

Name:

Index Number:

CINEC Campus



Faculty of Engineering & Technology

Bachelor of Science Honours in Engineering

CE4321- Construction Engineering and Management

RESIT EXAMINATION PAPER

Date : 30th August 2025
Examiner : Mr. Kushan Hirimuthugoda
Time Allowed : Three Hours

Instructions to Candidate

- This is an **open book** examination. The paper consists of two parts. **Part A and Part B**
 - **All questions are compulsory**
 - Use only the answers booklet, additional papers and graph paper for your answers.
 - Write clearly and legibly with a blue or black pen.
 - Write your name and student number on all sheets.
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Part A

1. Which of the following is NOT a project management process group?
 1. Initiating
 2. Planning
 3. Executing
 4. Programming
 5. Closing

2. In which item of a BOQ describes the costs that cannot be apportioned in to measured work
 1. Preliminaries
 2. Preambles
 3. Provisional Sums
 4. Contingencies
 5. Measured Works

3. If Actual Cost (AC) is greater than your Earned Value (EV), what does this mean
 1. The project is under budget
 2. The project is over budget
 3. The project is ahead of schedule
 4. The project is behind schedule
 5. Not enough data

4. If a worker is working at height with the full safety harness belt and lanyard of 5.5 feet length what should be the minimum height of the anchorage point to the floor level. Take height of the worker as 5.5 feet and safety factor as 3 feet and maximum deceleration distance as 3 feet.
1. 16.5ft
 2. 17.0ft
 3. 17.5ft
 4. 18.0ft
 5. Not enough data
5. What is the ISO standard for management systems of Occupational Health and Safety (OHS)?
1. ISO 45001
 2. ISO 27001
 3. ISO 18001
 4. ISO 9001
 5. ISO 9000
6. Which of the following statements are TRUE about productivity?
- a) The main objective of work study is to improve productivity of workers, machines and materials
 - b) Predetermined Motion Time System (PMTS) is NOT a work measurement technique that analyzes the basic human movements
 - c) Work study helps to find the best method of performing by eliminating wastages
1. a only
 2. a and b only
 3. a and c only
 4. b and c only
 5. All

7. Which of the following statements are TRUE regarding construction machines?
- a) Forklift can lift one or few workers
 - b) Asphalt paving machine provides minor compaction before it is compacted by a roller
 - c) From a tunnel boring machine a specific excavation profile can be achieved
- 1. a only
 - 2. b only
 - 3. c only
 - 4. a and b only
 - 5. b and c only
8. You are managing a project that has a To-complete performance index (TCPI) of 0.98 What is the BEST course of action?
- 1. You're under budget, so you can manage costs with lenience
 - 2. Manage costs aggressively
 - 3. Create a new schedule
 - 4. Create a new budget
 - 5. Not Enough Data
9. What is a similar name for Slack
- 1. Float
 - 2. Buffer
 - 3. Lag
 - 4. Reserve
 - 5. Schedule

10. In a project the selected main contractor has to provide services needed by the nominated subcontractors and to do the coordination with them. For that the main contractor is paid with;

1. Nominated fee
2. Subcontractor fee
3. Nominated sub-contractor fee
4. Attendance fee
5. Coordination fee

11. You are managing to build a bridge. You work with your team and come up with a most likely estimate of 26 weeks to complete the job. In the Best case the project can be completed in 23 weeks because they have some precast beams. But there is a risk of bad weather where the project can be delayed by three weeks than the most likely estimate. Use PERT (Program Evaluation Review Technique) to calculate the estimated duration for this project.

1. 25.83 weeks
2. 26 weeks
3. 27 weeks
4. 27.5 weeks
5. 28.3 weeks

12. You are a project manager for a construction project and you work with your own work force of the company. But for electrical and plumbing works you do not have competent skill workers on the company. Because of that you are going to hire some subcontractors for that specific job. This is called;

1. Outsourcing
2. Referrals
3. Walk ins
4. Head Hunting
5. Offshoring

13. You are doing the Vendor Bid Analysis. Which Process Are you in?

1. Determining Budget
2. Controlling Costs
3. Estimating Costs
4. Cost Baseline
5. Cost Evaluation

14. You are the project manager of a multi-story building. you are having enough technical officers to manage different activities like reinforcement works, formwork, concreting works, finishes etc... But your staff is not properly given the target tasks and responsibilities. what is the Management Theory that you are lagging of as per the Henry Fayol's Management Theories?

