CVL 772		Construction Project Management	MINOR EXAMINATION	
Time allowed	1 HOUR 13:00-14:00		Maximum Marks	50
Venue	LH-510		Date	26.09.2022

ASSUME MISSING DATA SUITABLY IF REQUIRED.

Q 1. (20 marks)

A construction company has been awarded a contract to construct a flyover in a city with a completion period of 18 months. The major activities in the project and the relationships among them, the normal and crash durations, and the corresponding normal and crash costs are given in the following Table.

Table: Data for Question 1

Activity	Predecessor	Duration (months)		Cost (Rs.)	
A	-	6	4	24,000	34,000
B	-	4	3	12,000	22,000
C	A	5	3	20,000	28,000
D	A	7	4	29,000	47,000
E	B	6	5	26,000	34,000
F	B	8	5	34,000	52,000
G	C,E	10	6	27,000	47,000
H	D,F	9	7	34,000	48,000

(i) If the project attracts a penalty of Rs 10,000 per month for project completion beyond 18 months, find out the total project cost including penalty if the company does not 'crash' any activity.

(ii) Which of the activities should be crashed first in order to reduce the penalty payable and reduce the total cost?

Q 2. (15 marks)

You have been given the following schedule information: There are seven activities to be done over the next year. The minimum duration of these activities is 1 month.

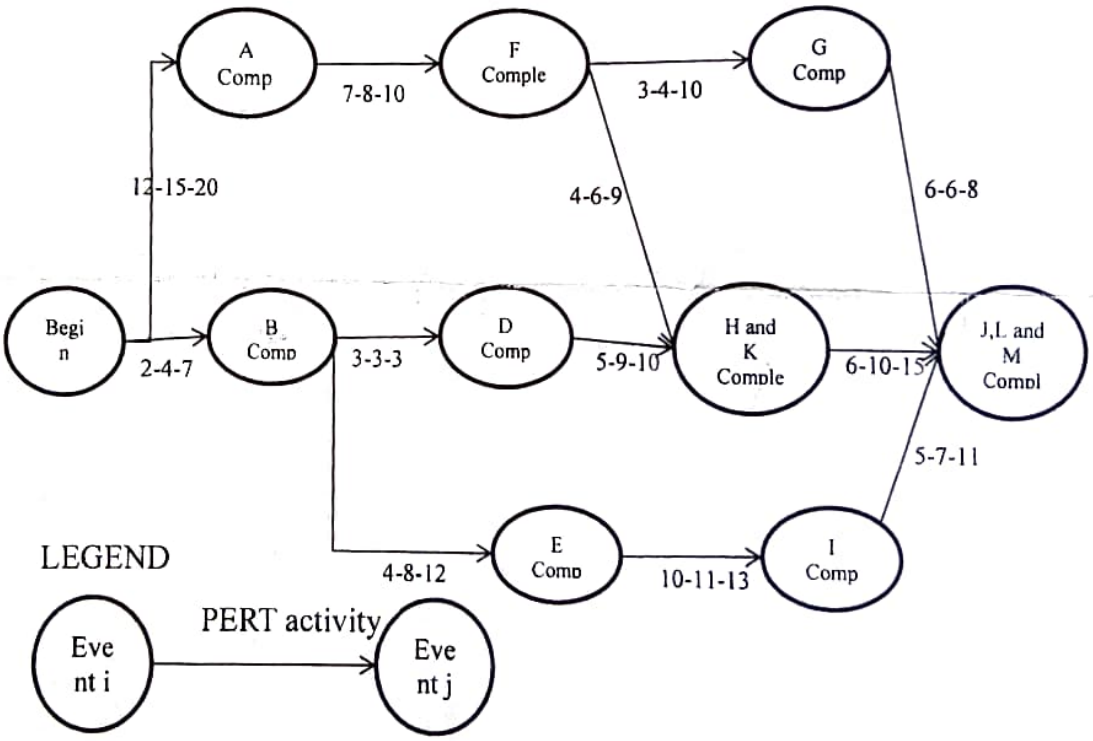
Activity	Duration (month)	Cost: $ x 1,000	Follower(s)
A	2	50	B and C after 1 month of A is complete
B	1	20	None
C	4	120	D after 1 month of C
D	3	90	E after 1 month of D
E	2	50	F when E is finished
F	4	40	G when F is finished
G	2	40	None

The ABC project, as this is known, must be presented first as an AOA network, then in a bar chart format. Give each activity an identity I.D. The period cost (cost/month) should be tabulated beneath the bar chart, as should the cumulative cost. Then a histogram and an s-curve should be drawn of these costs, using dollars. Answer the following questions:

a. When is the project 50% complete by resource ($)?
b. What is the status of the project activities when the project is 50% complete by time?
c. In what month is the largest expenditure of dollars and what is its value in dollars?

Q 3. (15 marks)

1. Using the following diagram,
   a. Calculate the project mean duration, T_e.
   b. Find the critical path.
   c. Find the probability of completing the project in 38.0 days or less.

