (C) Dispatcher (D) Process control

9. A situation in which two or more processes are unable to proceed because each is waiting for one of the others. This situation is called
   (A) Livelock (B) Starvation
   (C) Race condition (D) Deadlock

10. Mutex is a(n) _____ semaphore
   (A) Binary (B) Condition
   (C) Event (D) Spinlock

11. Among the listed option which scheduling algorithm does not support preemption?
   (A) Shortest job first (B) Shortest remaining time next
   (C) Round robin (D) First come first serve

12. Choose the selection function for round robin scheduling listed below.
   (A) max[w] (B) Constant
   (C) min[s] (D) min[w]

13. _____ chooses the block that is closest in size to the request.
   (A) First-fit (B) Worst-fit
   (C) Best-fit (D) Next-fit

14. In buddy system, memory blocks are available of size _____ words.
   (A) 2^k (B) 2^{k+1}
   (C) 2^{k-1} (D) $2^{k/2}$

15. Select the correct pair listed below.
   (A) Logical address ↔ relative address (B) Logical address ↔ physical address
   (C) Relative address ↔ physical address (D) Absolute address ↔ logical address

16. The system spends most of its time swapping pieces rather than executing instructions is called
   (A) Principle of locality (B) Thrashing
   (C) Paging (D) Segmentation

17. The _____ stores information in chunks that are usually of fixed sixe.
   (A) Stream-oriented device (B) Buffer-oriented device
   (C) Schedule-oriented device (D) Block-oriented device

18. Select odd ones from the listed option
   (A) Seek time (B) Rotational delay
   (C) Transfer time (D) Multiprocessing

19. In preallocation logic of file allocation methods, _____ method is necessary for file management.
   (A) Chained (B) Contiguous
   (C) Indexed (D) File indexed

20. Which of the following options, interrupts are not involved in I/O techniques?
   (A) Interrupt-driven I/O (B) Programmed I/O
   (C) Direct memory access (D) Interrupt memory I/O

PART – B (5 × 4 = 20 Marks)
Answer **ANY FIVE** Questions

21. A user reads one record from file in 15 μs, executes 100 instructions in 1 μs and writes one record to file in 15 μs. Find the CPU utilization for the scenario.

22. List any five reasons to create a new process.

23. Briefly explain the conditions for deadlock.

24. Discuss the three different ways of process interaction.

25. Differentiate paging and segmentation with appropriate examples.

26. Neatly sketch the page table entry and segment table entry formats.

27. Define direct memory access and list the DMA configuration types.

PART – C (5 × 12 = 60 Marks)
Answer **ALL** Questions

28. a.i. Define interrupt and discuss classes of interrupts. (5 Marks)

ii. Illustrate simple interrupt processing with flowchart. (7 Marks)

(OR)

b. Explain in detail the evolution of operating system with suitable example.

29. a. Draw five state process model and explain it with queuing model technique and suspend state.

(OR)

b.i. Differentiate single threaded and multi-threaded process model. (4 Marks)

ii. Discuss categories of thread implementation with neat sketch. (8 Marks)

30. a. Define semaphores and write the algorithm for semaphore and binary semaphore.

(OR)

b. Determine whether the given state is safe or not using deadlock avoidance algorithm.

Claim			Allocation			Resource vector			Available vector		
A	B	C	A	B	C	A	B	C	A	B	C
3	2	2	1	0	0	9	3	6	0	1	1
6	1	3	6	1	2						
3	1	4	2	1	1						
4	2	2	0	0	2						

31. a. Explain paging and segmentation with respect to address translation. Illustrate with example.

(OR)