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 ASSESSOR:

1. The candidate has **THREE HOURS** to attempt all the questions.

2. Marks for each section are indicated in the brackets

3. The paper consists of **TWO** sections: **A** and **B.**

4. The candidate is required to attempt **ALL** questions from section **A** and **ANY THREE** questions from section **B.**

5. The candidate is provided with a separate answer booklet for their responses.

SECTION A [40 MARKS]

Answer all the questions in this section

1. list when a project is considered a success?   (3 Marks)

   i.   It meets business requirements

   ii. It delivered on schedule and on a budget

   iii. It delivers the expected value and ROI

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

   i.   When it's done right, it helps every part of the business run more smoothly.

   ii. 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.

   iii. Enables your employees to see how their work contributes to the company's strategic goals.

   iv. It empowers them to deliver results that actually impact the business's bottom line.

3. List the key features of "The age of project management"   (4 Marks)

   i.   Shortened market windows and product life cycles.

   ii. Rapid development of third-world and closed economies.

   iii. Increasingly complex and technical products.

   iv. Heightened international competition.

   v.   The environment of organizational resource scarcity

4. What are the human aspects of project management?   (3 Marks)

   i.   Project sponsorship and leadership.

   ii. The organization structure and culture.

   iii. The project teams.

   iv. Communication.

5. list characteristic of effective teams.   (5 Marks)

   i.   Positive interdependence

   ii. Individual and group accountability

   iii. Promote interaction

   iv. Teamwork skills

   v.   Group processing

6. List characteristics of a project (4 Marks)

    i. **A clear start and end date**

    ii. **A project creates something new**

    iii. **A project has boundaries**

    iv. **A project is not business as usual**

7. List skills necessary for effective project managers (5 Marks)

    i. **Planning**

    ii. **Organisation**

    iii. **leading**

    iv. **controlling**

    v. **Communication**

    vi. **Problem solving**

8. Describe a project management software (3 Marks)

Project management software assists employees, administrators, and teams with managing team goals and long-term projects, as well as coordinating individual tasks. Project management software accomplishes this through a range of tools to manage workloads, monitor productivity, and allocate resources. Task interdependence is a large component of project management software as it is largely used to coordinate assignments that are related to a sequence of tasks or a larger project. Users leverage the software to track multiple projects, track a team's or individual's progress, and analyse team productivity.

9. List the five broad phases of capital budgeting. (5 Marks)

    -Market analysis,

    -Technical analysis,

    -Financial analysis,

    -Economic analysis,

    -Ecological analysis.

10. List five methods of making decisions. (5 Marks).

    -Decision by authority without discussion

    -Expert member to make decisions

    - Average of members opinion

    -Decsion by authority after discussion

    -Minority control

SECTION B (60 MARKS)

(Answer any THREE (3) questions in this section)

11. State and describe different types of project management (20 Marks)

i. **Traditional project management: refers to the management and coordination of project deliverables completed by a geographically distributed team, often without in-person interactions. The goal is to deliver the end project within the specified requirements. A remote project manager's role is to oversee each of these types of teams. They are responsible for delegating assignments across the team, perhaps for employees with whom they have never interacted in person. They should be able to deftly handle the cloud-based project management tools the team uses and keep projects within budget. And, perhaps most important, the remote project manager needs to have excellent communication skills to ensure the project moves forward on time and everyone on the team pulls their weight.**

ii. **Agile project management: Agile project management is an iterative approach to delivering a project throughout its life cycle. Iterative or agile life cycles are composed of several iterations or incremental steps towards the completion of a project. Iterative approaches are frequently used in software development projects to promote velocity and adaptability since the benefit of iteration is that you can adjust as you go along rather than following a linear path. One of the aims of an agile or iterative approach is to release benefits throughout the process rather than only at the end. At the core, agile projects should exhibit central values and behaviors of trust, flexibility, empowerment and collaboration.**

iii. **Remote projects: involves making sure projects run smoothly and get completed on time and budget, all while managing a remote team. It can be hard. Communication and motivation are major concerns for remote companies, and both of these things are crucial for good project management. Remote project management is usually used by distributed teams that seldom meet in person. Handling freelance contributors is an example of a remote project. factors that can influence the success of a remote project include:**

- **Outlining clear processes for each person's role**
- **Ensuring deadlines are agreed upon and set in advance**
- **Finding a project management approach that empowers your team to get the job done on time and on budget**

iv. **Agency projects: Agency projects are outsourced to an agency that is likely to have projects with multiple clients. Marketing and design projects commonly outsourced to agencies. It is suggested that a greater outcome-basis of the contract between project manager and systems developers reduces goal conflict which in turn increases the likelihood of project success, and that project monitoring reduces privately held information which in turn increases the likelihood of that success.**

12. Every project operates within certain boundaries called constraints list and explain them.

(20 Marks)

Every project has to manage four basic constraints: scope, schedule, budget and quality. The success of a project depends on the skills and knowledge of the project manager to take into consideration all these constraints and develop the plans and processes to keep them in balance.

