

PNG UNIVERSITY OF TECHNOLOGY
DEPARTMENT OF CIVIL ENGINEERING – 4th YEAR DEGREE
SECOND SEMESTER EXAMINATIONS – 2021
CE 452 –ENGINEERING MANAGEMENT IV

DATE: 2ND OF NOVEMBER 2021
TIME ALLOWED: 3 HOURS
STARTING TIME: 8:20 AM
VENUE: SLT

INFORMATION FOR CANDIDATES:

1. WRITE YOUR NAME AND ID NUMBER CLEARLY ON THE FRONT PAGE.
2. You have 10 minutes to read the paper. You must not begin writing during this time.
3. All answers must be written on the answer booklet provided. No other written material will be accepted.
4. Calculator only is allowed in the examination room. Notes and handouts are not allowed. MOBILE PHONE is not allowed.
5. Limited use of Correction Fluid. You are not allowed to share it in the exam room.
6. There are three (3) Parts in this exam paper with a total of (100) marks.

Part 1: (32 Marks) is multiple choice type of examination. You are to select the best answer from the five (A,B,C,D and E) choices. One (1) mark each except Question 1.

Part 2: (48 Marks) Short Answer Questions & Applications. You are to define and/or explain definitions and terms.

Part 3: (20 Marks) is a Problem Solving and Calculation. Answer all questions for full marks. Show all Calculations

PART 1: MULTIPLE CHOICES (1 Mark each except Q 1 = 29 + 3 = 32 Marks)

1. The all-in labor cost of a welder (excluding a welding machine) is \$60 per hour. The welding machine rental cost is \$220 per hour. A welding crew is comprised of two (2) welders and one (1) welding machine. Assume each weld takes two (2) hours to complete. What is the cost of completing 20 welds? (3 Marks)

A) \$ 680
B) \$13,600
C) \$3,400
D) \$11,200

2. The process of incorporating changes and rescheduling or replanning is called

A) Resource levelling
B) Resource smoothing
C) Updating
D) Critical path scheduling

3. Slack time refers to

A) An activity
B) An event
C) Both event and activity
D) None of the above

4. In undertaking contracts larger than usual a company may wish to subcontract some work they would normally undertake themselves, the reason being _____.

A) To offset some of the financial risk
B) To work as partners
C) To increase their popularity
D) To maintain good relationships

5. The constraints in case of resource smoothing operation would be

- A) Resources
 - B) Project duration time
 - C) Both resources and project duration time
 - D) None of the above
- 6. Which part of the project life cycle stage does the “Go or Not- Go” recommendations made?**
- A) Planning and Design
 - B) Feasibility studies
 - C) Business case
 - D) Construction stage
 - E) Turnover and Start up
- 7. Beyond the use of resource aggregation, there are two approaches to assessing resources required. One of them is _____.**
- A) time-limited problem
 - B) budget limited problem
 - C) Activity limited problem
 - D) None of the above
- 8. Which one of the following illustrates why effective project management is beneficial to an Organisation?**
- A) It utilizes resources as and when required under direction of a project manager.
 - B) It advocates employing a consultancy firm which specializes in managing change.
 - C) It recommends using highly people in the project team.
 - D) It ensures that the chief executive is accountable for the achievement of the defined benefits.
 - E) None of the above
- 9. Which is a false statement regarding precedence diagrams?**
- A) Node represents the activity
 - B) No dummies needed
 - C) Link represents logical relationship

D) Arrow represents process

10. In Contract Documentation, What is one of the purposes of Specification?

- A) The drawings generally show what work is to be done whereas the specification defines how it is to be done
- B) It defines the specification of project delivery activities that are not properly scoped.
- C) It defines the construction works described in that design brief, completion of the detailed design, consistent with that design brief.
- D) The drawings defines what work is to be done whereas the specification generally show how it is to be done.
- E) None of the above

11. An idle construction equipment rental rate or standby rate is the cost of equipment that remains on site ready for use but is placed in standby basis. The standby rate includes:

- A) Some proportion of ownership costs but not operating labor or fuel or maintenance costs.
- B) Life cycle cost(ing).
- C) Long lead costs.
- D) All costs except the cost of capital.

12. When allocating resources to tasks, material shipment costs would come under the resource category _____.

- A) Material
- B) Labor
- C) Cost
- D) Demurrage

13. Which of the following does not represent an activity?

- A) Site located
- B) Foundation is being dug
- C) The office area is being cleaned

D) The invitations are being sent

14. The term “field cost” refers to

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- A) costs associated with Greenfield projects.
 - B) all work within battery limits.
 - C) the total associated with site work cost.
 - D) engineering and construction costs associated with the construction site rather than with the home office.

15. What is a risk and how can it be measured?

- A) Something happening that will impact on circumstances and can be measured in terms of risk analysis techniques.
- B) Probability of something happening that will impact on objective and can be measured in terms of consequences and likelihood.
- C) Change of something not happening that will impact on objective and can be measured in terms of likelihood and consequences.
- D) Probability of something happening that will have severe impact on our lives and property and can be measured in terms of risk management.
- E) None of the above.

