Register Number:

Name of the Candidate:

**3203**

# B.E. DEGREE EXAMINATION, 2011

**(CIVIL ENGINEERING)**

(FIFTH SEMESTER)

**CLEC-503/PCLEC-105/CSEC-504/PCSEC-305. STRUCTURAL MECHANICS-I**

**(Old Regulation)**

**(For the students joined during 2006-07 and before)**

Nov.)

(Time: 3 Hours

Maximum: 60 Marks

***Answer any ONE FULL question from each unit***

***All questions carry equal marks***

## *UNIT-I*

1. A girder of 15m span is traversed by a moving load as shown in figure.1.Determine the maximum bending moment at E, 7m form the left hand support.

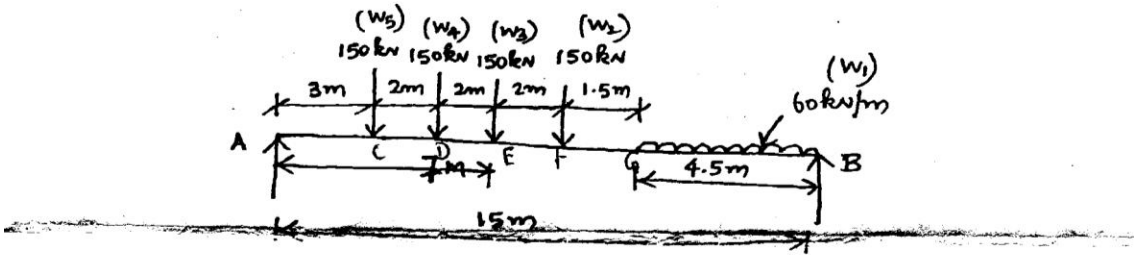


fig-1

(12)

2. A single rolling load of 100kN moves a girder of span 20m. Construct the influence line for
   a) Shear force.
   b) Bending moment for a section 5m form left support. (12)

## *UNIT-II*

3. A continuous beam ABC is loaded as shown in figure-2.Detemient all reactions and draw shear force and bending moment diagrams.

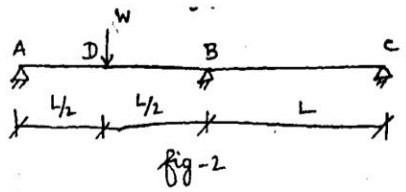


fig-2

(12)

4. For the beam as loaded in the figure3, draw the shear force and bending moment diagrams.

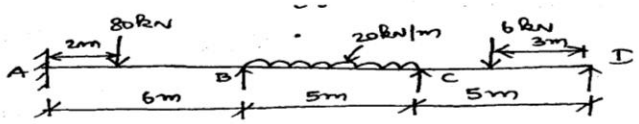


fig – 3

(12)

## UNIT-III

5. A three hinged parabolic arch has span of 40m and a central rise of 8m. Five wheel loads of 4,4,6,6 and 5 tonnes spaced 2, 3, 2 and 3m in order, cross the arch from left to right with the 4kN load leading. When the leading load is 25m form the left hand hinge, calculate the horizontal thrust in the arch. Also calculate the bending moment, normal thrust and shear force at the section under the tail load. (12)

6. A parabolic two hinged arch has span 'L' and central rise 'r'. Calculate the horizontal thrust at the hinges due to
   a) udl of 'w' over the entire span and
   b) udl 'w' over half the length of the span. (12)

## UNIT-IV

7. A cable is used to support five equal and equidistant loads over a span of 30m. Find **the length of the cable required and its sectional area if the safe tensile stress is** $140N/mm^2$. The central dip of the cable is 2.5m and loads are 5kN each. (12)

8. The three hinged stiffening girder of a suspension bridge of 100m span is subjected to two point loads of 10 kN each placed at 20m and 40m respectively form the left hand hinge. Determine the BM and SF in the girder at section 30m form each end. Also determine the maximum tension in the cable which has a central dip of 10m. (12)

## UNIT-V

9. The portal frame shown in figure -4 has fixed ends. If D sinks by Δ, find the moments induced in the frame. All the memebres have same uniform cross section.

