4E2032

Total No. of Questions:  5 OR 5                    Total No. of Pages: 3
Roll No. _____

# B.Tech. IV Semester (Old Back) Exam., July 2014
# Civil Engg.
# 4CE1 Strength of Materials and Mechanics of Structures-II
## 4E2032

Time: 3Hours                                    Maximum Marks: 80
                                               Min Passing Marks: 24

Attempt any **five questions,** selecting **one question** from **each unit.** All Questions carry **equal** marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/ calculated must be stated clearly.
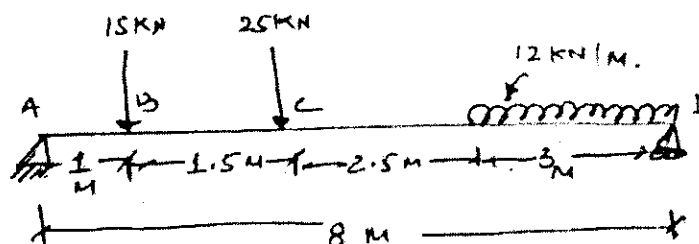
### UNIT -I

Q. 1  (i) Derive an expression which shows relation between slope, deflection and moment.
(ii) Find the slope and defection for a cantilever beam given in figure.
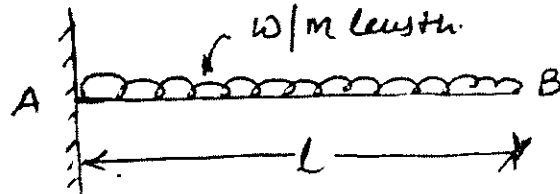


8+8=16

OR

Q.1  (i) Write down the utility of Double integration method over moment area method and their applications.
(ii) A uniform beam shown in figure is subjected to the loads as shown. Calculate maximum slope and deflection of beam.



8+8=16

1

**UNIT -II**

Q. 2 Find the fixing moments and support reactions of a fixed beam AB of length 8 M, carrying a uniformly distributed load of 5KN/m over the left half of span.

16

**OR**

Q.2 A continuous beam ABC of uniform section, with span AB and BC as 6M each, is fixed at A and C and supported at B as shown in figure. Find the support moments and the reactions. Also draw SFD and BMD for the beam.

16
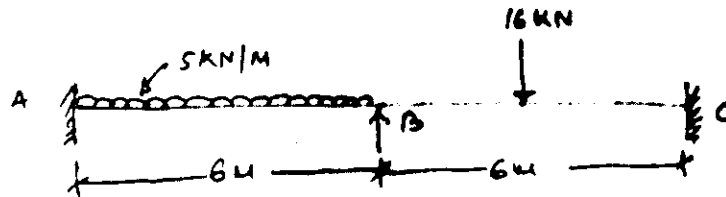


**UNIT -III**

Q. 3 (i) Derive the torsional equation with all abbreviation and units.

(ii) Two shafts of the same material and same length are subjected to the same torque. If the first shaft is of a solid circular section and the second shaft is of hollow section (circular) whose internal dia. is 2/3 of the outside diameter and the maximum shear stress developed in each shaft is the same, compare the weights of the shafts.

8+8=16

**OR**

Q.3 (i) For combined bending and torsion show that the maximum shear stress is equal to

$$\frac{16}{\pi D^3}\left(\sqrt{M^2 + T^2}\right)$$

8+8=16

(ii) A closely coiled helical spring made of 10 mm diameter steel wire has 15 coils of 100 mm diameter. The spring is subjected to an axial load of 120 N. Calculate.

a)     Maximum shear stress induced
b)     The deflection, and
c)     Stiffness of spring

8+8=16

**UNIT -IV**

Q. 4    (i) Derive an expression for strain energy due to bending in a simply supported beam.

ii) Using unit load method analyze the truss shown in the figure.



8+8=16

OR
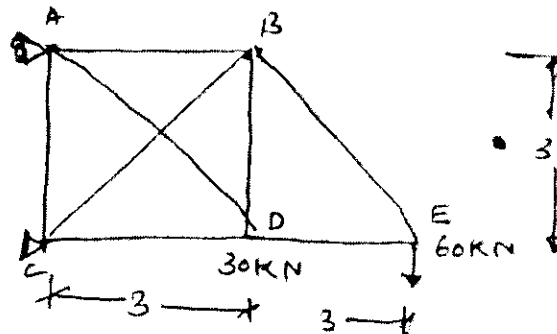
Q.4    (i) Explain castaglianos I$^{st}$ and 2$^{nd}$ theorem and their applications.

