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University of Asia Pacific
Department of Civil Engineering
Mid Term Examination Fall 2023
Program: B.Sc. Engineering (Civil)

Course Title: Project Planning and Management

Course Code: CE 401

Time: 1 Hour

Credit Hours: 3.00

Full Marks: 60

Answer all the questions.

1. Consider yourself as the owner of a Civil Engineering Company intending to hire a Civil Engineer for the position of Project Manager overseeing multiple construction projects. Prepare a list of skills you expect from your potential Project Manager, and provide thorough justification for the inclusion of each required skill.

[10]

2. How will you practice quality control at construction site before commencing the erection work and throughout the erection process?

[10]

3. Different Activities of a Civil Engineering project with their durations and predecessors are presented in the following Table:

Activity	Description	Duration (Days)	Predecessors
A	Site Clearing	1	-
B	General Excavation	2	A
C	Excavation for Utility Trenches	2	B
D	Placing Formwork and Reinforcement Bars	3	B
E	Installing Sewer Lines	3	C
F	Installing Other Utilities	3	C
G	Pouring Concrete	2	D, E

- (a) Construct a bar chart and predict the total time of completion of the project.

[12]

- (b) If today is the end of day 5 and the site engineer reported that Activity C is 80% completed and Activity D is 33% completed; investigate and comment on the progress of the project.

[08]

4. The network diagram for a certain project is shown in the Figure 1. Apply PERT network analysis technique to determine the followings:

(a) The expected time for each path.

[15]

(b) The critical path.

[05]

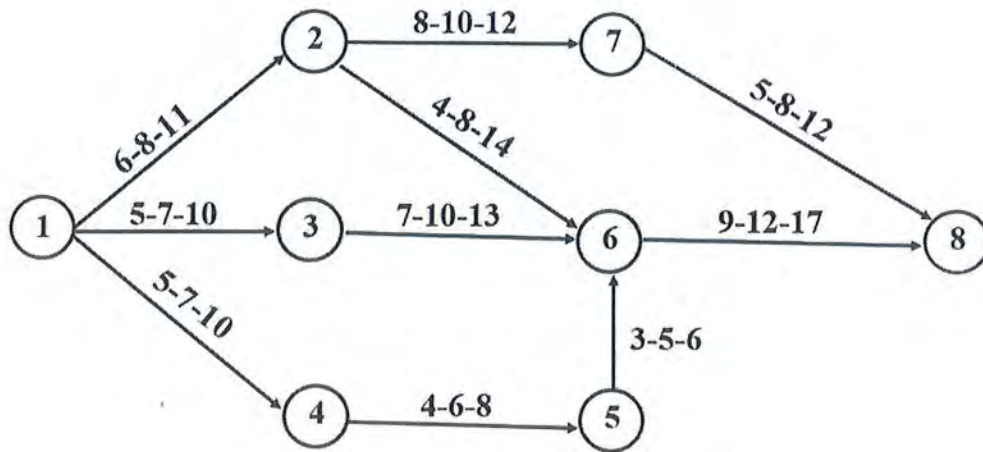


Figure 1

University of Asia Pacific
Department of Civil Engineering
Mid-Term Examination, Fall 2023
Program: B.Sc. in Civil Engineering

Course Title: Engineering VIII (GIS and
Remote Sensing)
Time: 1 hour

Credit Hour: 2

Course Code: CE531
Full Marks: 50

1. Write a chronological list of events leading to cholera prevention in London. Mention the names of relevant persons and places, the year, and the source of your information. (10)
2. Topology
 - a. What is topology in GIS? (1)
 - b. How is the topology of a vector GIS dataset organized? (i.e., how points, lines, and polygons are connected to each other to form the dataset.) Explain with diagrams. (3)
 - c. What is a topology error? List the different topology errors and draw diagrams to describe them. (3)
 - d. What is a special type of vector data? Draw a figure to explain. (3)
3. Projection
 - a. What is a projection system in GIS and RS? (2)
 - b. What map aspects are distorted by projection systems? (2)
 - c. What are the three basic ways to transfer a curved surface to a plane? (2)
 - d. What are the 4 different projection systems commonly used in Bangladesh? (2)
 - e. Which projection system is used for preparing Mouza maps (land ownership maps) in Bangladesh? (2)
4. Suppose you are a Highway Engineer designing a national highway. The alignment goes through private lands, and you will need to prepare land acquisition maps. Your manager wants you to prepare it with GIS.
 - a. What kinds of data will you need to do this job? (4)
 - b. What is the sequence of activities to prepare the land acquisition maps? You may draw figures to explain your answer. (6)
5. Remote Sensing
 - a. You are working for a consulting firm that is carrying out agricultural mapping for a large area. One of the project outputs is the preparation of NDVI maps for 10 years (the months of January and December only). Your manager doesn't have any idea about Remote Sensing, and you decide to show him how you can complete the job with Landsat images.
 - i. What will be your data source? (2)
 - ii. What will be the formula for NDVI calculation? (3)
 - iii. Which software can you use for preparing NDVI datasets? (1)
 - iv. How would you prepare a time series of vegetation change for a given area? (4)

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Mid-Term Examination, Fall 2023
Program: B.Sc. in Civil Engineering

Course Title: Structural Engineering X
Time: 1 hour

Credit Hour: 2.0

Course Code: CE 425
Full Marks: 20

Question 1:

[3+1]

Explain the hydration of four main compounds of cement and their effects on strength development of concrete.

