Section I: Attempt this question by writing the best option on the ANSWER SHEET at the last page. Only one best option is correct. Cutting and overwriting will be considered as incorrect answer. Otherwise, there is no negative marking [40 X 1=40]

1. After a fork() system call, which of the following process attributes not differ between parent and child process:
   A. PID & PPID
   B. File locks
   C. Current working directory
   D. All of the above differ
2. return value from fork The mode is switched from user to kernel after:
   A. Generation of system call
   B. Occurrence of trap
   C. Both A and B
   D. None of the above
3. Which of the following is the reason of failure of fork() system call:
   A. Maximum number of processes allowed on the system has exceeded
   B. Not enough swap space
   C. Maximum number of processes allowed under one user has exceeded
   D. All of the above
4. After a fork() system call, which of the following process attributes are not inherited by child process:
   A. Nice value
   B. Contents of stack
   C. CPU time usage
   D. All of the above are inherited
5. If we remove binary semaphore 1 from counting semaphore:
   A. it will becomes binary semaphore
   B. all process can go to critical section
   C. process count in critical section vary
   D. no process can go to critical section
6. Round Robin scheduling with 100 ms time slice become First Come First Served if
   A. All processes are having burst times smaller than 100ms
   B. All processes are having burst times greater than 100ms
   C. Half of the processes have time slice less than 100 ms and other half have time slice greater than 100 ms
   D. Round Robin and FCFS are entirely different
7. In SVR3, what is the priority value of a process having a nice value of -5, base value of 50 and recent CPU usage of 10:
   A. 50
   B. 55
   C. 60
   D. None of the above

Consider the following set of processes in a system where Shortest Remaining Time First (SRTF) scheduling algorithm is implemented. [For next four questions]

Process	Arrival Time	CPU Burst
P_1	1	5
P_2	2	3
P_3	3	1
P_4	4	2

8. What is the finish time of process P_4?
   A. 6
   B. 8
   C. 3
   D. 2
9. At time 7 process, P_2 will be in _____ state.
   A. Ready
   B. Waiting
   C. Running
   D. Terminated
10. Waiting Time of P_3 will be
    A. 0
    B. 1
    C. 2
    D. 3
11. What is the finish time of process P_3?
    A. 4
    B. 5
    C. 6
    D. 7
12. Which of the following scheduler controls the degree of multi-programming?
    A. Long term scheduler
    B. Medium term scheduler
    C. Short term scheduler
    D. All of the above

13. What will be the value of α in exponential averaging formula for which $\tau_{n+1} = \tau_n$
    A. ½
    B. 1
    C. 0
    D. It is not possible
14. Compute τ_5 using exponential averaging by assuming $\alpha = \frac{1}{3}, T_4 = 33 \; and \; \tau_4 = 18$
    A. 33
    B. 23
    C. 29
    D. 18
15. Which is NOT a criterion for a good solution of critical section problem?
    A. Mutual exclusion
    B. Bounded waiting
    C. Circular waiting
    D. Progress
16. In Bakery algorithm, given **(Tno, PID)** pair, which of the following process will enter in critical section:
    A. Process having (5, 7)
    B. Process having (1,12)
    C. Process having (5,6)
    D. Process having (1, 10)
17. If there is busy waiting in the system, it means
    A. CPU is doing productive work
    B. CPU is doing multitasking
    C. CPU cycles are being wasted
    D. CPU scheduler implements RR
18. Critical Section in a cooperating process is:
    A. Part of code to modify shared data
    B. Part of code to read shared data
    C. Shared part of code
    D. All of the above
19. Race condition is a situation where the final value of the shared data being accessed by concurrent processes depends upon:
    A. Which process finishes first
    B. Which process finishes last
    C. Which process starts first
    D. Which process starts last
20. To improve response time, we can manipulate:
    A. Time Slice
    B. Nice Value
    C. Burst Time
    D. IO Time
21. Busy waiting version to handle a critical section problem is better if:
    A. Critical section is large
    B. Critical section is small
    C. CPU is of very high speed
    D. There is large amount of free space available in the system
22. An IO bound process with normal termination will minimum _____ time(s) go to running state.
    A. 0
    B. 1
    C. 3
    D. 2
23. The weightage of estimated burst time will be maximum:
    A. Last Time
    B. Second Time
    C. First Time
    D. Second Last Time
24. Which of the following statement is true about hypervisors:
    A. Type II is most economical and Type 0 is most robust
    B. Type II is most economical and robust
    C. Type I is costly but most efficient
    D. Type 0 is economical and robust
25. Which of the following is not a task of CPU scheduler
    A. Switching from running to ready state
    B. Swapping a process into disk
    C. Termination of a process
    D. Switching from running to wait state
26. If we implement preemption in FCFS scheduling algorithm then it may simulate
    A. Shortest Remaining Time First
    B. Round Robin
    C. Priority Scheduling Algorithm
    D. It is not possible to implement preemption in FCFC
27. Starvation problem may occur in _____ scheduling algorithm.
    A. First Come First Serve
    B. Shortest Remaining Time First
    C. Round Robin
    D. The problem is not related to the scheduling algorithms