(ii) Using unit load method, determine the deflection at D of the loaded beam shown in figure.
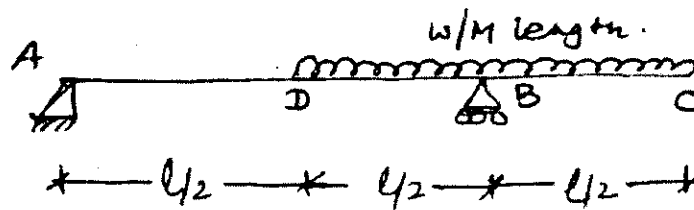


8+8=16

UNIT -V

Q. 5    (i)  Explain D- Alembert's principal in detail with examples.

(ii)  Define degrees of freedom with examples and with neat sketches

8+8=16

OR

Q.5    Write a short notes on following.

I.      Under damping and over damping

II.     Time period and Natural frequency

III.    Free vibration and forced vibration.

IV.     Critical Damping

4x4=16

3

Total No. of Questions:                    Total No. of Pages:

Roll No. _____

4E2033

### B.Tech. IV Semester (Old Back) Exam., July 2014
### Civil Engineering
### 4CE2 Concrete and construction Technology
### 4E2033

Time: 3Hours                          Maximum Marks: 80
                                      Min Passing Marks:  24

Attempt any **five questions,** selecting **one question** from **each unit.** All Questions carry **equal** marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/ calculated must be stated clearly.

**UNIT-I**

1.    (a) Define the workability of concrete and its role in governing the quality of concrete.                                   [6]

(b) Write a short note on "Gel-space ratio" and its use in finding the theoretical strength of concrete.                            [6]

(c) List any four methods of determining workability of concrete mix. Describe the limitation of "slump test".               [4]

**OR**

1.    (a) With the help of neat curve describe creep and its recovery. Also discuss the factors influencing the creep of concrete.        [8]

(b) Describe the compaction factor test for determining the workability of concrete mix and its limitations.  Give   the   neat labelled sketch of experimental setup.                        [8]

**UNIT-II**

2.    (a) Differentiate between the followings:                   [2x6]

(i)    Volume batching and Weigh Batching and their relative advantages.

(ii)   Retarder   and   Accelerator   admixtures   and   their application

(b) Describe the precautions necessary during placing of concrete.
                                                                [4]

**OR**

2.    (a) Discuss the purpose of compaction of concrete. Describe the appropriate method of compaction for the following with reasons:

i.    R.C.C. slabs

ii.   Mass concreting

    iii.    Heavily reinforced Columns         [2+6]

(b) Describe the purpose of curing of concrete. Describe the appropriate method of curing for the following:

    i.    Concrete Dams
    ii.    Concrete columns
    iii.    Concrete slabs and floors         [2+6]

## UNIT-III

3.    (a) Describe the requirements for a good form work. Give the neat sketch of the form work used for a RCC slab to be constructed monolithically with R.C.C. beam.     [5+3]

(b) Describe the sequence of various activities right from planning to construction for a big construction project.     [8]

**OR**

3.    (a) Write short note on any two of the followings:     [2x6]
    i.    Dewatering of soil during excavation
    ii.    Underpinning
    iii.    Anti termite treatment

(b) Differentiate between shoring and scaffolding.     [4]

## UNIT-IV

4.    (a) Describe the requirements for a good stair case. Give a typical neat labelled sketch of a flight of stair case.     [5+3]

(b) Describe the relative merits and demerits of any two of the following:     [2x4]
    i. Precast v/s cast-in-situ construction
    ii. lift v/s ramp
    iii. arch v/s lintel

**OR**

(a) Draw a typical neat sketch of a circular masonry arch indicating the terminology involved.     [6]

(b) Write short notes on any two of the following (support your answer with neat sketch)     [2x5]
    i. Ribbed floor
    ii. Lift slab construction
    iii. Construction joint

## UNIT-V

a.    (a) Describe the factors affecting the selection of flooring material for a building. With the help of neat sectional elevation describe the construction detail of Kota Stone Flooring.     [5+5]

(b) Draw the neat line diagrams indicating the following types of pitched roof truss:

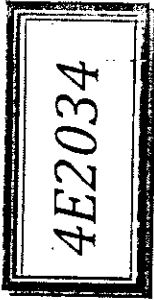                                                 [2x3]

    i. Lean-to roof truss             ii. King post roof truss

**OR**

5. (a) Describe the factors required in selection of roof coverings. Draw the neat sketch of a north light roof truss and discuss its application. [6+4]

