

**Birla Institute of Technology & Science, Pilani**

**First Semester 2022-2023**

**Comprehensive Examination (Regular)**

Course No. : MPBA G 526  
Course Title : IT PROJECT MANAGEMENT  
Nature of Exam : **Open Book**  
Weightage : (40 Max Marks)  
Duration : 3.0 Hours  
Date of Exam : 30/12/22 (AN)

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Note:

1. Please follow all the *Instructions to Candidates* given on the cover page of the answer book.
  2. All parts of a question should be answered consecutively. Each answer should start from a fresh page.
  3. Mobile phones and computers of any kind should not be brought inside the examination hall.
  4. Use of any unfair means will result in severe disciplinary action.
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**Q.1** Use the following data and draw the time cost graph and show the optimal project duration.  
**(10)**

Activity	Normal Time (weeks)	Crash Time (weeks)	Normal Cost	Crash Cost	Total Allowable Crash Time (weeks)	Crash Cost per Week
1 → 2	12	7	\$ 3,000	\$ 5,000	5	\$ 400
2 → 3	8	5	2,000	3,500	3	500
2 → 4	4	3	4,000	7,000	1	3,000
3 → 4	0	0	0	0	0	0
4 → 5	4	1	500	1,100	3	200
4 → 6	12	9	50,000	71,000	3	7,000
5 → 6	4	1	500	1,100	3	200
6 → 7	4	3	<u>15,000</u>	<u>22,000</u>	1	7,000
			\$75,000	\$110,700		

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**Q.2** You have to prepare the following schedule for a project in which the key resources is a tractor. There are three tractors available to the project. Activity A and D require one tractor while activity B, C, E and F require 2 tractors.

Precedence relationship and time for each activity is given. that follows

Activity	Relationship	Normal Time
A	-	4
B	-	5
C	A	4
D	A, B	5
E	B	3
F	C, D, E	2

Develop a resource-constrained schedule in the loading chart. Use the parallel method and heuristic given. Be sure to update each period. Record the ES, LS , LF , EF and slack for the new schedule.

**[10 Marks]**

**Q.3** Case : Calcutta's Metro

In 1996, Calcutta's long-awaited metro finally opened to a collective sigh of relief from the long – suffering population of this large Indian city. Critics had long derided the project as one of the “Slowest-Moving” public works projects ever conceived and implemented. The single route line, comprising 17 stations and slightly more than 10 total miles of track, had taken 23 years from the date it was first approved at a final estimated cost of almost \$5 billion. To put this figure into perspective, New York City's subway system boasts 656 miles of mainline track and 468 stations, all for a city whose population is significantly less that Calcutta's estimated 11 million residents, Calcutta's Metro project represents a textbook example of the problem that can arise from poor planning.

The project was initially hampered by poor funding that slowed the development process. However, it was during project planning that a number of constraints became apparent that were to negatively impact on the project. For example, one factor that impeded progress was the decision to begin construction right in the middle of the city. Rather than start at one of the two terminal points, the project managers elected to begin digging in the city center, first tunneling down and then in both directions simultaneously. The problems with soil removal and heavy equipment transportation rose dramatically as a result. Among the other factors that the Metro project had to work around were:

1. Exclusive possession of the site was not possible. Normal life in the city had to go on as usual. While this is a normal by product of most metropolitan construction, in a city the size and congestion of Calcutta, with an inadequate road system to begin with, there was a

constant battle between maintaining normal traffic flows and creating enough buffers to allow for Metro construction.

2. Traffic could not be fully diverted from the roads. The road system was almost completely inadequate to start. It was, therefore, impossible to divert traffic from already dreadfully overcrowded thoroughfares.
3. Uncharted utilities (sewer, water, gas mains, phone, electric cables). By far one to the worst features of construction was the near total absence of a master plan showing the location of underground utilities and cable lines. Work was continually started, stopped, and gradually restarted as crews hit underground lines and had to call for repair crews and await their repairs to the infrastructure.
4. Shops around the site had to be provided with view and approach. Local shop owners were justifiably worried about the effect on their commerce of closing off access to their shops while construction went on. They actively worked against Metro development until they were individually provided with access lanes from their shops to the still –operating streets.

Another unforeseen problem resulted from the large bureaucracy that sprang up around the Metro’s construction. Utilizing thousands of laborers, the project organization led to the creation of a huge social umbrella for employees and their families, as housing, schools, and medical centers were created and subsidized by the Metro Authority for the life of the project. In fact, one critic argued that it was wishful thinking to assume that worker would be motivated to quickly complete a project the provided such a comprehensive set of benefits for them and their families!

**5 (a)** Assume that you are mayor of Calcutta soliciting bids for the construction of the Metro. How would you construct a Statement of work for the project to encourage efficient and creative means for undertaking this project? **[5 Marks]**

**5 (b)** How much of the problems the Metro project faced were the result of a poorly conceived project scope and how much was due to simple bad luck? Defend your position. **[5 Marks]**

**Q.4 (a)** Using the following data, calculate the planned and actual monthly budgets through the end of June. Assume the project is planned for a 12-month duration and \$250,000 budget. **(5)**

Activity	Jan	Feb	Mar	Apr	May	Jun	Plan	% C	Value
Staffing	8	7					15	100	_____
Blueprinting		4	6				10	100	_____
Prototype Development			2	8			10	70	_____
Full Design				3	8	10	21	67	_____
Construction					2	30	32	25	_____

Transfer 10 10 0 \_\_\_\_\_

Monthly Plan \_\_\_\_\_

Cumulative \_\_\_\_\_

Monthly Actual 10 15 6 14 9 40

Cumul. Actual \_\_\_\_\_

**Q.4 (b)** Using the data from above, calculate the following values: **(5)**

**Schedule Variances**

Planned Value of Work Scheduled (PV) \_\_\_\_\_

Earned Value (EV) \_\_\_\_\_

Schedule Performance Index (SPI) \_\_\_\_\_

Estimated Time to Completion \_\_\_\_\_

**Cost Variances**

Actual Cost of Work Performed (AC) \_\_\_\_\_

Earned Value (EV) \_\_\_\_\_

Cost Performance Index (CPI) \_\_\_\_\_

Estimated Cost to Completion \_\_\_\_\_