1. Unity of command
2. Unity of direction
3. Scalar chain
4. Order
5. Stability of tenure personnel

15. When you use MS Project to allocate Resources for the project what is the frequency that you use?

- a) Specify people and equipment for the project
- b) Define working times for resources
- c) Assign people and equipment to tasks
- d) Specify the booking types for resources

1. $a \Rightarrow b \Rightarrow c \Rightarrow d$
2. $a \Rightarrow b \Rightarrow d \Rightarrow c$
3. $a \Rightarrow d \Rightarrow b \Rightarrow c$
4. $a \Rightarrow d \Rightarrow c \Rightarrow b$
5. $a \Rightarrow c \Rightarrow d \Rightarrow c$

16. Which process you do the inspections in Quality Management?

1. At the beginning of the project
2. At any time, a project deliverable is produced
3. Just before the final product is delivered
4. At the end of the project
5. At the middle of the project

17. During the Bid evaluation process a Bid can be rejected due to;

- a) There are calculation errors in the BOQ
- b) Contract has not provided the required Bid security
- c) Contractor has not signed the Bid properly

Which of the above are TRUE?

1. a only
2. a and b only
3. a and c only
4. b and c only
5. All

18. Which of the following business organizations will protect the owner's assets in the event of business fault or accident?

- a) Limited Liability
- b) Sole Proprietorship
- c) Partnership

1. a only
2. a and b only
3. a and c only
4. b and c only
5. All

19. Which of the following is FALSE about legal system in Sri Lanka?

1. By Laws are regulations made by a local authority or corporation
2. Legislation is an act passed by the supreme court
3. The existing constitution of Sri Lanka has been formally amended 21 times as October 2022
4. Roman Dutch Law is the common law of our country
5. Judicial Precedent is called judge made law

20. Which is NOT an advantage of having a proper organization structure?

1. Better communication
2. Provides accountability
3. Better employee performance
4. Set organization priorities
5. Conflict in decision making authority

21. Which of the following statements are TRUE about soil compaction?

- a) In the case of large lift thickness, bridging may occur at the top of lifts
- b) When the soil starts to crack, it means you need some more roller passes
- c) At site you use 75% of the ideal maximum lift thickness provided by the machine manufacturer

1. a only
2. b only
3. c only
4. a and b only
5. b and c only

22. Which of the following is a technique used in controlling cost?

1. Life Cycle Costing
2. Internal Rate of Return (IRR)
3. Cost Baseline
4. Earned Value (EV)
5. Benefit Cost Ratio (BCR)

23. Which of the following Techniques that you can use to Manage Quality?

- a) 5S
 - b) Three MU's
 - c) Standardization
1. a only
 2. a and b only
 3. a and c only
 4. b and c only
 5. All

24. Which of the following are TRUE regarding individual's response for change?

- a) People always motivated with the change
 - b) People sometimes get new opportunities with change and they think it will be better
 - c) People can be confused and scared
1. a only
 2. a and b only
 3. a and c only
 4. b and c only
 5. All

25. In the Law case of Harvey v Facey, what fundamental element of contract of was considered in giving the judgement

1. An Offer
2. An Acceptance
3. Genuineness of Consent
4. Certainty of terms
5. Intention

26. Key Performance Indicators (KPI) Can be used to improve;

- a) Quality in Construction
 - b) Productivity in Construction
 - c) Time efficiency in construction
1. a only
 2. a and b only
 3. a and c only
 4. b and c only
 5. All

27. When you go to the job for the first time you find that your company is having different departments for different functions such as Engineering, Procurement, Finance, Human Resources. You have a project manager who is handling your project also. You need to report to the Project Manager at site and also to the Engineering manager at head office. The organization structure at your company is highly likely;

1. Flat Organization
2. Functional Organization
3. Divisional Organization
4. Matrix Organization
5. Not enough data

28. When selecting a new project manager for a construction project you should NOT consider this;

1. Gender
2. Knowledge
3. Skills
4. Abilities
5. Previous experience in similar projects

29. You are managing a project with a BAC of Rs. 93,000.00, EV of Rs. 51,840.00, PV of Rs. 64,800.00 and AC of Rs. 43,200.00. What is the CPI?

