



**PRESIDENCY UNIVERSITY**  
**BENGALURU**  
**SCHOOL OF ENGINEERING**

Roll No.																			
----------	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

**TEST – 1**

**Winter Semester:** 2021-22

**Course Code:** MEC 106

**Course Name:** Project Management

**Program & Sem:** B.Tech. & VI Sem

**Date:** 27/04/2022

**Time:** 10:00AM to 11:00AM

**Max Marks:** 30

**Weightage:** 15%

---

**Instructions:**

- (i) Read all the questions carefully and answer accordingly.
  - (ii) Use of calculator is permitted.
- 

**Part A [Memory Recall Questions]**

**Answer all the Questions. Each question carries 1 mark.**

**(6Qx1M=6M)**

1. The process each manager follows during the life of a project is known as \_\_\_\_\_.  
a) Project Management  
b) Manager Lifecycle  
c) Project Management Lifecycle  
d) None of the above
  
2. The entire process of a project may be considered to be made up on number of sub process placed in different stage called the \_\_\_\_\_.  
a) Technical Key Resources  
b) Work Key Structure  
c) Work Breakdown Structure  
d) None of the above
  
3. Resources in a project refers to?  
a) Manpower  
b) Machinery  
c) Materials  
d) All of the above
  
4. The scope of the work is defined in which phase of the project management?  
a) Initiating  
b) Planning  
c) Executing  
d) Closing

5. Johnson's rule is used for \_\_\_\_\_.
- Sequencing problem
  - Assignment problem
  - Aggregate planning
  - Scheduling
6. The time between the starting of the first job and completion of the last job in sequencing problems is called \_\_\_\_\_.
- Processing time
  - Assignment time
  - Elapsed time
  - Idle time
- (CO NO 1,2) [Knowledge Level]

### Part B [Thought Provoking Questions]

**Answer both the Questions. Each question carries 5 marks. (2Qx5M=10M)**

7. A project can be defined as a complex of non-routine activities that must be completed with a set number of resources and within a set time limit. Typical examples of projects include: construction of a house, performing a marriage, overhauling a machine, maintenance of equipment, commissioning of a factory, conducting national elections. Explain the importance of Project Management with example.
- (CO NO 1) [Comprehension Level]
8. A Responsibility Matrix (RM) describes the participation by various roles in completing tasks or deliverables for a project or business process. It is especially useful in clarifying roles and responsibilities in cross-functional/departmental projects and processes. Prepare a RACI matrix considering various tasks (project deliverables) and roles of each participant for a "Building Construction" process.
- (CO NO 1) [Comprehension Level]

### Part C [Problem Solving Questions]

**Answer both the Question. The questions carry 14 marks. (2Q = 14M)**

9. Sequencing Problem is a type of problem to determine the order or sequence in which the jobs are to be processed through machines so as to minimize the total processing time. Here the total effectiveness, which may be the time or cost that is to be minimized is the function of the order of sequence. Consider the following single machine sequencing problem.

Job	A	B	C	D	E
Processing time (In hours)	9	7	5	11	6
Due Date ( $D_j$ in hours)	16	20	25	15	40

Determine: a) Job sequence as per EDD rule. b) Completion time of all the jobs  
c) Mean flow time d) Maximum lateness e) Number of tardy jobs.

[5M] (CO NO 2) [Comprehension Level]

10. The sequencing problem is very much common in Job workshops and Batch production shops. There will be number of jobs which are to be processed on a series of machine in a specified order depending on the physical changes required on the job. We can also see the same situation when number of critical patients waiting for treatment in a clinic, where number of patients are in queue, to be treated. Like this we may find number of situations in real world. A machine operator has to perform two operations, drilling on machine A and milling on machine B on a number of different jobs. Processing times are given below.

Jobs	Time in Hours	
	Machine A	Machine B
1	6	3
2	2	7
3	10	8
4	4	9
5	11	5

Determine the order in which the jobs should be processed on the machines, in order to minimize the total time required. Also find the idle time of both the machines.

