



School: School of Engineering and Technology
Program/s: BTech(IT)
Year: 3rd **Semester:** 5th
Examination: End Semester Examination
Examination year: December - 2021

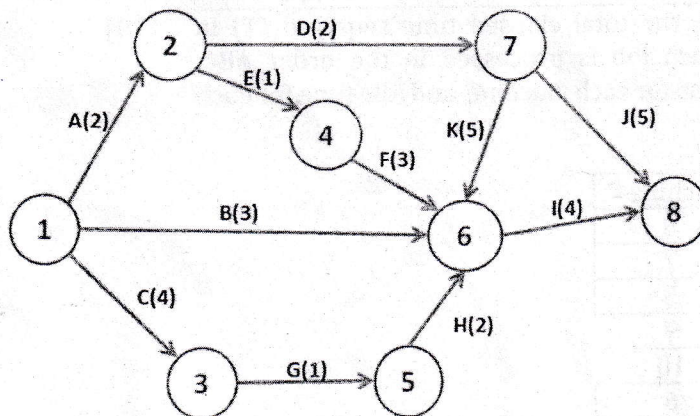
Course Code: IT404 **Course Name:** Operations Research
Date: 02/12/2021
Time: 11:30 am to 01:30 pm

Total Marks: 40
Total Pages: 03

Instructions:

- Write each answer on a new page.
- Use of a simple calculator is permitted.
- Draw all relevant waveforms in answer sheet only.
- * COs=Course Outcome mapping. # BTL=Bloom's Taxonomy Level mapping

Q. No.	Details	Marks	COs*	BTL#
Q.1	Attempt any five	[10]		
A.	Differentiate between PERT and CPM.	[02]	CO4	BT3
B.	Explain following terminologies, 1. Dummy activity 2. Burst event	[02]	CO4	BT2
C.	List different types of sequencing problems.	[02]	CO3	BT1
D.	In your own words write steps for PROCESSING OF 2 JOBS THROUGH n MACHINES	[02]	CO3	BT2
E.	Differentiate between single server vs multiple server queuing models.	[02]	CO4	BT2
F.	Explain different elements of queuing model.	[02]	CO4	BT2
Q.2	Attempt any four	[20]		
A.	Write a short note on the Queuing models.	[05]	CO4	BT1
B.	Explain Johnsons rule for solving sequencing problems	[05]	CO3	BT2
C.	Write and explain steps to find critical path in the network diagram.	[05]	CO4	BT1
D.	For the given network diagram, find critical path, critical activities, and total float for each activity.	[05]		



CO4 BT3

- E. A company plans to fill six positions. Since the positions are known to vary considerably with respect to skill and responsibility, different types of aptitude tests and interviews are required for each. While the aptitude tests are conducted by people from the clerical positions, the job interviews are held by the personnel from the management cadre. The job interviews immediately follow the aptitude test. The time required (in minutes) by each of the positions is given below: [05]

Position	Aptitude Test	Job Interview
P1	140	70
P2	180	120
P3	150	110
P4	200	80
P5	170	100
P6	100	90

CO3 BT4

Identify the order which minimizes the waiting time of management personnel.

Q.3 Attempt any two

- A. For the following project scheduling problem, draw the network diagram, find critical activities and total float for each activity. [20] [10]

ACTIVITY	DESCRIPTION	Expected Time	PREDECESSORS
A	Select Office Site	3	—
B	Create Organizational and Financial Plan	5	—
C	Determine Personnel Requirements	3	B
D	Design Facility	4	A, C
E	Construct Interior	8	D
F	Select Personnel to Move	2	C
G	Hire New Employees	4	F
H	Move Records, Key Personnel, etc.	2	F
I	Make Financial Arrangements with Institutions	5	B
J	Train New Personnel	3	H, E, G

CO4 BT4

- B. Find the sequence that minimizes the total elapsed time required (T) in completing the following jobs. Each job is processed in the order ABC. Calculate total elapsed time, idle time for each machine, and idle time for each job. [10]

Job	Machine A	Machine B	Machine C
1	10	6	8
2	8	4	7
3	12	6	5
4	6	5	9
5	9	3	10
6	11	4	6
7	9	2	5

CO3 BT4

- C. Use the graphical method to minimise the time required to process the following jobs on the machines, that is, for each machine specify the job that should be done first. Also calculate the total elapsed time for completing both jobs. [10]

Job-1

Sequence:	A	B	C	D	E
Time(in hrs)	6	8	4	12	3

CO3 BT4

Job-2

Sequence:	B	C	A	D	E
Time(in hrs)	10	8	6	4	12

*****End of Question Paper*****