Question 2:

[1+1+2]

Discuss the cause, effects and control of segregation of concrete.

Question 3:

[4]

Distinguish the features between ready-mix concrete and site-mix concrete.

Question 4:

[3+5]

A cement with a Silica ratio of 2.65, Alumina ratio of 1.55, Hydraulic modulus of 2.0 and Lime saturation factor of 0.95 is selected. Determine the missing oxide percentages and comment of the properties of cement in terms of strength, heat of hydration, setting time.

Oxides	Content (%)
Cao	?
SiO ₂	22.0
Al ₂ O ₃	7.25
Fe ₂ O ₃	?
SO ₃	?

University of Asia Pacific
Department of Civil Engineering
Midterm Examination Fall 2023
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Course Title: Structural Engineering VI
Time: 1 hour

Credit Hour: 2

Course Code: CE 417
Full Marks: 40

QUESTION 1

(i) With neat sketches, explain the limit states that control the strength of a bolted connection. [6]

(ii) Compare between rivets and bolts as structural fasteners. Which one is more advantageous? Justify your opinion. [4+2]

QUESTION 2

A tension member, PL20×3/4, is connected to another member with the bolt configuration shown in **Figure 1**. The material is A36 ($F_u = 62$ ksi) steel and bolts are 5/8-inch dia. with standard holes. Determine the design tension capacity of the plate. [14]
Neglect block shear failure.

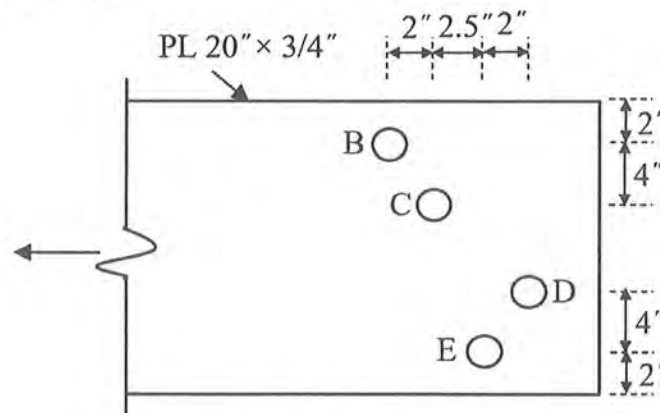


Figure 1

QUESTION 3

Determine the number of 1/2-in dia. A325 bolts ($F_y = 92$ ksi, $F_u = 120$ ksi) in standard holes required to develop the full strength of A572 Grade 50 ($F_u = 65$ ksi) steel plates shown in **Figure 2**. Assume the portion of double lap splice is a bearing type connection with threads excluded from the shear planes, the arrangement of the bolts is not in a staggered pattern, a double row of bolts is used, and the center-to-center & edge distances of the bolts are $2.5d$ and $1.5d$, respectively, where d is the diameter of the bolt. Show a neat sketch of the designed bolted connection. [14]
Ignore block shear mode, and use AISC-ASD approach.

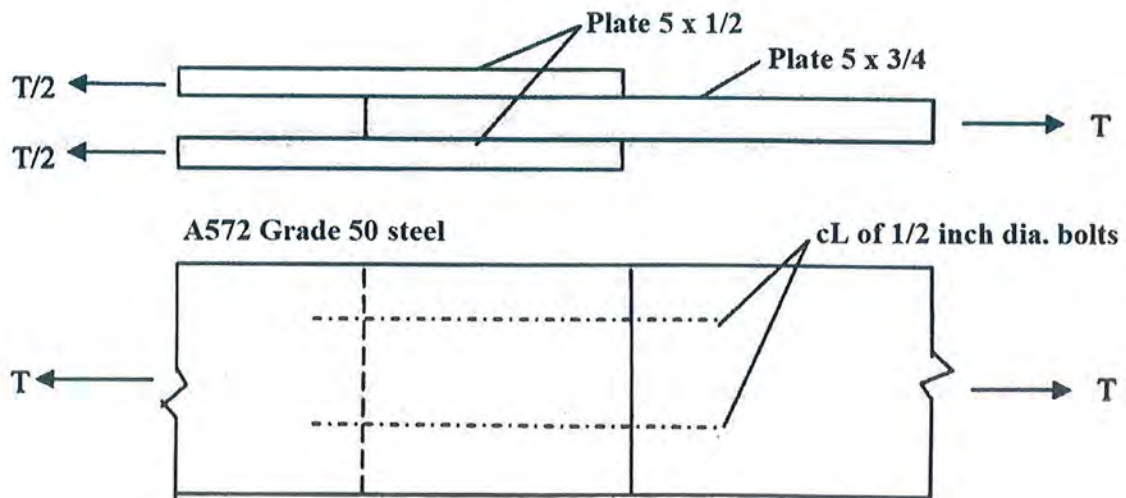


Figure 2

Formula

1. $R_n = m A_b F_{nv}$
2. $R_n = 0.6 F_y A_{gv} + U_{bs} F_u A_{nt}$
3. $R_n = 0.6 F_u A_{nv} + U_{bs} F_u A_{nt}$
4. $R_n = 1.5 L_{ct} F_u \leq 3.0 d t F_u$
5. $R_n = 1.2 L_{ct} F_u \leq 2.4 d t F_u$
6. $R_n = 1.0 L_{ct} F_u \leq 2.0 d t F_u$
7. $R_x = \frac{M y}{\Sigma d^2}$ and $R_y = \frac{M x}{\Sigma d^2}$