



**TVET CURRICULUM DEVELOPMENT, ASSESSMENT AND CERTIFICATION
COUNCIL (TVET CDACC)**

Qualification Code : 071606T4MCT
Qualification : Mechatronics Technician Level 6
Unit Code : ENG/OS/MC/CR/07/6/A
Unit of Competency : Manage mechatronic projects

ASSESSORS GUIDE

INSTRUCTIONS TO CANDIDATE

1. You have **THREE** hours to answer all the questions.
2. Marks for each question are indicated in the brackets.
3. The paper consists of **TWO** sections: A and B.
4. Do not write on the question paper.
5. A separate answer booklet will be provided.

SECTION A [40 MARKS]

Answer all the questions in this section

1. What is a project? (2 Marks)

is defined as a sequence of tasks that must be completed to attain a certain outcome.

2. State why we do need project management? (3 Marks)

The importance of project management in organizations can't be overstated. When it's done right, it helps every part of the business run more smoothly. It allows your team to focus on the work that matters, free from the distractions caused by tasks going off track or budgets spinning out of control.

3. Describe the properties of NPV (4 Marks)

-Positive NPV. If NPV is positive then it means you're paying less than what the asset is worth.

-Negative NPV. If NPV is negative then it means that you're paying more than what the asset is worth.

- Zero NPV. If NPV is zero then it means you're paying exactly what the asset is worth

4. What are the human aspects of project management? (4 Marks)

- **Project sponsorship and leadership.**
- **The organization structure and culture.**
- **The project team**
- **Communication.**

5. Write down the major demands of a mechatronics project manager? (5 Marks)

- **acquiring adequate resources**
- **acquiring and motivating personnel**
- **dealing with obstacles**
- **making project goal trade-offs**
- **handling failure and the fear of failure**
- **maintaining the appropriate patterns of communication**

6. What is work schedule? What purpose does it serve? (4 Marks)

-It's simply the dates and times when a person is supposed to work. Because of the type of work you do, the holidays you take, or the laws in your state, or country — there are different types of work schedules

7. list the five-project life cycle. (5 Marks)
- Initiation – launching of the project it is named and a broad plan is identified
 - Planning - A roadmap that will guide teams from creating a project plan throughout the project’s execution and closure phases is developed comprehensively during the planning stage.
 - Execution - The project plan is implemented during the project execution phase. At this point, teams will work on the deliverable to ensure that the project meets the necessary requirements.
 - Monitoring and Controlling-The project monitoring and controlling phase happen at the same time as the execution phase. It’s the job of the project manager to oversee operations and make sure that everything is headed in the right direction, according to plan.
 - closing - The final phase of the project management life cycle known as the project closure phase isn’t as simple as delivering the output itself.
8. Discuss the tools & techniques of project management. (3 Marks)
- Work Breakdown Structure
 - Gantt Chart
 - Critical Path Method
 - Waterfall / Linear
 - Kanban.
9. List the five broad phases of capital budgeting. List the five broad phases of capital budgeting. (5 Marks)
- a) Market analysis,
 - b) Technical analysis,
 - c) Financial analysis,
 - d) Economic analysis,
 - e) Ecological analysis.
10. What do you understand by SWOT Analysis? Explain with the help of example. (5 marks).
- SWOT stands for Strengths, Weaknesses, Opportunities, and Threats.**
- Strengths and weaknesses are internal to your company—things that you have some control over and can change. Examples include who is on your team, your patents and intellectual property, and your location**

SECTION B (60 MARKS)

11. How will you prepare a project budget? What are the various budgets? (20 Marks)
- (a) Break down your project into tasks and milestones. **working with your task list will give you an understanding of what you'll need to accomplish and help you with project cost management. If you already have a task list, that's fine, and you can start right off. But if you don't, start creating a scope and writing down everything that your team needs to do.**
 - (b) Estimate each item in the task list. **Now it's time to give each item that you've written down an optimistic estimation. At this point, identify all the resources and materials you'll need to perform well and include them into your estimate when calculating the price.**
 - (c) Add your estimates together. **This is probably one of the easiest parts of the project budgeting process, especially if you have a spreadsheet with two columns: Tasks and Costs. Then, you'll be able to calculate the total fast.**
 - (d) Add contingency and taxes. **Better safe than sorry. Of course, you can't be 100% confident about the final estimate, as things change all the time. By adding contingency and taxes, you make sure that the project doesn't go over budget and your estimate number is closer to the final costs you eventually spend. If you don't know how much contingency to add, project management experts recommend going for 10% of the total.**
 - (e) Get approval. **Talking to your manager to approve project costs would be the last thing in the project budget creation process.**

Types of budgets

- i. **Deficit Budget- In case of a deficit budget, the estimate expenditure exceeds the estimated revenue of a government in a financial year. This kind of budget is helpful in times of economic recession and also in boosting employment rate.**
- ii. **Surplus Budget- In case of a surplus budget, the expected revenue surpasses the estimated expenditure in a financial year. This implies that a government's earnings from taxes are greater than the amount spent by a government on public welfare.**
- iii. **Balanced Budget- In case of a balanced budget, the estimate government expenditure shall be equal to its estimated revenue in a financial year. Many economists believe that a government's expenditure should not be higher than its revenue.**

12.