[9M] (CO NO 2) [Comprehension Level]



Roll No.																				
----------	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

**PRESIDENCY UNIVERSITY  
BENGALURU**

**SCHOOL OF ENGINEERING**

**TEST – 2**

**Winter Semester:** 2021-22

**Course Code:** MEC 106

**Course Name:** Project Management

**Program & Sem:** B.Tech. & VI Sem

**Date:** 2<sup>nd</sup> JUNE 2022

**Time:** 10:00 AM to 11:00 AM

**Max Marks:** 30

**Weightage:** 15%

---

**Instructions:**

- (iii) *Read all the questions carefully and answer accordingly.*
  - (iv) *Use of graph sheet is permitted.*
  - (v) *Use of Normal Distribution Table is permitted.*
- 

**Part A [Memory Recall Questions]**

**Answer all the Questions. Each question carries ONE mark.  
(6Qx1M=6M)**

1. Gantt chart is applicable for \_\_\_\_\_.
  1. Time study
  2. Motion study
  3. Sales forecasting
  4. Production scheduling
  
2. Tardiness is a measure of \_\_\_\_\_.
  - a) Maximum lateness
  - b) Lateness
  - c) Positive lateness
  - d) None of the above
  
3. Which of the following minimizes the idle time of n jobs and 2 machine problem?
  - a) SPT rule
  - b) Johnson's algorithm
  - c) EDD rule
  - d) Critical ratio rule

4. Which of the following statement is true?
  - a) PERT and CPM are both probabilistic techniques
  - b) PERT and CPM are both deterministic techniques
  - c) PERT is considered as deterministic and CPM as a probabilistic technique
  - d) PERT is considered as probabilistic and CPM as a deterministic technique
  
5. Which of the option is not a notable challenge while scheduling a project?
  - a) Deadlines exist
  - b) Independent activities
  - c) Too many workers may be required
  - d) Costly delay
  
6. The standard deviation for a PERT diagram is calculated by?
  - a) Taking the sum of the variance on all the nodes, then find the square root
  - b) Taking the sum of the standard deviations on the nodes on the critical path
  - c) Taking the sum of the standard deviations on all the nodes
  - d) Taking the sum of variances on nodes of critical path & find the square root

[6M] (CO NO 2,3) [Knowledge Level]

### Part B [Thought Provoking Questions]

**Answer the Question. The question carries TWELVE marks.**

**(1Qx12M=12)**

7. Graphical method is applicable to solve the problems involving 2 jobs to be processed on 'm' machines in the given order of machining for each job. We have to lay out the jobs in the order of machining showing the processing times. Using the graphical method, calculate the minimum time needed to process job 1 and job 2 on five machines A, B, C, D and E, that is, for each machine find the job which should be done first. Also calculate the total time needed to complete both jobs. The machining order for job 1 is ABCDE and the order of machining for job 2 is CADEB respectively for processing.

Job 1	Sequence	A	B	C	D	E
	Time in hrs.	1	2	3	5	1
Job 2	Sequence	C	A	D	E	B
	Time in hrs.	3	4	2	1	5

Level]

**Part C [Problem Solving Questions]**

**Answer the Question. The question carries TWELVE marks.  
(1Qx12M=12)**

8. The main objective in the analysis through PERT is to find out the completion for a particular event within specified date. The PERT approach takes into account the uncertainties. The use of PERT chart gives project managers a tool to estimate the time and resources needed to complete their project tasks, which is crucial during the initiation and planning phases. A small project is composed of 8 activities whose time estimates are listed below.

SActivities	Time in days		
	$t_o$	$t_m$	$t_p$
1-2	6	9	12
1-3	3	4	11
2-4	2	5	14
3-4	4	6	8
3-5	1	1.5	5
2-6	5	6	7
4-6	7	8	15
5-6	1	2	3

- Draw the network diagram and find the expected project completion time.
- Calculate the variance and standard deviation for the project.
- If the due date is 26 days, what is the probability of completing the project?
- What due date has 82% chance of being met?

[12M] (CO NO 3) [Comprehension

Level]