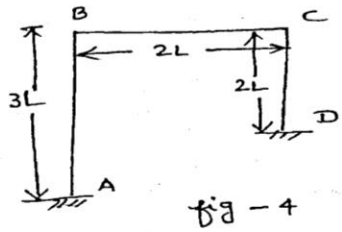


fig – 4

12



10. A beam ABC, 12m long, fixed at A and C and continuous over support B, is loaded as in figure.5. Calculate the end moments and plot B.M diagram. EI is constant.

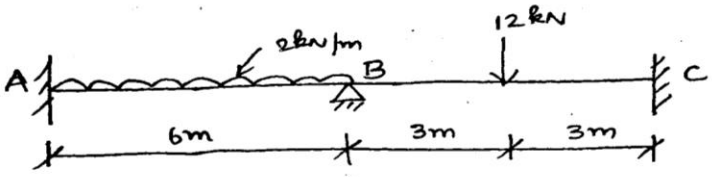


fig – 5

# B.E. DEGREE EXAMINATION, 2011

**(CIVIL ENGINEERING)**

**(FIFTH SEMESTER)**

**CLEC-504 / CSEC – 505/PCLEC-204/ PCSEC-304/PCLEC-302.**

**SOIL MECHANICS**

***(For the Students joined during 2006-07 and before)***

***(Old Regulations)***

November] [Time: 3 hours

Maximum : 60 Marks

Answer ALL questions Assume any missing data.
All questions carry equal marks

## UNIT-I

1. What is geologic cycle? Explain the phenomena of formation and transportation of soils.

(OR)

2. A compacted cylindrical specimen, 50 mm dia and 100 mm length, is to be prepared from oven-dry soil. If the specimen is required to have a water content of 15 % and the percentage air voids of 20 %, calculate the mass of the soil and water required for the preparation of the sample. Take G = 2.69.

## UNIT- II

3. What are the different methods for determination of the co-efficient 'of permeability in a laboratory? Discuss their limitations.

(OR)

4. If the effective grain size of the soil is 0.3 mm, estimate the co-efficient of permeability. Take Hazen's C = 10.

## UNIT-III

5. What is an influence diagram? What is its use in practice?

(OR)

6. Two columns A and B are situated 6m apart. Column A transfers a load of 500 kN and column B, a load of 250 kN. Determine the resultant vertical stress on a horizontal plane 20 m below the ground surface at points vertically below the points A and B.

## UNIT-IV

7. What is Mohr's strength theory for soils? Sketch typical strength envelopes for a clean sand.

(OR)

8. A cylindrical soil sample failed at an axial load of 140 $kN/m^2$ in an unconfined compression test. The failure plane makes an angle of 54 degree with horizontal. Determine the soil properties.

## UNIT-V

9. Write short note on Friction Circle Method.

(OR)

10. Determine the factor of safety with respect to shear strength of a slope 12 m high and having an inclination of 30° a soil with C =25 $kN/m^2$, $\phi$ = 12° and $\gamma$ = 18.6 $kN/m^3$.

Register Number: **3210**

Name of the Candidate:

# B.E. DEGREE EXAMINATION, 2011

## (CIVIL ENGINEERING)

## (FIFTH SEMESTER)

## CLEC-504. SOIL MECHANICS

## (New Regulations)

## (For the students joined during 2007-08 and after)

Nov.] [Time : 3 Hours

Maximum : 60 Marks

***Answer any ONE FULL Question from each unit***
***Assume any missing data***

### UNIT-I

1. Describe in detail about the Indian system of soil classification. (12)

2. Explain the "proctor compaction test" and state on what factors it depends. (12)

### UNIT-II

3. Explain how the permeability of a soil is affected by various factors. (12)

4. Describe the various form of soil water in detail. (12)

### UNIT-III

5. Write a brief critical note on Newmark's influence chart. (12)

6. Distinguish between consolidation settlement and secondary settlement. (12)

### UNIT-IV

7. The following data were obtained in a direct shear test. Normal pressure=25kN/$m^2$, tangential pressure =18kN/$m^2$. Angle of internal friction =20°, cohesion=8kN/$m^2$. Represent the data by Mohr's circle and compute the Principal stresses and the direction of the Principal planes. (12)

8. Write brief critical notes on: (12)
   a) Unconfined compression test
   b) Triaxial test

## UNIT-V

9. An embankment is inclined at an angle of 36° and its height is 15m. The angle of shearing resistance is 15°and the cohesion interrupt is 200kN/$m^2$. The unit weight of soil is 18kN/$m^3$. If Taylor's stability number is 0.06, find the factor of safety with respect to cohesion. (12)

10. Write critical notes on the friction circle method of analyzing the stability of slopes. (12)

---

4

8. Design a solid bridge for effective span of 5·5 m. The clear road way is 6·8 m. The bridge is to be designed for class-A and class AA loading.