- a) What are the three components of cash flow? (20 marks)
- cash from operating activities
 - cash from investing activities
 - cash from financing activities
- b) What is meant by “Environment Impact Assessment”? What are the stages for Environment Impact Assessment? Explain.

EIA - a critical examination of the effects of a project on the environment. An EIA identifies both negative and positive impacts of any development activity or project, how it affects people, their property and the environment

stages

- a. **Screening** to determine which projects or developments require a full or partial impact assessment study;
- b. **Scoping** to identify which potential impacts are relevant to assess (based on legislative requirements, international conventions, expert knowledge and public involvement), to identify alternative solutions that avoid, mitigate or compensate adverse impacts on biodiversity (including the option of not proceeding with the development, finding alternative designs or sites which avoid the impacts, incorporating safeguards in the design of the project, or providing compensation for adverse impacts), and finally to derive terms of reference for the impact assessment;
- c. **Assessment and evaluation of impacts and development of alternatives**, to predict and identify the likely environmental impacts of a proposed project or development, including the detailed elaboration of alternatives;
- d. **Reporting the Environmental Impact Statement (EIS) or EIA report**, including an environmental management plan (EMP), and a non-technical summary for the general audience.
- e. **Review of the Environmental Impact Statement (EIS)**, based on the terms of reference (scoping) and public (including authority) participation.
- f. **Decision-making** on whether to approve the project or not, and under what conditions; and

- g. Monitoring, compliance, enforcement and environmental auditing. Monitor whether the predicted impacts and proposed mitigation measures occur as defined in the EMP. Verify the compliance of proponent with the EMP, to ensure that unpredicted impacts or failed mitigation measures are identified and addressed in a timely fashion.**

13. Explain the PERT Model and CPM Model

(20 Marks)

no	PERT	CPM
1	PERT is that technique of project management which is used to manage uncertain (i.e., time is not known) activities of any project.	CPM is that technique of project management which is used to manage only certain (i.e., time is known) activities of any project.
2	It is event-oriented technique which means that network is constructed on the basis of event.	It is activity oriented technique which means that network is constructed on the basis of activities.
3	It majorly focuses on time as meeting time target or estimation of percent completion is more important.	It majorly focuses on Time-cost trade off as minimizing cost is more important.
4	It is a probability model.	It is a deterministic model
5	It is appropriate for high precision time estimation.	It is appropriate for reasonable time estimation.
6	There is no chance of crashing as there is no certainty of time.	There may be crashing because of certain time boundation.
7	It is suitable for projects which required research and development.	It is suitable for construction projects.

14. Mechatronics being a combination of different fields at one point one will work with other members from other fields and form a team. List and explain the characteristics of a functional team. (20 Marks)

- i. Purpose-** In order to achieve anything with teamwork, each individual on the team must share the same goal. This is one of the reasons purpose-based work is so important. If everyone on the team shares the same ideals, then the team is far more likely to be successful.
- ii. Roles-** Every person on the team must fulfill a specific role, and every team member should have a clear understand of what his or her role requires. Team leaders should know what they need to do in order to lead, and employees should know what they are expected to contribute to the project.

- iii. Priorities-** Each team member needs to know which duties need to be fulfilled first in order for the project to be completed on time. This way, the most critical components of the project are finished when the team gets together.
- iv. Standards-** There should be a set quality standard for the project, and each member of the team should know how hard he or she has to work in order to deliver a high-quality end result. This helps ensure that no team member slacks off or overcompensates for anyone else.
- v. Decision-making-** In order to have a well-functioning team, someone should be able to make decisions, and the rest of the team members should execute these decisions. This helps makes sure that the team maintains a common goal. However, decision-makers need to be sure they are being effective leaders in order to keep the team functioning at a high level.
- vi. Clear communication and feedback-** Everyone on the team should be able to give and receive thoughtful, considerate feedback. Members should feel like they can ask one another for help without facing ridicule. Overall, team members should be able to learn from this project.
- vii. Effectiveness-** Teams need to work effectively in order to make sure that no one wastes time in unproductive discussions.
- viii. Personalities-** With so many different people coming together, it's easy for an individual to feel like their thoughts and ideas don't matter. A well-functioning team makes sure everyone gets an opportunity to share their ideas so nobody feels stifled.
- ix. Conflict resolution-** When multiple people come together on a project, butting heads is common. Trying to eliminate conflict altogether doesn't usually work, and ignoring the conflict often makes the problem even worse. The best teams know that the best way to deal with conflict is address the issue directly, quickly, and respectfully.
- x. Success-** In order to be successful as a team, everyone on the team must have the same understanding of what makes a project successful. If everyone is on the same page about what it takes to be successful, then no one will feel like the project is incomplete once the team stops working.