11/01/23
(S1)
O/C

Course Code: **SOE-B-CE601**

# O P JINDAL UNIVERSITY

**III B. Tech. VI Semester Backlog Examinations**

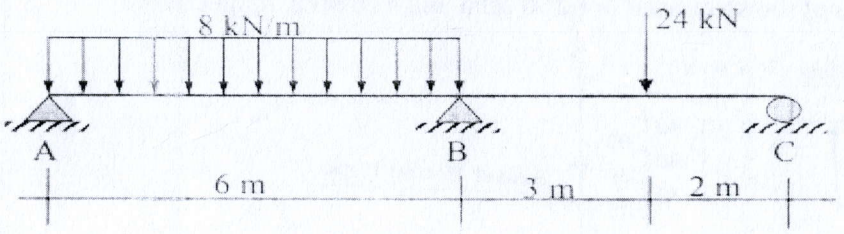
**SED II**

(Offered to Civil Engineering)

**Time: 3 Hrs.** **Max. Marks: 100**

Solve all questions from section A

(Solve any two from each unit)

| | | | M | CO | KL |
|---|---|---|---|---|---|
| **Section-A( Solve all questions)** | | | | | |
| Q.1 | a. | What is the criterion to decide spacing section in built up columns? | 2 | CO4 | KL1 |
| | b. | Explain effective length of compression member | 2 | CO4 | KL1 |
| | c. | What are laterally supported and laterally unsupported beams. | 2 | CO5 | KL1 |
| | d. | What do you mean by net area and net effective area of tension member | 2 | CO3 | KL1 |
| | e. | What you mean by built up column? What are the cross sections | 2 | CO4 | KL1 |
| | f. | List different types of structural sections | 2 | CO1 | KL1 |
| | g. | Define: i)Nominal diameter ii) Gross diameter iii) Pitch | 2 | CO1 | KL1 |
| | h. | Draw force transmission in HSFG Bolt. | 2 | CO2 | KL1 |
| | i. | What do you mean by bolt value | 2 | CO2 | KL1 |
| | j. | Define plastic hinge | 2 | CO1 | KL1 |
| **Section-B: (Solve any two from each unit)** **Unit-I** | | | | | |
| Q.2 | a. | Compute plastic moment for the portal frame shown in figure   | 8 | CO1 | KL2 |
| | b. | Calculate shape factor for tringle section (dimensions b,h) | 8 | CO1 | KL2 |
| | c. | Compute collapse load for the Propped cantilever beam point load W kN at a distance b from propped end. | 8 | CO1 | KL2 |

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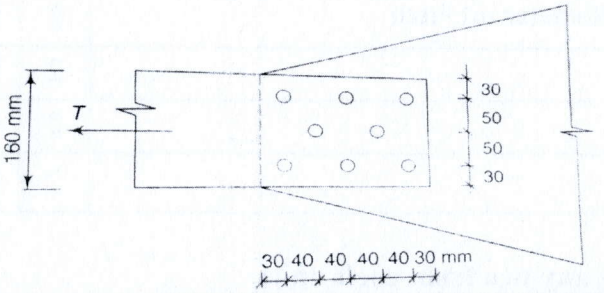
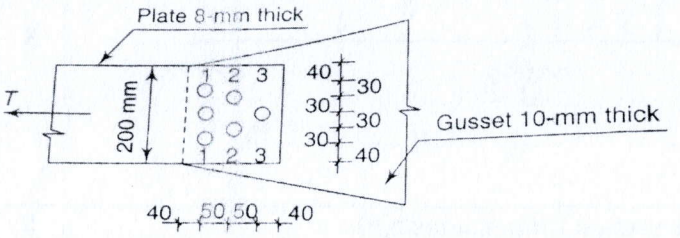
|---|---|---|---|---|---|
| | | **Unit-II** | | | |
| Q.3 | a. | Design a lap joint between two plate 12 mm and 20 mm. to transmit a factored load of 80 KN using M 16 Bolts of grade 4.6 and grade 410 plates. | 8 | CO2 | KL2 |
| | b. | Calculate strength(KN) based on block shear (for case rupture in shear and yieldig in tension) when Avg=2450 sq.mm Avn= 1823 sq.mm Atg=618 sq.mm Atn=325 sq.mm. assume yield stress of steel=250 N/sq.mm and Ultimate stress of steel=410 N/sq.mm | 8 | CO2 | KL2 |
| | c | Calculate strength(KN) based on block shear (for case rupture in shear and yieldig in tension) when Avg=2000 sq.mm Avn= 1800 sq.mm Atg=800 sq.mm Atn=250 sq.mm. assume yield stress of steel=250 N/sq.mm and Ultimate stress of steel=410 N/sq.mm | 8 | CO2 | KL2 |
| | | **Unit-III** | | | |
| Q.4 | a. | Select suitable angle section to carry a factored tensile force of 300 kN. Assume single row of M20 bolts and assuming design strength as $f_y$ 250 N/mm$^2$ | 8 | CO3 | KL2 |
| | b. | Determine the design tensile strength of plate (160 mm x 8 mm) connected to 10mm thick gusset using 16mm bolts as shown in figure if the yield and the ultimate stress of the steel used are 250 MPa and 410 MPa, respectively.   | 8 | CO3 | KL2 |
| | c | Determine the design tensile strength of plate (200 mm x 8 mm) connected to 10 mm thick gusset using 20 mm bolts as shown in figure if the yield and the ultimate stress of the steel used are 250 MPa and 410 MPa, respectively.   | 8 | CO3 | KL2 |