1. 1.5
2. 0.8
3. 1.2
4. Rs. 9,000.00
5. Rs. 1.2

30. Which of the following is FALSE about Near Miss?

- a) It is also known as Near Hit
 - b) It is an accident result in injury or damage
 - c) A Near Miss today can be tomorrow's accident
1. a only
 2. b only
 3. c only
 4. a and b only
 5. b and c only

31. Your Project has a BAC of Rs. 4,522 million and it is 13% complete. What is the Earned Value (EV)?

1. Rs. 3,934.14 million
2. Rs. 587.86 million
3. Rs. 4,522.00 million
4. Rs. 5,876.60 million
5. Not Enough Data

32. Which of the following is NOT an advantage of Tendering Process?

1. Allow for competition
2. Neglect small contractors
3. Prevents frauds
4. Provide Transparency
5. Protects Tax payers

33. Estimated cycle time of an excavator which is going to be used in a bulk excavation project is calculated as 2 minutes. The capacity of the bucket which is going to be used is 0.4m^3 and the efficiency of the machine and the operator is estimated as 75%. Calculate the hourly production of the machine?

1. 7.25m^3
2. 8.00m^3
3. 8.25m^3
4. 9.00m^3
5. 9.25m^3

34. If the natural soil which is going to be excavated in Question 18 is having a compaction factor of 1.2, how many 1cube truck loads you need to transport the soil?

1. 3
2. 4
3. 5
4. 6
5. 7

35. Which one of the following is NOT an advantage of an orientation program?

1. It helps to understand about the organization
2. Feels welcome
3. Can get an idea about what is expected in work and behavior
4. Gives technical knowledge on what to do
5. It helps to start the socialization process

36. Which of the following are fundamental element of a contract?

- a) Legality of objects
- b) An offer and an acceptance
- c) Capacities of parties

1. a only
2. a and b only
3. a and c only
4. b and c only
5. All

37. If you have a commercial dispute of Rs. 6,000,000.00 of a contract you signed with your client in which of the following courts you can file a case;

- a) Commercial High Court
- b) Civil High Court
- c) Magistrate Court

- 1. a only
- 2. b only
- 3. c only
- 4. a and b only
- 5. a and c only

38. Which of the following is NOT a project?

- 1. Repairing a car
- 2. Building a highway over pass
- 3. Running ready mix concrete plant
- 4. Building an extension for an existing factory
- 5. Widening the road width for 100 km

39. Which of the following statements are TRUE;

- a) Contracts can be formed within the family, over the family matters
- b) To Form a contract, it should always have a written document
- c) Sometimes only one party is liable for making a contract

- 1. a only
- 2. b only
- 3. c only
- 4. a and b only
- 5. b and c only

40. Which of the following is NOT an advantage of Tendering Process?

1. Allow for competition
2. Neglect small contractors
3. Prevents frauds
4. Provide Transparency
5. Protects Tax payers

Part B

1. Develop a Logic Network (Network Diagram) for the sequence of activities listed in the table. Calculate Early Start (ES), Early Finish (EF), Late Start (LS), Late Finish (LF) time and float for all activities. Find the Critical Path and duration for the critical path

Activity	Duration(Weeks)	Predecessor
Start	-	-
A	6	Start
B	4	A
C	8	B
D	1	A
E	1	D
F	2	E
G	3	Start
H	3	G
I	2	H
J	3	B,I
Finish	-	F,J,C

2. You are a newly appointed safety officer for the proposed construction of an overhead bridge (Flyover) in 177 bus route near Baththaramulla area. You need to identify **Two** safety hazards that can happen at each the following stages of the site progress and the safety measures that you can take to avoid them.
- Site planning
 - Pilling works
 - Super Structure construction

3. As a job rotation you have been asked to work as a Procurement Manager for a period of one year. Once you start working with the procurement team you found that the productivity of the department is very low. Based on the knowledge that you gained during the university, describe what are the methods that you can use to improve productivity at your new department. (Discuss **three** methods with **examples**)
4. You are a team leader of a structural design company. Your company is trying to introduce a new computer software which they believe will be more accurate and easy to work with. But most of your team members are afraid to adopt to the new system. As the team leader how you are going to deal with this resistance to change (Discuss **three** methods with **examples**)
5. You are a project manager of a pre cast concrete yard. At your yard you construct precast concrete wall panels for high rise buildings. Recently you found some defects in your products. At the moment you do not have any quality management system at your construction yard. To introduce a quality management plan first you want to plan for quality.