**UNIT – V**

9. Design a steel roof truss for a clear span of 6m with king post. The length of the roof is 12·0 m, between and walls. Rise of the truss = 1·60m

(OR)

10. Design a roof truss, having a pitch of 1/4 and span of 10m. The trusses are spaced at 4m c/ c. Use G.I sheets for roofing.

Register Number :

Name of the Candidate :

**3 2 1 1**

**B.E. DEGREE EXAMINATION, 2011**

**(CIVIL ENGINEERING )**

(FIFTH SEMESTER)

**CLEC-505 / PCLEC - 403. STRUCTURAL ENGINEERING - II**

*( New Regulations )*

*( For the students joined during 2007-08 and after )*

November ] [ Time : 3 Hours

Maximum : 60 Marks

*Answer ONE FULL question from each unit.*
*ALL questions carry equal marks.*

**UNIT - I**

1. Describe the design steps to be followed for a multi–storyed frame structure.

(OR)

2. The figure - 1 showing the multi-storyed frames are spaced 4m intervals. Dead load from the slab is 3000 N / $m^2$ and live load is 5000 N / $m^2$ Design the frame.

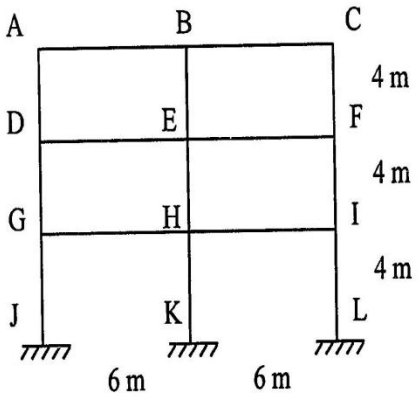


Figure - 1

**UNIT – II**

3. Describe different types of retaining walls; general design requirements and choice of type of retaining wall, with sketches.

(OR)

4. A retaining wall is to retain level surface of earth to a height of 5m. The density of earth is 15000 $N/m^3$ and the angle of repose of soil is $30^o$.



The bearing capacity of soil is 100 KN / $m^2$ Coefficient of friction = 0·6. Determine the thrust on the wall.

**UNIT – III**

5. Design a rectangular water tank for capacity of 100,000 litres. The depth of tank is to be 3 m and length to breadth ratio 1·5. The tank is resting on the ground.

(OR)

6. Design an elevated tank in rectangular shape of 12m × 5m × 4m high. The bottom of the tank is 12m above ground level. The tank is covered at top. Bearing capacity of the soil is 150 KN / $m^2$.

**UNIT – IV**

7. Design a slab bridge for the following data:

   Clear span = 6m;

   Clear width of roadway is 7·8 m;

   Live load – class-A loading ;

   Mix used-M20.

   Average thickness of wearing coat = 10 cm.

(OR)

**Turn Over**

egister Number: **3206**

ame of the Candidate:

# B.E. DEGREE EXAMINATION, 2011

## (CIVIL ENGINEERING)

## (FIFTH SEMESTER)

## :LEC-506/PCLEC-604. STRUCTURAL DESIGN AND DRAWING-II

## (Old Regulations)

## (For the students joined during 2006-07 and before)

ɔv.] [Time : 3 Hours

Maximum : 60 Marks

***Answer any ONE FULL Question***
***Use of relevant I.S. codes permitted***
***Use of steel tables permitted***

1. ~~An open rectangular tank 4m×6m×3m deep rests on firm ground.~~
   Design the tank. Use M20mix. (30)
   i) Draw the sectional plan at a depth of 1m. (10)
   ii) Sections on the middle and long walls. (10)
   iii) Bar bending schedule. (10)

(OR)

2. Design a knee braced truss for a span of 18m. The spacing of the trusses is 4m. The roof is to be covered with galvanized corrugated sheeting. Take pitch of the truss ¼. The truss is in the region where there is no snow fall and the wind pressure intensity is 150kg/$m^2$. The height of caves above the ground level is 6m. (40)
   Draw the elevation of roof truss and details of the joints. (20)

---