### Normal Distribution Table for positive value of Z

<b>Z</b>	<b>0.00</b>	<b>0.01</b>	<b>0.02</b>	<b>0.03</b>	<b>0.04</b>	<b>0.05</b>	<b>0.06</b>	<b>0.07</b>	<b>0.08</b>	<b>0.09</b>
<b>0.0</b>	0.5000	0.5040	0.5080	0.5120	0.5160	0.5199	0.5239	0.5279	0.5319	0.5359
<b>0.1</b>	0.5398	0.5438	0.5478	0.5517	0.5557	0.5596	0.5636	0.5675	0.5714	0.5753
<b>0.2</b>	0.5793	0.5832	0.5871	0.5910	0.5948	0.5987	0.6026	0.6064	0.6103	0.6141
<b>0.3</b>	0.6179	0.6217	0.6255	0.6293	0.6331	0.6368	0.6406	0.6443	0.6480	0.6517
<b>0.4</b>	0.6554	0.6591	0.6628	0.6664	0.6700	0.6736	0.6772	0.6808	0.6844	0.6879
<b>0.5</b>	0.6915	0.6950	0.6985	0.7019	0.7054	0.7088	0.7123	0.7157	0.7190	0.7224
<b>0.6</b>	0.7257	0.7291	0.7324	0.7357	0.7389	0.7422	0.7454	0.7486	0.7517	0.7549
<b>0.7</b>	0.7580	0.7611	0.7642	0.7673	0.7704	0.7734	0.7764	0.7794	0.7823	0.7852
<b>0.8</b>	0.7881	0.7910	0.7939	0.7967	0.7995	0.8023	0.8051	0.8078	0.8106	0.8133
<b>0.9</b>	0.8159	0.8186	0.8212	0.8238	0.8264	0.8289	0.8315	0.8340	0.8365	0.8389
<b>1.0</b>	0.8413	0.8438	0.8461	0.8485	0.8508	0.8531	0.8554	0.8577	0.8599	0.8621
<b>1.1</b>	0.8643	0.8665	0.8686	0.8708	0.8729	0.8749	0.8770	0.8790	0.8810	0.8830
<b>1.2</b>	0.8849	0.8869	0.8888	0.8907	0.8925	0.8944	0.8962	0.8980	0.8997	0.9015
<b>1.3</b>	0.9032	0.9049	0.9066	0.9082	0.9099	0.9115	0.9131	0.9147	0.9162	0.9177
<b>1.4</b>	0.9192	0.9207	0.9222	0.9236	0.9251	0.9265	0.9279	0.9292	0.9306	0.9319
<b>1.5</b>	0.9332	0.9345	0.9357	0.9370	0.9382	0.9394	0.9406	0.9418	0.9429	0.9441
<b>1.6</b>	0.9452	0.9463	0.9474	0.9484	0.9495	0.9505	0.9515	0.9525	0.9535	0.9545
<b>1.7</b>	0.9554	0.9564	0.9573	0.9582	0.9591	0.9599	0.9608	0.9616	0.9625	0.9633
<b>1.8</b>	0.9641	0.9649	0.9656	0.9664	0.9671	0.9678	0.9686	0.9693	0.9699	0.9706
<b>1.9</b>	0.9713	0.9719	0.9726	0.9732	0.9738	0.9744	0.9750	0.9756	0.9761	0.9767
<b>2.0</b>	0.9772	0.9778	0.9783	0.9788	0.9793	0.9798	0.9803	0.9808	0.9812	0.9817
<b>2.1</b>	0.9821	0.9826	0.9830	0.9834	0.9838	0.9842	0.9846	0.9850	0.9854	0.9857
<b>2.2</b>	0.9861	0.9864	0.9868	0.9871	0.9875	0.9878	0.9881	0.9884	0.9887	0.9890
<b>2.3</b>	0.9893	0.9896	0.9898	0.9901	0.9904	0.9906	0.9909	0.9911	0.9913	0.9916
<b>2.4</b>	0.9918	0.9920	0.9922	0.9924	0.9927	0.9929	0.9931	0.9932	0.9934	0.9936
<b>2.5</b>	0.9938	0.9940	0.9941	0.9943	0.9945	0.9946	0.9948	0.9949	0.9951	0.9952
<b>2.6</b>	0.9953	0.9955	0.9956	0.9957	0.9958	0.9960	0.9961	0.9962	0.9963	0.9964
<b>2.7</b>	0.9965	0.9966	0.9967	0.9968	0.9969	0.9970	0.9971	0.9972	0.9973	0.9974
<b>2.8</b>	0.9974	0.9975	0.9976	0.9977	0.9977	0.9978	0.9979	0.9979	0.9980	0.9981
<b>2.9</b>	0.9981	0.9982	0.9982	0.9983	0.9984	0.9984	0.9985	0.9985	0.9986	0.9986



Roll No.																				
----------	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

**PRESIDENCY UNIVERSITY  
BENGALURU**

**SCHOOL OF ENGINEERING**

**END TERM EXAMINATION**

**Winter Semester:** 2021-22

**Course Code:** MEC 106

**Course Name:** Project Management

**Program & Sem:** B.Tech. & VI Sem

**Date:** 1<sup>st</sup> July 2022

**Time:** 9:30 AM to 12:30 PM

**Max Marks:** 100

**Weightage:** 50%

**Instructions:**

- (vi) Read the question properly and answer accordingly.
- (vii) Use of normal distribution table is allowed.
- (viii) Use of graph sheets are permitted.