Discuss **Three** techniques that you can use to **Plan Quality** at your precast concrete yard with **examples**

-End of Questions-

**FACULTY OF ENGINEERING & TECHNOLOGY****IN-CLASS TEST 01**

Module Code	:	STEM 1501
Module Title	:	Foundation mathematics I
Date	:	August 2025
Examiner	:	Mr. Supun Walpita
Time Allowed	:	2 hours

INSTRUCTIONS TO CANDIDATES

- This is a closed book examination
- Answer **all** questions.
- Show all stages of your work, with clear assumptions where appropriate.
- Write legibly in blue or black ink
- No calculators are allowed

1)

a) Simplify the following:

I. $\frac{11}{15} - \frac{2}{5}$

II. $3\frac{1}{2} + 1\frac{3}{4}$

III. $5\frac{2}{3} - 3\frac{1}{6}$

IV. $\frac{2}{3} \times \frac{4}{5}$

V. $\frac{7}{8} \div \frac{1}{4}$

(10 marks)

b) A class is divided into three groups: Group A, Group B, and Group C. The ratio of students in the three groups is 4:6:5. If there are 75 students in total, how many are in each group?

(8 marks)

c) A farmer uses a field for different crops:

- $\frac{2}{5}$ of the field is used for growing vegetables,
- $\frac{1}{4}$ is used for fruit trees,
- $\frac{1}{10}$ is used for flowers.

I. What fraction of the field is being used in total?

(5 marks)

II. What fraction of the field is still unused?

(2 marks)

- d) Originally, a forest had a certain number of trees. Over the next six years, due to deforestation and natural causes, the number of trees decreased by 40%. By 2022, only 4800 trees remained. How many trees were lost during this period? **(9 marks)**

2)

- a) Arrange the following in ascending order

$$\frac{2}{3}, \quad 0.25, \quad 75\%, \quad \frac{5}{8}, \quad 40\%, \quad 0.9$$

(6 marks)

- b) Simplify following

I. $a^{-3} \cdot a^4 \cdot a^2$

II. $\left(\frac{4x^{-1}y^2}{8x^2y^{-3}}\right)^3$

III. $\sqrt[3]{c^9}$

IV. $\left(\frac{16}{81}\right)^{\frac{1}{2}}$

V. $3^n \cdot 9^{n+1} \cdot 27^{n-1}$

VI. $(64)^{2.5} \cdot (4)^{1.5} \div (8)^4 = 2^m$ find m

(21 marks)

c) Simplify followings

I. $\log_2(8) + \log_2(4)$

II. $\log_2(32) + \log_4(16) - \log_8(64)$

(8 marks)

d) Solve for x

I. $\log_2(x) = \log_8(512)$

II. $\log_3(x + 2) + \log_3(x - 4) = 3$

III. $\log_6(x + 5) - \log_6(x - 2) = 1$

(13 marks)

e) A person deposits \$900 into a savings account that earns 4.5% interest compounded annually. Find how long it will take for the account balance to grow to \$2,700 (take $\log_{10}(3) = 0.5$ & $\log_{10}(1.045) = 0.02$)

(18 marks)

Colombo International Nautical & Engineering College
Faculty of Engineering & Technology
Bachelor of Science Honours in Engineering



ME1312 – Engineering Drawing

EXAMINATION PAPER (Semester 1)

Date	:	2025 August
Examiners	:	Virantha E.A.I
Time Allowed	:	3 Hours

INSTRUCTIONS TO CANDIDATES

- This is a closed book examination.
- The question paper consists of **one** question in two pages.
- Answer all questions.
- Any data which is not given assume.

MATERIALS REQUIRED

- A2 size drawing sheet (Will be provided)
- Drawing tools including compass set and triangles
- You may use a Scientific calculator. This must not be programmable and may be inspected during the examination.