The Project Triangle
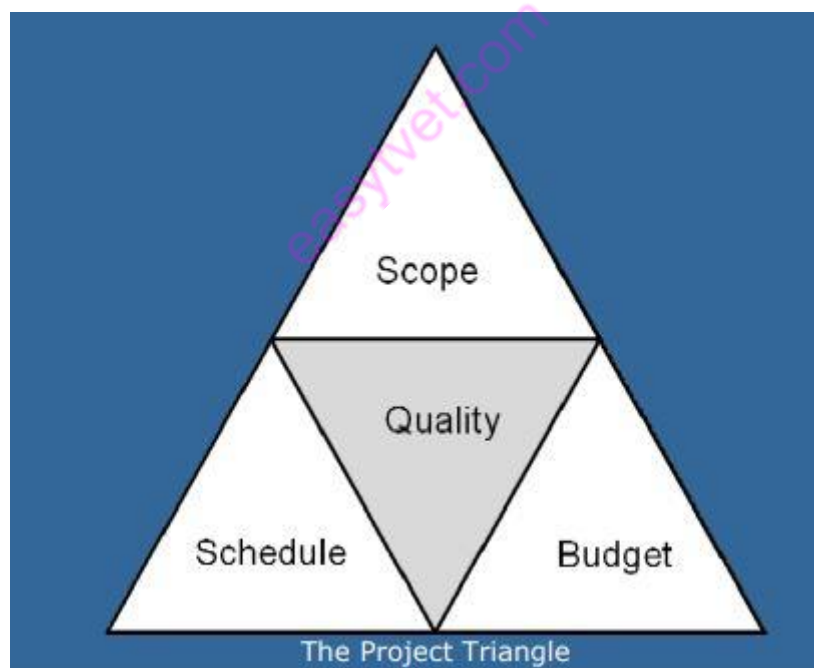
i. **Scope- it is what the project is trying to achieve, it entails all the work involved in delivering the project outcomes and the processes used to produce them; it is the reason and the purpose of the project. Scope is the boundary of a project, it is what the beneficiaries, and the donors expect from the project, nothing more, and nothing less.**

ii. **Schedule- it is defined as the time to complete the project. The schedule is often the most frequent project oversight in developing projects. This is reflected in missed deadlines, incomplete activities, and late donor reports. Proper control of schedule**

requires the careful identification of tasks to be performed, an accurate estimation of their durations, the sequence in which they are going to be done, and how people and other resources are allocated. Examples of schedule constraints are: Building a schoolhouse, the roof must be finished before the rainy season arrives or training farmers must be completed before the harvest season starts.

iii.   **Budget**- it is the costs approved for the project including all necessary expenses to deliver the project. Within development organizations, projects managers have to balance between not running out of money and not under spending because many projects receive funds or grants that have contract clauses with a 'use it or lose it' approach to project funds. Poorly executed budget plans can result in a last-minute rush to spend the allocated funds. For virtually all projects, the cost is ultimately a limiting constraint; few projects could go over budget without eventually requiring a corrective action.

iv.   **Quality**- it is defined as delivering the project outcomes according to the stated or implied needs and expectations of the project beneficiaries and the donor agency in order to meet stakeholder satisfaction. It also means complying with quality standards that are either mandated by the donor, local government (such as laws and regulations), or by professional standards (such as health). Quality is not necessarily a constraint but rather the result of achieving the project and managing the three constraints of scope, schedule and budget. It can be said that a project that meets these three aspects has meet 'the quality' or 'the needs of donors and beneficiaries.

13. Compare the PERT Model and CPM Model   (20 Marks)

no	14. PERT	15. 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.

15. List and explain the typical project cost categories. (20 Marks)

  i. **Human resources- Salary rates of full-time and temporary workers.**

 ii. **Training fees- Conferences, workshops, outside contractors.**

iii. **Material resources - All the items your team might need to perform the work, including software, equipment, or other unique materials.**

 iv. **Research expenses- Studies or data to support your project and deliver the best value.**

  v. **Traveling spending - Anyone who travels from one location to another to do project work (including budget for meals and lodging).**

 vi. **Sunk cost- These are costs that have already been incurred. They could be made up of any of the types of cost above but the point is that they have happened. The money has gone. These costs are often forgotten in business cases, but they are essential to know about.**

vii. **Fixed cost- Fixed costs are everything that is a one-off charge. These fees are not linked to how long your project goes on for. So, if you need to pay for one-time advertising to secure a specialist software engineer, or you are paying for a day of Agile consultancy to help you start the project up the best way, those are fixed costs.**

viii. **Indirect cost- These costs are not specifically linked to your project but are the cost of doing business overall. Examples are heating, lighting, office space rental (unless your**

project gets its own offices hired specially), stocking the communal coffee machine and so on.

ix. **Direct cost- Direct costs are those directly linked to doing the work of the project. For example, this could include hiring specialized contractors, buying software licenses or commissioning your new building.**

x. **Variable cost- These are the opposite of fixed costs - charges that change with the length of your project. It's more expensive to pay staff salaries over a 12-month project than a 6 month one. Machine hire over 8 weeks is more than for 3 weeks.**