**Part A (Memory recall)**

**Answer ALL Questions. Each question carries SIX marks.  
(4Qx6M=24M)**

1. Classify the projects depending on various criteria.
2. Consider the following single machine sequencing problem.

Job	J <sub>1</sub>	J <sub>2</sub>	J <sub>3</sub>	J <sub>4</sub>	J <sub>5</sub>
Processing time	14	8	6	4	16

Obtain Optimal sequence by SPT rule, Completion time of all the jobs and mean flow time.

3. Draw the network diagram for the given activities.

Activity	A	B	C	D	E	F	G
Preceding activity	-	A	A	B	C	A	D, E, F

4. What are the stages of group development?

(CO NO 1, 2, 3, 4) [Knowledge

Level]



## Part B (Thought Provoking)

**Answer ALL Questions. Each question carries 12 marks  
(3Qx12M=36)**

5. The project delays happen when they take more time than what is estimated and it is called as time overrun. This phenomenon is also referred as white elephants, i.e., most of the government projects are time overrun. When projects are time overrun (i.e., delayed), cost overrun will be the result. Cost overrun happen when the projects consumer more resources than what is estimated. It is natural when the projects are delayed, more resources, in terms of material, money, manpower, will be required and thus, the cost overruns happen. With an example explain delay in projects and their causes.

(CO NO 1) [Comprehension Level]

6. The sequencing problem is very much common in Job workshops and Batch production shops. There will be number of jobs which are to be processed on a series of machine in a specified order depending on the physical changes required on the job. We can also see the same situation when number of critical patients waiting for treatment in a clinic, where number of patients are in queue, to be treated. Like this we may find number of situations in real world. Five jobs go first over machine I and then over machine II. The order of the completion of jobs has no significance. The table shows the machine times in hours for five jobs and the two machines.

Jobs	J <sub>1</sub>	J <sub>2</sub>	J <sub>3</sub>	J <sub>4</sub>	J <sub>5</sub>
M <sub>1</sub>	6	2	10	4	11
M <sub>2</sub>	3	7	8	9	5

Obtain the sequence for the jobs that minimizes the total elapsed time and also find the idle time of both the machines.

(CO NO 2) [Comprehension Level]

7. The main objective in the analysis through PERT is to find out the completion for a particular event within specified date. The PERT approach takes into account the uncertainties. The use of PERT chart gives project managers a tool to estimate the time and resources needed to complete their project tasks, which is crucial during the initiation and planning phases. A project is composed of 11 activities whose time estimates are listed below.
- Draw the network diagram and find the expected project completion time.
  - Calculate the variance and standard deviation for the project.

c) What is the probability of completing the project in 19 weeks?

Activities	Time in weeks		
	$t_o$	$t_m$	$t_p$
1-2	2	2	2
1-3	1	2	3
1-4	1	1	1
2-6	2	3	10
3-7	3	5	7
3-5	2	9	10
4-5	1	3	5
5-9	2	4	12
6-8	1	1	1
7-8	2	3	10
8-9	2	2	8

(CO NO 3) [Comprehension

Level]

### Part C (Problem Solving)

Answer ALL Questions. Each question carries TWENTY marks

(2Qx20M=40)

8. The critical path method (CPM) is a technique where you identify tasks that are necessary for project completion and determine scheduling flexibilities. A critical path in project management is the longest sequence of activities that must be finished on time in order for the entire project to be complete. It is an algorithm for planning, managing and analyzing the timing of a project. The step-by-step CPM system helps to identify critical and non-critical tasks from projects' start to completion and prevents temporary risks. A small marketing project consists of jobs in the table given below. Using CPM method, determine the critical path, early times, late times and float for all the activities.

Job	Time duration (days)
1-2	9
1-3	5
2-4	6
3-4	6
3-5	2
2-6	6
4-6	9
5-6	2

Level]

9. Graphical method is applicable to solve the problems involving 2 jobs to be processed on 'm' machines in the given order of machining for each job. We have to lay out the jobs in the order of machining showing the processing times. Using the graphical method, calculate the minimum time needed to process job 1 and job 2 on five machines A, B, C, D and E, that is, for each machine find the job which should be done first. Also calculate the total time needed to complete both jobs. The machining order for job 1 is ABCDE and the order of machining for job 2 is BCADE respectively for processing.

