

M.E. MECHANICAL ENGINEERING FIRST YEAR FIRST SEMESTER – 2024**Subject: PROJECT MANAGEMENT****Time: 3 Hours****Full Marks: 100**Answer any five questions. All questions carry equal marks.

1. With respect to the Table as given below the home builder wants to finish the following project (i.e. a house) within 30 weeks. In this context, find out the extra cost needed to complete the house by this time. [20]

Table: Normal Activity and Crash Data

Activity	Normal Time (Weeks)	Crash Time (Weeks)	Normal Cost (Rs)	Crash Time (Rs)
1-2	12	7	3000	5000
2-3	8	5	2000	3500
2-4	4	3	4000	7000
4-5	4	1	500	1100
4-6	12	9	50,000	71,000
5-6	4	1	500	1100
6-7	4	3	15,000	22,000

2. (a) Explain the four levels of project success.
 (b) How is Gantt chart used in the project management?
 (c) Discuss five steps of project management process. [6+4+10]
3. (a) How general management is different from project management?
 (b) Discuss 5-C model of project environment. [10+10]
4. (a) Explain MODeST.
 (b) What are the elements of scope management of a project?
 (c) Discuss ICOMs related to process of project planning?
 (d) Apply **Stage-gate model** of a mechanical project. [5+5+5+5]
5. (a) How do you manage constraints in a project?
 (b) What is the relationship between Quality Management and project management?

[Turn over

(c) Write an explanatory note on QFD.

[6+6+8]

6. (a) A project is expected to have the following cash flows:

Year	Cash Flow (in Thousands)
0	(1900)
1	300
2	500
3	600
4	800
5	500

What is the expected payback period?

- (b) Storm Co is evaluating Project X, which requires an initial investment of Rs 50,000. Expected net cash flows is Rs 20,000 per year for four years at today's price. However, the same is expected to rise by 5.5 % per year because of inflation. The cost of capital is 15%. Find the NPV by discounting cash flows.

- (c) What is annuity? Prove the following relationship for annuity factor. Notations have their usual meanings.

$$AF = \frac{1 - (1 + r)^{-n}}{r}$$

- (d) Define NPV. State conditions of NPV to select a project.

[5+5+5+5]

7. (a) What are differences between current and non-current assets?

- (b) A firm has decided to acquire a new machine to neutralise the toxic waste produced by its refining plant. The machine would cost Rs 6.4 million and would have an economic life of five years.

Capital allowances (CAs) of 25% pa on a reducing balance basis are available for the investment.

Taxation of 30% is payable on operating cash flows, one year in arrears.

The firm intends to finance the new plant by means of a five year fixed interest loan at a pre-tax cost of 11.4% pa, principal repayable in five years' time.

As an alternative a leasing company has proposed a finance lease over five years at Rs 1.42 million pa payable in advance.

Scrap value of the machine under each financing alternative will be zero.

Evaluate the two options for acquiring the machine and advise the company on the best alternative.

[5+15]