(b) With the help of neat sketch describe the method of laying and fixing A.C. sheet roof covering. [6]

Total No. of Questions:

Total No. of Pages: 4

Roll No. _____

B.Tech. IV Semester (Back) Exam., July 2014
Civil Engg. •
4CE3 Hydraulics & Hydraulic Machines
4E2034

Time: 3Hours

Maximum Marks: 80
Min Passing Marks: 24

Attempt any **five questions,** selecting **one question** from **each unit.** All Questions carry **equal** marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/ calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No.205)

1._____

2._____

## UNIT -I

Q. 1    a) What is a model. Write down advantages of Model analysis

8

b) A model of spillway is constructed to scale of 1:30 in a flume. The length of the spillway is 30 m. If the discharge over the spillway at the head of 6 m(depth of flow over spillway) is 443.6 cumec, calculate the corresponding head and discharge of the model required for this model study.                                    8

OR

Q.1    a) Explain Buckingham's π- theorem.                                            8
       b) Prove that the discharge over a spillway is given by the relation:

$$Q = VD^2 f\left[\frac{\sqrt{gD}}{v}, \frac{H}{D}\right]$$

Where V= Velocity of flow, D = Depth at throat,, H= Head of water and g=Acceleration due to gravity

## UNIT -II

Q. 2    a) Explain Hagen-Poiseuille law for laminar flow in pipes.                8

b) In a laboratory experiment, a crude oil is flowing through a pipe of 50 mm diameter with a velocity of 1.5 m/s. During this experiment a pressure drop of 18 kpa was recorded from two pressure gauges 8 meters a part. Find the viscosity of the flowing oil. 8

8+8=16

**OR**

Q.2 a) Explain in brief Nikeradse's experiment on Rough pipes. 8
b) Find the discharge through a pipe of 100 mm diameter, if the loss of head is 1.8 m per 100 m length of the pipe. Take average height of the roughness as 0.25 mm. **8**

**8+8=16**

# UNIT -III

Q.3 a) Derive chezy's formula for discharge through an open channel. 8
b) An earthen channel with 3m wide base and side slopes 1:1 carries water with a depth of 1m. The bed slope is I in 1600, Estimate the discharge. Take value of N in Manning's formula as 0.04. 8

**OR**

Q.3 a) What is specific energy. Explain with neat sketch specific energy diagram.
2+6=8
b) Derive the equation for critical depth of water in open channel.
8

# UNIT -IV

Q. 4 a) What is hydraulic jump. Derive the equation for hydraulic jump. 2+6=8
b) Write short note on Parshall flume. 8

8+8=16

**OR**

a) A 25 mm diameter jet exerts a force of 1KN in the direction of flow against a flat plate, which is held inclined at an angle of $30^0$ with the axis of the stream. Find the rate of flow. 8
b) A jet of water, water having a velocity of 30 m/s impinges on series of vanes with a velocity of 15 m/s. The jet makes an angle of $30^0$ to the direction of motion of vanes when entering and leaves at an angle of $120^0$. Draw velocity triangles at entrance and exit, and determine vane angles so that water enters and leaves without shock. 8

8+8=16

## UNIT -V

Q. 5   a) Explain working of centrifugal pump with neat sketch.    8

b) A centrifugal pun=mp has external and internal impeller diameters as 600mm and 300 mm respectively. The vane angle at inlet and outlet are $30^0$ and $45^0$ respectively. If the water enters the impeller at 2.5 m/s find

a) speed of impeller in r.p.m. b) work done per KN of water.    8

8+8=16

## OR

Q.5   a) Explain with neat sketch working of pelton wheel Turbine.    8

b) What is Draft tube. Explain with neat sketch conical draft tube and elbow draft tubes, write down the formula to calculate efficiency of a draft tube.    2+4+2=8

Total No. of Questions:

Total No. of Pages:

Roll No. _____

# B.Tech. IV Semester (Back) Exam., July 2014
## Civil Engineering
## 4CE4  Surveying-I
## 4E2035

Time: 3Hours

**Maximum Marks: 80**
**Min Passing Marks:  24**

Attempt any **five questions,** selecting **one question** from **each unit**. All Questions carry **equal** marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/ calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No.205)

1_____                                                    2. _____

## UNIT -I

Q. 1    a) What is surveying? How it is useful for engineers?              8
        b) Explain the following fundamental principles of surveying.      8