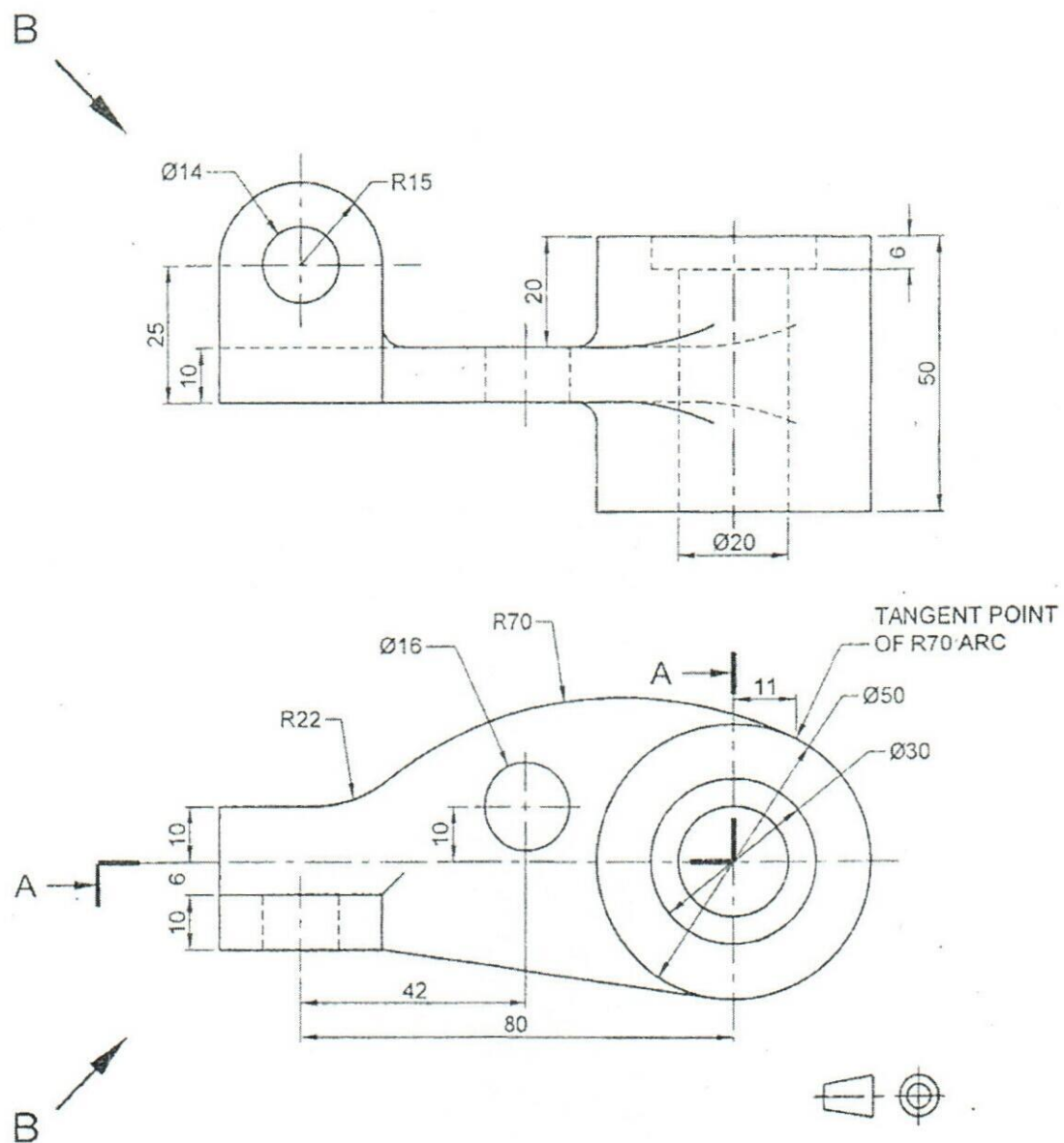
Q1. Figure 1 shows an orthographic projection of a MACHINE COMPONENT with all dimensions in mm. Draw the following views in THIRD ANGLE PROJECTION. Select a suitable scale.

- a) Front Elevation
- b) Sectional End Elevation on AA
- c) Plan

Complete the drawing by inserting the dimensions, projection symbol, title, subtitles, and scale.

Marking Scheme

1.	Accuracy of view (a)	20 Marks
2.	Accuracy of view (b)	20 Marks
3.	Accuracy of view (c)	20 Marks
4.	Alignment of views	10 Marks
5.	Spacing	10 Marks
6.	Title block, Projection symbol, Lettering	05 Marks
7.	Dimensioning	05 Marks
8.	Final Appearance/ Neatness	10 Marks



ALL DIMENSIONS ARE IN MILLIMETERS

FILLETS TO HAVE 5 mm

Figure 1