M.E. PRODUCTION ENGINEERING FIRST YEAR SECOND SEMESTER – 2024

MANAGEMENT AND CONTROL OF PROJECTS (PM)

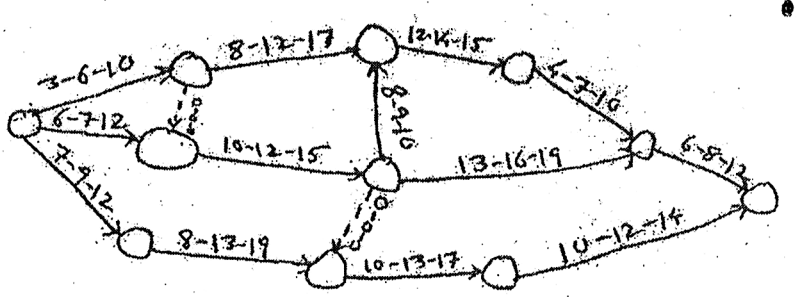
Time: 3 Hrs. Full Marks:100

Use separate Answer Script for each part.

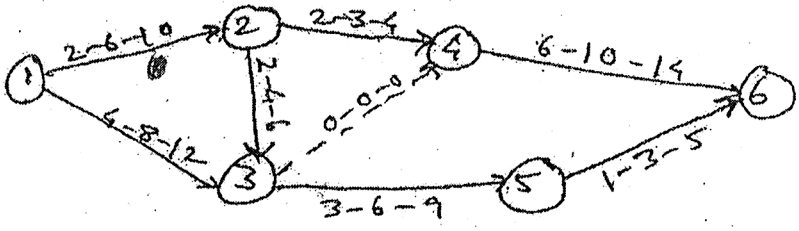
PART –I (40 Mks.)

Ans. **any 2** Q-s.

1. a) For the network shown below, number the events according to Fulkerson's rule & calculate the variance & the expected time. 6



b) For the network shown below, calculate the probability of completion in 22 days.



(The Normal Distribution Function has been supplied with the QP) 8

c)Suppose the Prod. Engg. Dept., JU, is to conduct the M.Prod. E. Admission Test on 1 June, 2025. The number applicants forced the dept. (suppose), to conduct the test in different centres. Represent on Gantt Charts the following project. The activities & their duration are indicated below: 6

Design question pattern	7 days
Ask the faculties to submit questions in their areas of interest	7 days
Print QP	2 days
Distribute to various centres	4 days

[Turn over

Asking the faculties to submit solutions of their Q-s 2 days
Collect answer books at the main office 4 days
Evaluate the answer script 2 days
Preparation of merit list & publication of results 2 days.

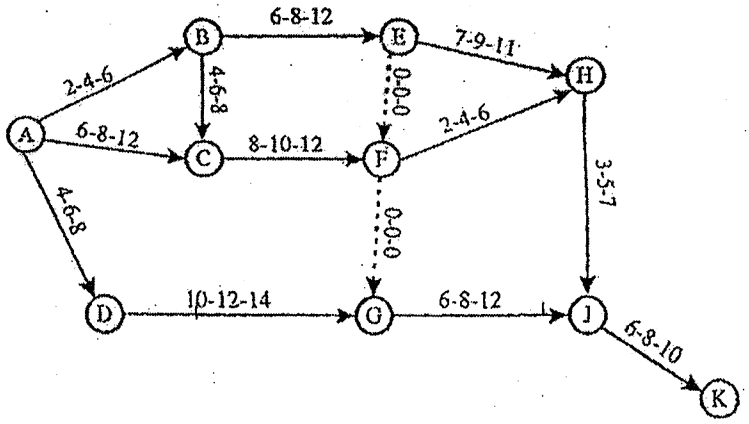
2. a) The following information applies to a particular project:
Event 0 is the initial event. Event 10 is preceded by event 0. Event 30 is preceded by event 10. Event 40 is preceded by event 10. Event 20 is preceded by event 10. Event 30 is preceded by events 20 & 10. Event 40 is preceded by events 30 & 10. Event 50 is preceded by event 40. Draw the arrow diagram for the project. 6

b) For the various activities in the project stated in Q2 (a), the expected times are:

Activity	Duration (days)	Activity	Duration (days)
0-10	3	10-40	10
10-30	16	30-40	5
10-20	6	40-50	3
20-30	8		

If the scheduled completion date is equal to the earliest expected time T_E for the end event, calculate the slack time for each event & identify the critical path. 6

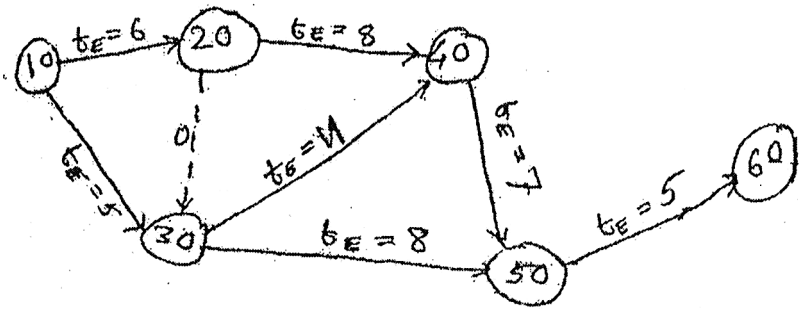
c) The three time estimates are indicated along the activity arrows for the project shown below. Calculate, (i) the expected or the average time t_E& the variance for each activity, (ii) the earliest expected time & (iii) the latest allowable occurrence time for each event. 8