Job 1	Sequence	A	B	C	D	E
	Time in hrs.	3	4	2	6	2
Job 2	Sequence	B	C	A	D	E
	Time in hrs.	5	4	3	2	6

(CO NO 2) [Comprehension

Level]

**Normal Distribution Table for positive value of Z**

Z	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	0.5000	0.5040	0.5080	0.5120	0.5160	0.5199	0.5239	0.5279	0.5319	0.5359
0.1	0.5398	0.5438	0.5478	0.5517	0.5557	0.5596	0.5636	0.5675	0.5714	0.5753
0.2	0.5793	0.5832	0.5871	0.5910	0.5948	0.5987	0.6026	0.6064	0.6103	0.6141
0.3	0.6179	0.6217	0.6255	0.6293	0.6331	0.6368	0.6406	0.6443	0.6480	0.6517
0.4	0.6554	0.6591	0.6628	0.6664	0.6700	0.6736	0.6772	0.6808	0.6844	0.6879
0.5	0.6915	0.6950	0.6985	0.7019	0.7054	0.7088	0.7123	0.7157	0.7190	0.7224
0.6	0.7257	0.7291	0.7324	0.7357	0.7389	0.7422	0.7454	0.7486	0.7517	0.7549
0.7	0.7580	0.7611	0.7642	0.7673	0.7704	0.7734	0.7764	0.7794	0.7823	0.7852
0.8	0.7881	0.7910	0.7939	0.7967	0.7995	0.8023	0.8051	0.8078	0.8106	0.8133
0.9	0.8159	0.8186	0.8212	0.8238	0.8264	0.8289	0.8315	0.8340	0.8365	0.8389
1.0	0.8413	0.8438	0.8461	0.8485	0.8508	0.8531	0.8554	0.8577	0.8599	0.8621
1.1	0.8643	0.8665	0.8686	0.8708	0.8729	0.8749	0.8770	0.8790	0.8810	0.8830
1.2	0.8849	0.8869	0.8888	0.8907	0.8925	0.8944	0.8962	0.8980	0.8997	0.9015
1.3	0.9032	0.9049	0.9066	0.9082	0.9099	0.9115	0.9131	0.9147	0.9162	0.9177
1.4	0.9192	0.9207	0.9222	0.9236	0.9251	0.9265	0.9279	0.9292	0.9306	0.9319
1.5	0.9332	0.9345	0.9357	0.9370	0.9382	0.9394	0.9406	0.9418	0.9429	0.9441
1.6	0.9452	0.9463	0.9474	0.9484	0.9495	0.9505	0.9515	0.9525	0.9535	0.9545
1.7	0.9554	0.9564	0.9573	0.9582	0.9591	0.9599	0.9608	0.9616	0.9625	0.9633
1.8	0.9641	0.9649	0.9656	0.9664	0.9671	0.9678	0.9686	0.9693	0.9699	0.9706
1.9	0.9713	0.9719	0.9726	0.9732	0.9738	0.9744	0.9750	0.9756	0.9761	0.9767
2.0	0.9772	0.9778	0.9783	0.9788	0.9793	0.9798	0.9803	0.9808	0.9812	0.9817
2.1	0.9821	0.9826	0.9830	0.9834	0.9838	0.9842	0.9846	0.9850	0.9854	0.9857
2.2	0.9861	0.9864	0.9868	0.9871	0.9875	0.9878	0.9881	0.9884	0.9887	0.9890
2.3	0.9893	0.9896	0.9898	0.9901	0.9904	0.9906	0.9909	0.9911	0.9913	0.9916
2.4	0.9918	0.9920	0.9922	0.9924	0.9927	0.9929	0.9931	0.9932	0.9934	0.9936
2.5	0.9938	0.9940	0.9941	0.9943	0.9945	0.9946	0.9948	0.9949	0.9951	0.9952
2.6	0.9953	0.9955	0.9956	0.9957	0.9958	0.9960	0.9961	0.9962	0.9963	0.9964
2.7	0.9965	0.9966	0.9967	0.9968	0.9969	0.9970	0.9971	0.9972	0.9973	0.9974
2.8	0.9974	0.9975	0.9976	0.9977	0.9977	0.9978	0.9979	0.9979	0.9980	0.9981
2.9	0.9981	0.9982	0.9982	0.9983	0.9984	0.9984	0.9985	0.9985	0.9986	0.9986