### OR

Q.1    a).What are different tape corrections and how are they applied?     10
        b) Discuss different sources of errors in surveying.             6

## UNIT -II

Q. 2    a) What is a meridian? Differentiate between true and magnetic meridian.     8
        b) In a closed traverse, the following bearing were observed with a compass.
Calculate the interior angles:                                              8

| LINE | Fore bearings |
|------|---------------|
| AB | $16^0 300$ |
| BC | $122^0 0$ |
| CD | $46^0 0'$ |
| DE | $205^0 30'$ |
| EA | $300^0 0$ |

OR

Q.2    a) Differentiate between Prismatic and surveyor's compass.      8
      b) Discuss temporary adjustments of venire theodolite.      8

## UNIT -III

Q. 3    a) What is traverse ? What are different methods of traversing ? Discuss chain and compass method of traversing.      10
      b) Discuss the checks available in closed traverse.      6

OR

Q.3    The following data pertains to a theodolite traverse:

| Line | Length(m) | Latitude(m) | Departure(m) |
| --- | --- | --- | --- |
| AB | 129.64 | +129.56 | +4.52 |
| BC | 300.08 | +17.27 | +299.58 |
| CD | 147.61 | -147.53 | +4.94 |
| DA | 307.20 | 0.00 | -307.20 |

Balance the traverse by Transit rule and compute the independent Co-ordinates of station 'A'

## UNIT -IV

Q. 4    a) What are different types of leveling? Discuss direct differential leveling.      8
      b) Explain the working of a dumpy level. Under what conditions Dumpy level and tilting level are most useful.      8

OR

.Q.4    a) What do you understand by balancing of sights? How it helps in reducing the errors in leveling.      8
      b) What do you understand by cross-section leveling? Explain how it is conducted. Draw a typical cross-section.      8

## UNIT -V

Q. 5    a) Explain the principles of plane tabling.      6
      b) What is resection? Describe any two methods of resection.      10

OR

Q.5    a) Define contour and discuss characteristics of conductors giving suitable sketches.      8

      b) What are the uses of contour map? How will you determine the indivisibility of paints from a contour map?      8

**4E2036**

Total No. of Questions:                     Total No. of Pages: *

Roll No. _____

# B.Tech. IV Semester (Old Back) Exam., July 2014
## Civil Engg.
## 4CE5 Building Technology
## 4E2036

Time: 3Hours                                      **Maximum Marks: 80**
                                                 **Min Passing Marks: 24**

Attempt any **five questions**, selecting **one question** from **each unit**. All Questions carry **equal** marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/ calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No.205)

1._____                                  2._____

## UNIT -I

Q. 1   a) Classify the buildings based on occupancy.                          8
        b) Discuss principles underlying building bylaws?                      8
                                                                    8+8= 16

### OR

Q.1    a) Discuss criteria for locating site and various factors affecting site selection.
                                                                              8
        b) What is sum chart ? Discuss any one method of drawing sum chart.    8
                                                                    8+8=16

## UNIT -II

Q. 2   a) What are the various factors affecting orientation of building. Discuss it.   8
        b) What are the different climate zones of India.                      8
                                                                    8+8=16

### OR

Q.2    a) Discuss about various provisions regarding open spaces around building.   8
        b) What is Bidimatic chart. Discuss about its uses?                    8

## UNIT -III

Q. 3  a) What are the various factors affecting planning of building. Discuss it.

16

### OR

Q.3  What are the various factors considered in vastu. Discuss site selection according to vastu?

16

## UNIT -IV

Q. 4  Design and draw a Rest house for government servants of PWD. The following are the requirements in the Rest house.
1) Reception and Enquiry counter
2) Bed rooms with attached toilet 05 Nos (Area 20-25 $m^2$  ) sizes 4.2 m x 5.5 m 3.6 m 5.5 m.
3) VIP rooms two sets: Each set consisting of one drawing room & Bedroom with attached toilet(Area, 40-55 $m^2$)
4) Dining hall with toilet 01 no, (Area 10-12 $m^2$) for 20 seats
5) Kitchen 01 no, size 2.75 x 3.5 (Area 10.12 $m^2$)
6) Store 01 no. (Area, 10 $m^2$  )
7) Office rooms 02 nos, (Area 10-15 $m^2$)
8) Parking space, Garages, 5-6 vehicles
9) Servants quarters 02 nos, each consistent of one drawing room & Bedroom, (Area 60-70 $m^2$).                                                 16

