Question # 01 **[20+30=50 Points]**

A. Express your answer to the point, first is solved for your guidance: **[20x1=20 Points]**

Sample Question: write count of standard descriptors?

Sample Answer: 3

a. How process response time can be improved?

_____

b. In order to achieve best utilization of resources what role LTS can play?

_____

c. Write number of standard error descriptor:

_____

d. Persistence refers to the life time of an IPC object, from above list select the one having least persistence? (Disk, Pipe, Kernel Buffer)

_____

Consider given cat command and answer next questions:

```
cat abc.txt def.txt 1>output.txt 2>error.txt
```

e. How many descriptors will be used by this command?

_____

f. Give two reasons, when output will be written in error.txt

_____

g. Specify purpose of this particular command (on success what this command do)

_____

h. What will be the response of this command "**`cat 1>abc.txt`**", if abc.txt does not exist?

_____

i. How OS knows that IO device is available

_____

j. Number of descriptors used by following command:

```
cat abc.txt def.txt ghi.txt 1>xyz.txt 2>err.txt
```

_____

k. Why fork system call can fail, provided there is enough space available in memory?

_____

l. After successful fork system call, which of the two processes (parent or child process) will execute first?

_____

m. If file not exist, what will be the effect of this failure on second command? **`cat abc || ls –l`**?

_____

n. If file not exist, what will be the effect of this failure on second command? **`cat abc && ls –l`**?

_____

o. Write name of step, in which compiled library files are attached to the program

_____

p. How many bytes (minimum) required to store number 550?

_____

q. How many bytes required to store string “BSE Fall 2020”?

_____

r. Describe the reason, why a process in ready state can be sent to ready suspended state

_____

s. What is meant by good behavior of process?

_____

B. Express your answer in two lines only: [15x2=30 Points]

a. Why a good job mix have more CPU bound processes than IO bound processes?

_____

_____

b. Discuss drawback/ issues with 2-state simple process model?

_____

_____

c. To increase degree of multi-programming where blocked queue is full, specify process model with smallest states that can handle this situation and how?

_____

_____

d. Describe situation, where SJF& SRTF has same results?

_____

_____

e. Differentiate between process persistence & kernel persistence?

_____

_____

f. Give a set of multiple equivalent command (without using pipe) against this command: ls -l | grep “data” 1>result.txt

_____

_____

g. Write a single command that reads contents of a file abc.txt and stores the lines containing string “prog” in another file def.txt (Use pipe & IO redirection)

_____

_____

h. Write down a single command to see all files starting with “prog”, if file(s) exist then write output in files.txt otherwise show error in error.txt

_____

_____

i. Why open system call will fail if file exists on the given path and user has all the permission to use the given file?

_____

_____

j. Write formula to compute Ƭ3 using exponential averaging?

_____

_____

k. Why IO bound processes are favored by SJF?

_____

_____

l. FCFS is not a good scheduling algorithm, is there any use of this algorithm?

_____

_____

m. What is process affinity and what is hard affinity?

_____

_____

n. Write 1 advantage and 1 disadvantage of dynamic linking

_____

_____

o. LS command is showing a long list of files, your friend don't know use of wild cards, help your friend to locate required files

_____

_____

Question # 02 **[3+3+5+5+3+4 =20]**

A. Write fork statement(s) before this print statement to print Midterm 5 times? (Loop statements not allowed) (3 Points)

```
printf("Midterm");
```

B. Examine code carefully, and specify how many times each print statement will execute? (3 Points)

```
fork();
printf("One\n");
int id = fork() && fork();
if (id==0)      printf("Two\n");
else            printf("Three\n");
```

C. For Round Robin scheduling time slice is 4 units. Consider table and information about process P3 has IO requirement of 10 units after 3 units of CPU. Draw Gantt chart for both CPU and IO. Show complete working to secure full marks: (5 Points)

Process	Arrival time	Burst Time
P_1	10	0
P_2	7	2
P_3	5	6
P_4	2	9
P5	2	18

|----------|

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

D. Draw Gantt chart for priority scheduling with preemption. Also find waiting time for each process? (5 Points)

Process	Burst Time	Priority	Arrival Time
P_1	3	4	0
P_2	5	3	1
P_3	6	3	3
P_4	4	2	8
P_5	2	1	9

|----------|

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

E. Consider table, for FCFS give answer to following questions? (3 Points)

i. What is waiting time of P_3? _____

ii. What is turn-around time of P_2? _____

iii. What is response time of P_4? _____

Process	Arrival time	Burst Time
P_1	5	0
P_2	4	2
P_3	6	11
P_4	3	14
P_5	2	20

|----------|

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

F. Consider table. Compute finish time & turnaround time for each process using Multi-level feedback queue scheduling algorithm having 3 queues. Show working by making ready queue & drawing Gantt chart. Given first queue use round-robin with quantum of 20 units. Second queue use round robin with quantum of 50 units. Last queue use FCFS. (4 Points)

Process	Arrival time	Burst Time
P_1	0	100
P_2	50	120
P_3	60	60
P_4	65	110
P_5	80	70