28. Which of the following is not a pre-process task:
    A. Interpret pre-processor directives
    B. Generate assembly code
    C. Remove comments
    D. Include header files
29. One advantage of FCFS is:
    A. No starvation
    B. Lesser average waiting time
    C. Good response time
    D. Lesser turn-around time

Consider the following set of processes in a system where Priority scheduling algorithm with preemption is implemented. [Next four questions]

Process	Arrival Time	Priority #	CPU Burst
P_1	0	4	4
P_2	1	3	6
P_3	3	1	2
P_4	6	2	3

30. At time 7 process P_2 will be in ____
    A. Ready
    B. Terminated
    C. Running
    D. Waiting
31. At time 8, process P_4 will be in _____ state.
    A. Ready
    B. Waiting
    C. Running
    D. Terminated
32. Waiting Time of P_1 will be
    A. 11
    B. 0
    C. 6
    D. 5
33. What is the finish time of process P_2?
    A. 7
    B. 9
    C. 6
    D. 12
34. In SVR3, what is the priority value of a process having a nice value of -10, base value of 50 and recent CPU usage of 30:
    A. 50
    B. 55
    C. 60
    D. None of the above
35. Convoy Effect problem may occur in_____ ___ scheduling algorithm.
    A. Virtual Round Robin
    B. First Come First Serve
    C. Round Robin
    D. The problem is not related to the scheduling algorithms
36. Threads within a process share _____ with other threads of the same process
    A. Open files
    B. State
    C. Stack
    D. Registers
37. Which of the following is the disadvantage of using Threads:
    A. Economy
    B. Performance
    C. Robustness
    D. Responsiveness
38. CPU scheduling algorithms try to maximize the following parameter:
    A. Waiting time
    B. Turnaround time
    C. Throughput
    D. Response time
39. Which of the following is not objective of scheduling:
    A. Priority
    B. Mutual Exclusion
    C. Efficiency
    D. Fairness
40. Which of the following can reduce dispatcher latency
    A. Using a higher nice value
    B. Using priority scheduling algorithm
    C. Using SRTF scheduling algorithm
    D. Increasing time quantum
41. Which of the following is not a parameter of multi-level feedback queue scheduling:
    A. Number of queues
    B. Method to determine up gradation
    C. Decision on value of time quantum
    D. Decision of scheduling algorithm

Section II

Q1: Write single line answer only: **[15 X 2=30]**

a. write one advantage of short time slice

improved response time

b. write one disadvantage of short time slice

increased dispatcher latency

c. Why RR scheduling is not favorable for CPU bound processes

Because they need lot of CPU time but after every time slice they go back in the queue

d. What is the limitation of long term scheduler in five state process model

can't use dynamic memory to bring more processes

e. To save time separate queues for each possible type of waiting is maintained. How memory is managed for so many queues:

linked list implementation

f. Write two purpose of process scheduling

increase throughput

reduce waiting time

reduce response time

g. Describe the situation where SRTF and SJF has same average waiting time

where every next process has more time than the remaining time of current process

h. Write the contents in .data section of a process address space

names of global variables, function names etc.

i. Why we need to kill the parent of a Zombie process

to make it orphan, so that systemd can opt it

j. In every scheduling algorithm IO bound process comes to the rear of the queue in ready state, then why RR is favorable for IO processes

RR needs small CPU time and they quickly go again for IO

k. Improving response time means improving turn-around time, comment

Not necessary, response time is first response only

l. Operating system works as intermediary between software/ humans and hardware. Besides security and deadlock management, write one goal of operating system

improve performance

to share resources with fairness

m. In RR scheduling, when a long process may affect another process (reference to sub-processes)

yes, in case a parent process waiting for a child process having long cpu time

n. Why it is worst to disable interrupt in multi-processing environment

this will stop all processors to do any useful work

o. When a process is sent to virtual memory from running state before completion of time slice

on arrival of a priority process