### OR

Q.4  Draw Double line plan and elevation .                                 16

## UNIT -V

Q. 5  a) What do you understand by acoustics of building. Discuss about the requirements regarding good acoustics of building?                8
b) What is noise ? Discuss about the transmission of sound in the building.        8
8+8=16

### OR

Q.5  a) Why the building should be properly ventilated ? What is artificial ventilation?.
8
b) Discuss about different types of doors with diagram?                8
8+8=16

# B.Tech. IV Semester (Old Back) Exam., July 2014
## Civil Engg.
## 4CE6.2 Optimization Techniques
## 4E2039

Time: 3Hours

Maximum Marks: 80
Min Passing Marks: 24

Attempt any **five questions,** selecting **one question** from **each unit.** All Questions carry **equal** marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/ calculated must be stated clearly.

## UNIT – I

Q.1    (a) What is Optimization? Discuss the historical sketch of developments of optimization techniques.

Q.1    (b) Write twelve applications of Optimization in engineering fields.

"OR"

Q.1    (a) What is optimization problem? Discuss the various basic components of an optimization problem?

Q.1    (b) Write the formulation of design problems as mathematical programming problems?

## UNIT – II

Q.2    (a) Solve the following L.P.P graphically:

Minimize    $Z = 3x_1 + 9x_2$

Subject to:    $x_1 + x_2 \geq 800$    $7x_1 - 10x_2 \leq 0$

           $3x_1 - x_2 \geq 0,$    $x_1 \geq 0, x_2 \geq 0$

Q.2    (b) Solve the following L.P.P by using Simplex or Big-M method:

Minimize    $Z = x_1 + x_2$

Subject to:    $2x_1 + x_2 \geq 4$    $x_1 + 7x_2 \geq 7$ ,   $x_1, x_2 \geq 0$

"OR"

Q.2    (a) Solve the following LPP using the revised simplex method:

Maximize    $Z = 2x_1 + x_2 + 2x_3$

Subject to: $4x_1 + 3x_2 + 8x_3 \leq 12;$    $4x_1 + x_2 + 12x_3 \leq 8;$    $x_1, x_2, x_3 \geq 0.$

Q.2    (b) Use duality to solve the following LPP:

Minimize    $Z = 10x_1 + 6x_2 + 2x_3$

Subject to:    $-x_1 + x_2 + x_3 \geq 1;$    $3x_1 + x_2 - x_3 \geq 2; x_1, x_2, x_3 \geq 0$

## UNIT – III

Q.3  (a) Use Vogel's approximation method to solve the following transportation problem:

|     | D1 | D2 | D3 | D4 | Availability |
|-----|----|----|----|----|--------------|
| O1  | 1  | 2  | 1  | 4  | 30           |
| O2  | 3  | 3  | 2  | 1  | 50           |
| O3  | 4  | 2  | 5  | 9  | 20           |
| Requirement | 20 | 40 | 30 | 10 | 100 |

Q.3  (b) Solve the following Traveling Salesman Problem whose cost matrix is
$C_{12} = 20$, $C_{13} = 4$, $C_{14} = 10$, $C_{23} = 5$, $C_{25} = 10$, $C_{34} = 6$, $C_{35} = 6$, $C_{45} = 20$ where
$C_{ij} = C_{ji}$. If the value of $C_{ij}$ is not given, there is no route between cities i and j.

**"OR"**

Q.3  (a) Solve the following transportation problem for maximizing profit:

|     | I  | II | III | IV | Availability |
|-----|----|----|-----|----|--------------|
| A   | 15 | 26 | 46  | 6  | 140          |
| B   | 66 | 26 | 36  | 56 | 180          |
| C   | 36 | 4  | 66  | 16 | 360          |
| Requirement | 100 | 160 | 140 | 280 | 680 |

Q.3  (b) Solve the following assignment problem:

Machine

| Job | 1   | 2   | 3   | 4   |
|-----|-----|-----|-----|-----|
| A   | 310 | 620 | 290 | 420 |
| B   | 120 | 190 | 390 | 550 |
| C   | 170 | 290 | 500 | 410 |
| D   | 350 | 400 | 380 | 420 |

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## Unit – IV

**Q.4** (a) Solve by univariate search method:

Minimum $f = 2x_1^2 + 2x_1x_2 + 5x_2^2 - 6x_1 + 6x_2 + 5$

**Q.4** (b) Minimize $f(x_1, x_2) = x_1 - x_2 + 2x_1^2 + 2x_1x_2 + x_2^2$ from the starting point $X_1 = \binom{0}{0}$ using Powell's method.