16. Earliest finish of an activity is always

- A) greater than earliest event time of the following node
- B) less than earliest event time of the following node
- C) less than or equal to earliest event time of the following node
- D) greater than or equal to earliest event time of the following node

17. Which structure shows the link between activities in a project and the order of occurrence

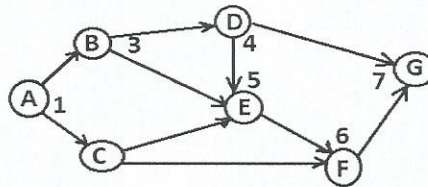
- A) Work Breakdown Structure
- B) Organizational Breakdown Structure
- C) Product Breakdown Structure
- D) Responsibility assignment structure
- E) Hierarchy Breakdown Structure

- 18. Which of the project schedule diagrams provides visual display of project schedule?**
- A) Milestone Chart
 - B) Gantt Chart
 - C) Bar Chart
 - D) Resources Chart
 - E) All of the above
- 19. Free float is mainly used to**
- A) identify the activities which can be delayed without affecting the total float of preceding activity
 - B) identify the activities, which can be delayed without affecting the total float of succeeding activity
 - C) establish priorities
 - D) identify the activities which can be delayed without affecting the total float of either the preceding or succeeding activities
- 20. In order to properly assess indirect costs, the estimator must:**
- A) Consult with the owner
 - B) Rely on past experience to recognize and record all indirect costs.
 - C) Conduct a pre-construction survey.
 - D) Check with an accountant
 - E) Check with previous employed estimator
- 21. _____ is a planning technique for repetitive work, the principles employed are taken from the planning and control of manufacturing processes.**
- A) Smoothing balance
 - B) Resource balance
 - C) Time balance
 - D) Line of balance
- 22. According to the different methods of cost estimation, 1 m² is a unit of building from the _____ method.**
- A) service unit method

- B) plinth Area method
- C) cubical Content Method
- D) approximate Quantity Method

23. With reference to the network shown below, which statement is correct?

- A) Events 3 and 4 occur after event 2
- B) Event 7 can occur after event 4
- C) Event 7 precedes event 6
- D) Event 5 follows event 3



24. If you have a task on the critical path and your time to complete your task has arrived, then it is recommended _____.

- A) that you drop everything else and work just on your task until it is complete
- B) that you make completion of the task a high priority
- C) that you acquire additional resources
- D) that you assess whether you can actually do the task by its due date first before doing anything else.

25. Resource smoothing is done purposely to _____.

- A) Reduce excessive peaks or troughs in the labour aggregation chart.
- B) Reduce excessive peaks or troughs in the material aggregation chart.
- C) Increase resources for balancing purposes.
- D) Decrease resources for balancing purpose.

26. An advantage for the client in tendering a project is;

- A) Obtaining the right contractor
- B) Obtaining the right price
- C) Being able to choose from a list of competitive bidders
- D) All of the above

27. Which of the following is an indirect cost of a concrete wall?

- A) Material
- B) Forming labor
- C) Supervisory labor
- D) Labor fringe benefits and taxes

28. Unit cost refers to

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- A) The cost of one unit where “unit” refers to a dwelling unit such as an apartment.
 - B) The cost of a given unit of a product or service.
 - C) The cost of labor, materials, equipment, and overhead, “united.”
 - D) The cost of one “unit” of labor.

29. The term “unit hours” refers to

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- A) Work hours per unit of production.
 - B) Hours “on the clock.”
 - C) Total crew hours expended toward completion of a direct item of work.
 - D) Overtime spent in completion of an item of work.

30. Why are standards important?

- A) Standard is another word for baseline.
- B) The process of quantity takeoff is standardized.
- C) The process of pricing is standardized.
- D) Standards promote consistent communication which aids in mutual understanding.

PART 2 – SHORT ANSWERS (48 Marks)

1. Briefly explain what the following terms mean and describe how it is applicable in Construction Projects Planning and Management, and Financing **(2 Marks each = 10 Marks)**
 - (i) Tender document
 - (ii) Schedule of Values
 - (iii) Meeting of the Minds
 - (iv) Tender security/ A bid Security
 - (v) Contingency Cost
2. List and explain the seven general steps of the tendering process of contracts with client-prepared contract documents and a bill of quantities **(7 Marks)**
3. What is a project Charter and what is the purpose of having a charter in place? **(5 Marks)**
4. List three (3) main Stakeholders of a Project involved in Project Planning, and explain how each are involved. **(6 Marks)**
5. What is a project network diagram, and what purpose does it serve? **(4 Marks)**
6. List the four (4) Risk Areas associated with Sub-contractors, and explain each of those Risk areas. **(8 Marks)**
7. List the four main areas around which cost estimation is revolved, and briefly explain each. **(8 Marks)**

PART 3 – APPLICATIONS AND CALCULATIONS (20 Marks)

Answer the following Questions. Show all calculations and answers must be given correctly with the correct units.

1. A design plan of a building is 15.0 m long and 6.0m wide. Total cost of building, inclusive of materials, fixtures, white goods, etc is K80,000.00. Construction cost is K40,000.00. What is the Unit Cost for the building, when following input are made.
(a) Overheads = 15 % (b) Profit = 10 % and (c) GST = 10 %

Show your calculation for this (5 Marks).

2. You get employed as a junior planner with R & Sons. As your first task you are given the following WBS. (15 Marks)

Activity	Time (Days)	Immediate Predecessor
A	4	
B	3	
C	5	A, B
D	1	
E	5	C
F	2	D
G	5	E, F
H	6	G

You are asked to;

- (a) Prepare a project network diagram
(b) Calculate the scheduling times and total slack for each activity
(c) List critical path activities and project duration