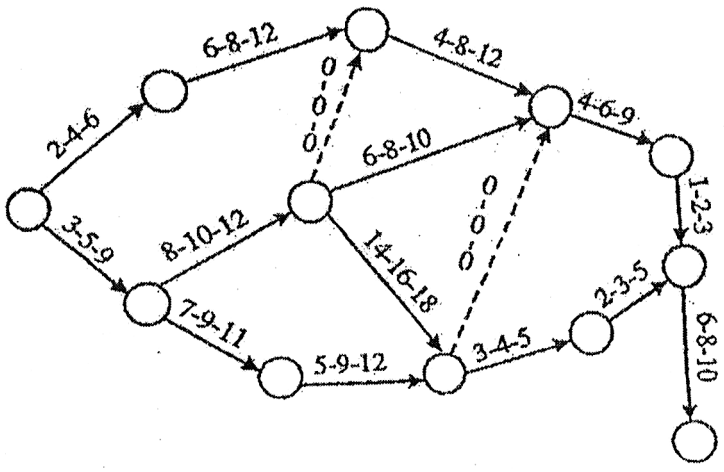
3. a) For the project represented by the following network, the value of the expected time for each activity is shown along the arrows.

i) If the scheduled completion time is 30 hrs., determine the slack time for each event & identify the critical path. Enter values in tabular form.

ii) Identify the sub-critical path/paths. 10



b) The 3 time estimates are indicated along the activity arrows for the project shown in the following fig. Calculate, i) the expected or the average time t_E& the variance for each activity, ii) the earliest expected time & iii) the latest allowable occurrence time for each event. Make the entries in a tabular form. Also enter the last 2 values against the respective event circles. Before starting the problem, number the events in the network, according to Fulkerson's rule in steps of 10. The start event is to be numbered 10. 10



The relevant portion of the

Normal Distribution Function

Normal deviate (+)	Probability (%)	Normal deviate (+)	Probability (%)
0	50.0	0	50.0
−0.1	46.0	+0.1	54.0
−0.2	42.1	+0.2	57.9
−0.3	38.2	+0.3	61.8
−0.4	34.5	+0.4	65.5
−0.5	30.8	+0.5	69.2
−0.6	27.4	+0.6	72.6
−0.7	24.2	+0.7	75.8
−0.8	21.2	+0.8	78.8
−0.9	18.4	+0.9	81.6
−1.0	15.9	+1.0	84.1
−1.1	13.6	+1.1	86.4
−1.2	11.5	+1.2	88.5
−1.3	9.7	+1.3	90.3
−1.4	8.1	+1.4	91.9
−1.5	6.7	+1.5	93.3
−1.6	5.5	+1.6	94.5
−1.7	4.5	+1.7	95.5
−1.8	3.6	+1.8	96.4
−1.9	2.9	+1.9	97.1
−2.0	2.3	+2.0	97.7
−2.1	1.8	+2.1	98.2
−2.2	1.4	+2.2	98.6
−2.3	1.1	+2.3	98.9
−2.4	0.8	+2.4	99.2
−2.5	0.6	+2.5	99.4
−2.6	0.5	+2.6	99.5
−2.7	0.3	+2.7	99.7
−2.8	0.3	+2.8	99.7

Ref. No. **Ex/PG/ProdE/T/128B/2024**

M.E. PRODUCTION ENGINEERING, FIRST YEAR
SECOND SEMESTER EXAM 2024
SUBJECT: MANAGEMENT AND CONTROL OF PROJECTS

Time : Three hours **Full Marks 100**

Use a Separate Answer Script For Each Part

PART II (60 Marks)

(Answer any Three Question)

4. a) Identify suitable location in India, stating various deciding factors to be considered for the evaluation of the plant site of the following type of industries. **10**
   i) Plywood Industries;
   ii) Lather Industries;
   iii) Toy manufacturing Industries
   iv) Food Processing Industries;

   b) A Nuclear Power plant location has to be selected from three probable sites as listed below. The comparative rating of major factors influencing the site selection process are as shown in table below: **10**

Rating / Site	Labour	Power	Water	Climatic Condi-tion	Transp-ortation	Zoning Regula-tion	Commu-nity Facility	Pollution Control measure
A	6	5	8	6	5	4	5	7
B	4	5	7	4	7	6	8	5
C	5	4	9	8	6	2	8	4

5. A Company is considering the following investment projects: **20**

Cash Folows (Rs.)						
Projects	C_0	$C_{1st\ Year}$	$C_{2nd\ Year}$	$C_{3rd\ Year}$	$C_{4th\ Year}$	$C_{5th\ Year}$
A	-70,000	+10,000	+20,000	+30,000	+45,000	+50,000
B	-70,000	+50,000	+40,000	+20,000	+20,000	+10,000

Rank the projects according to each of the following methods and explain:

1. Payback; **2.** IRR and **3.** NPV – assuming discount rate of 10%.

6. a) Explain the different types of forms of project Organisation **8**

   b) How the Performance Analysis helps to controls Projects **5**

   c) What do you mean by Project Control? What are the general reasons for Ineffective Control? **7**

7. a) Advantages and limitations of product and process layout **12**

   b) Explain Activity Relationship Analysis briefly along with Relationship diagram and chart. **8**