**"OR"**

**Q.4** (a) Minimize $Z = x_1^2 + x_2^2 - 2x_1 - 3x_2 + 3$

Subject to $g = x_1 + 2x_2 - 4 \le 0$

with the starting point $X_1 = \binom{0}{0}$ .Take $\epsilon_1 = 0.001, \epsilon_2 = 0.001, \epsilon_3 = 0.01$

**Q.4** (a) Minimize $f(X) = 2x$

Subject to $g(X) = 3 - x \le 0$ by exterior penalty function method.

## Unit - V

**Q.5** Use Dynamic programming techniques to solve the problem:

Minimize $Z = y_1^2 + y_2^2 + y_3^2$

Subject to $y_1y_2y_3 = 27$

and $y_1, y_2, y_3 \ge 0$

**"OR"**

**Q.5** Determine the minimum path for the the following travelling salesman problem represented graphically:
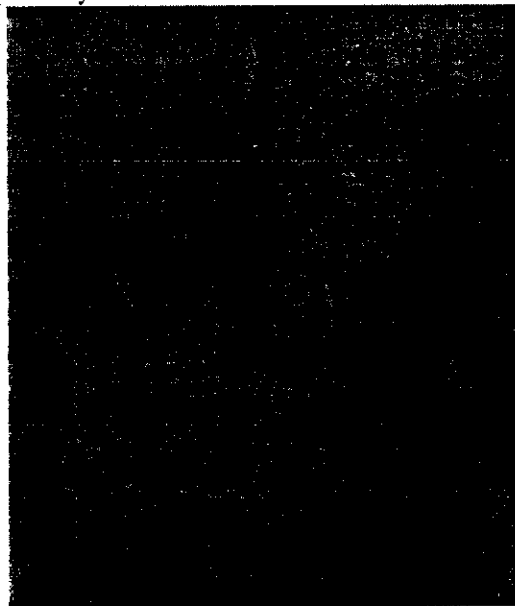
4E2031

Total No. of Questions:                                    Total No. of Pages:          ✦

Roll No. _____

### B.Tech. IV Semester (Old Back) Exam., July 2014
### Civil Engineering
### 4CE6.1 Rock Mechanics
### 4E2031

Time: 3Hours                                              Maximum Marks: 80
                                                         Min Passing Marks:  24

Attempt any **five questions**, selecting **one question** from **each unit**. All Questions carry **equal** marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/ calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No.205)

1._____                                            2._____

### UNIT -I

Q. 1   a) Describe engineering classification of Intact Rock after Deer and Miller..
                                                                               10

       b) Write the aim and objective of Rock mass classifications system for
       engineering problems.                                                    6

                                    OR

Q.1    a) Write in brief about the classification based on weathering.          10
       b) Write in brief important features of Terzaghi Rock classification.     6

### UNIT -II

Q. 2   a) Define the following terms in rock mechanics:- Porosity, Density, Moisture
       Content and Permeability.
       b) Write short note on any one of the following
       (i) "Brazillian test' for testing of rocks in Lab.
       (ii) Sample preparation of rocks for lab testing.
                                                                                8

                                    OR

Q.2 a) Define shear strength. Explain Tri axial shear test on rocks.

10

b) Write the procedure of conducting the uni axial compressive strength test on rocks.

6

## UNIT -III

Q. 3 a) Write the name of the different "In Situ Tests", conducted for testing the deformability of rock mass and describe any one of them.

2+8=10

b) Write note on any one of the following.
(i) FLAT-JACK TEST
(ii) Necessity of In Situ Tests.

6

OR

Q.3 a) Describe in brief the strength criteria of jointed rocks.  10
b) Write short note on any one of the following
i) joint properties
ii) Orientation of joints

8

## UNIT -IV

Q. 4 a) Describe in brief Rama murthy Criteria of strength for intact Rocks. .
b) Write in brief about Kulatilake methodology for strength of rocks

8+8=16

OR

Q.4 a) Describe in brief history of Hock and Brown failure criterion in rock measure.
b) What is Parabolic strength criteria.

10+6=16

## UNIT -V

Q. 5 a) Define grouting and describe in brief Stage and Packer methods of grouting. 10
b) Write short note on any one of the following
i) gunting
ii) Mechanism of rock bolting

6

10+6=16

OR

Q.5 a) Write in brief about the bearing capacity of intact rocks.  10
b) Write, short notes on the bearing capacity of jointed rocks.  6