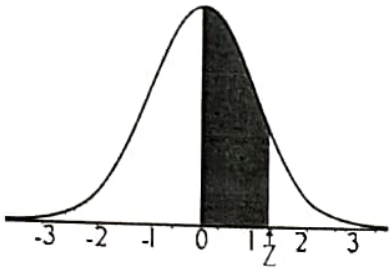


Optimistic-most likely-pessimistic duration

35.163

Appendix 6.1

STANDARD NORMAL DISTRIBUTION



The following table can be used to find the area under the curve from the central line to any Z-value up to 3. To determine the area under the curve between 0 and 1.35, start at the row for 1.3, and read along until 1.35. The value corresponding to Z = 1.35 is 0.4115.

	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	0.0000	0.0040	0.0080	0.0120	0.0160	0.0199	0.0239	0.0279	0.0319	0.0359
0.1	0.0398	0.0438	0.0478	0.0517	0.0557	0.0596	0.0636	0.0675	0.0714	0.0753
0.2	0.0793	0.0832	0.0871	0.0910	0.0948	0.0987	0.1026	0.1064	0.1103	0.1141
0.3	0.1179	0.1217	0.1255	0.1293	0.1331	0.1368	0.1406	0.1443	0.1480	0.1517
0.4	0.1554	0.1591	0.1628	0.1664	0.1700	0.1736	0.1772	0.1808	0.1844	0.1879
0.5	0.1915	0.1950	0.1985	0.2019	0.2054	0.2088	0.2123	0.2157	0.2190	0.2224
0.6	0.2257	0.2291	0.2324	0.2357	0.2389	0.2422	0.2454	0.2486	0.2517	0.2549
0.7	0.2580	0.2611	0.2642	0.2673	0.2704	0.2734	0.2764	0.2794	0.2823	0.2852
0.8	0.2881	0.2910	0.2939	0.2967	0.2995	0.3023	0.3051	0.3078	0.3106	0.3133
0.9	0.3159	0.3186	0.3212	0.3238	0.3264	0.3289	0.3315	0.3340	0.3365	0.3389
1.0	0.3413	0.3438	0.3461	0.3485	0.3508	0.3531	0.3554	0.3577	0.3599	0.3621
1.1	0.3643	0.3665	0.3686	0.3708	0.3729	0.3749	0.3770	0.3790	0.3810	0.3830
1.2	0.3849	0.3869	0.3888	0.3907	0.3925	0.3944	0.3962	0.3980	0.3997	0.4015
1.3	0.4032	0.4049	0.4066	0.4082	0.4099	0.4115	0.4131	0.4147	0.4162	0.4177
1.4	0.4192	0.4207	0.4222	0.4236	0.4251	0.4265	0.4279	0.4292	0.4306	0.4319
1.5	0.4332	0.4345	0.4357	0.4370	0.4382	0.4394	0.4406	0.4418	0.4429	0.4441
1.6	0.4452	0.4463	0.4474	0.4484	0.4495	0.4505	0.4515	0.4525	0.4535	0.4545
1.7	0.4554	0.4564	0.4573	0.4582	0.4591	0.4599	0.4608	0.4616	0.4625	0.4633
1.8	0.4641	0.4649	0.4656	0.4664	0.4671	0.4678	0.4686	0.4693	0.4699	0.4706
1.9	0.4713	0.4719	0.4726	0.4732	0.4738	0.4744	0.4750	0.4756	0.4761	0.4767
2.0	0.4772	0.4778	0.4783	0.4788	0.4793	0.4798	0.4803	0.4808	0.4812	0.4817
2.1	0.4821	0.4826	0.4830	0.4834	0.4838	0.4842	0.4846	0.4850	0.4854	0.4857
2.2	0.4861	0.4864	0.4868	0.4871	0.4875	0.4878	0.4881	0.4884	0.4887	0.4890
2.3	0.4893	0.4896	0.4898	0.4901	0.4904	0.4906	0.4909	0.4911	0.4913	0.4916
2.4	0.4918	0.4920	0.4922	0.4925	0.4927	0.4929	0.4931	0.4932	0.4934	0.4936
2.5	0.4938	0.4940	0.4941	0.4943	0.4945	0.4946	0.4948	0.4949	0.4951	0.4952
2.6	0.4953	0.4955	0.4956	0.4957	0.4959	0.4960	0.4961	0.4962	0.4963	0.4964
2.7	0.4965	0.4966	0.4967	0.4968	0.4969	0.4970	0.4971	0.4972	0.4973	0.4974
2.8	0.4974	0.4975	0.4976	0.4977	0.4977	0.4978	0.4979	0.4979	0.4980	0.4981
2.9	0.4981	0.4982	0.4982	0.4983	0.4984	0.4984	0.4985	0.4985	0.4986	0.4986
3.0	0.4987	0.4987	0.4987	0.4988	0.4988	0.4989	0.4989	0.4989	0.4990	0.4990