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|---|---|---|---|---|---|
| **Unit-IV** | | | | | |
| Q.5 | a. | Design laced column 10m long to carry a factored axial load of 1100 kN. Column is hinged at both ends. Provide single lacing system with bolted connection. Design the column with two channels back to back. | 8 | CO4 | KL2 |
| | b. | Design base plate for an ISMB 500 column to carry a factored load of 1500 kN. Assume Fe 410 grade and M25 Concrete. | 8 | CO4 | KL2 |
| | c. | Calculate compressive resistance of ISA150 x 150 x 16 mm angle assuming that the angle is loaded through only one leg, when it is connected by two bolts at the ends. | 8 | CO4 | KL2 |
| **UNIT-V** | | | | | |
| Q.6 | a. | Calculate deflection of ISMB 300 steel beam 4m long subjected to imposed load udl of 20 KN/m. | 8 | CO5 | KL1 |
| | b. | Design a simply supported beam of span 3m carrying a reinforced concrete floor capable of providing lateral restraint to the top compression flange. The uniformely distributed load is made up of 15 kN/m imposed load and 18 kN/m dead load. Assume fy 250 steel. E=2 x $10^5$ N/mm$^2$ | 8 | CO5 | KL2 |
| | c. | Calculate deflection of ISMB 400 steel beam 4.5m long subjected to imposed load udl of 25 KN/m. | 8 | CO5 | KL1 |

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Course Code: SOE-B-CE602

# O P JINDAL UNIVERSITY

**B. Tech. VI Semester Backlog Examinations**

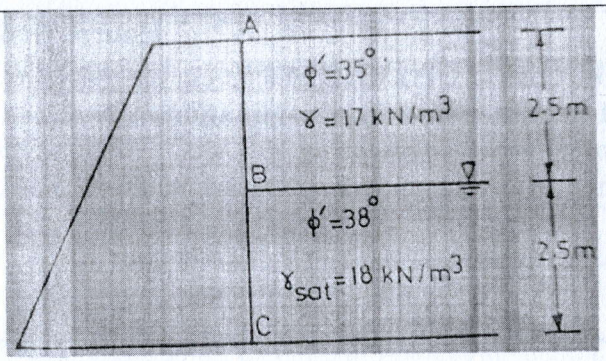
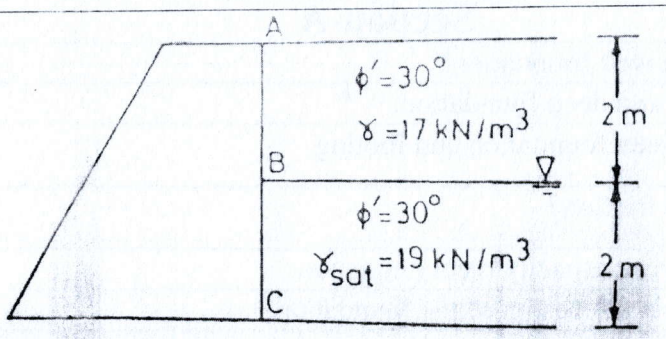
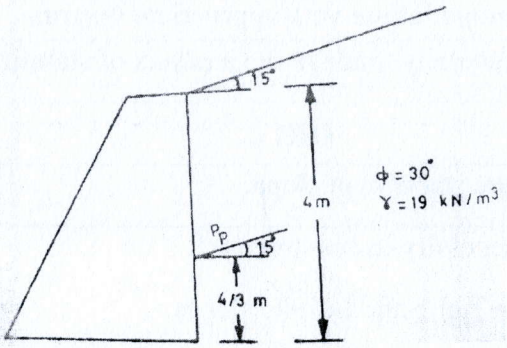
**Geotechnical Engineering II**

(Offered to Civil Engineering Department)

**Time: 3 Hrs.** **Max. Marks: 100**

Answer any one question from each unit
All questions carry equal marks

| | | | M | CO | KL |
|---|---|---|---|---|---|
| **Section-A** | | | | | |
| 1 | a. | What is grip length in well foundation? | 2 | 5 | 1,2,4 |
| | b. | Differentiate shallow and deep foundation. | 2 | 3 | 1,2 |
| | c. | Write difference between foundation and footing. | 2 | 3 | 1,2 |
| | d. | What is negative skin friction? | 2 | 4 | 1,2,3 |
| | e. | Write Terzaghi's bearing capacity theory equation. | 2 | 3 | 1,3,4 |
| | f. | Write two basic criteria for design of the foundation. | 2 | 3 | 2,3,4 |
| | g. | What is sheet pile wall? | 2 | 4 | 1,2 |
| | h. | Write difference between active and passive earth pressure? | 2 | 2 | 1,2,4 |
| | i. | What are the problems associated with expansive soils? | 2 | 5 | 1,2 |
| | j. | Define earth slope and causes of its failure. | 2 | 1 | 1,4 |
| **Section-B: Unit-I** | | | | | |
| 2 | a. | Describe different types of slope failure with appropriate diagram. | 8 | 1 | 2,3,4 |
| | b. | What are assumptions are generally made in the analysis of stability of slope? | 8 | 1 | 2,4 |
| **OR1** | | | | | |
| 3 | a. | Write methods to improve the stability of slope. | 8 | 1 | 2,3,4 |
| | b. | (i) What is a slope and its necessity in construction?<br>(ii) Write difference between finite and infinite slopes. | 8 | 1 | 2,3,4 |
| **Unit-II** | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| 4 | a. |  <br>Determine the active pressure on the retaining wall shown in the figure .Take . $\Upsilon w=10kN/m3$. | 8 | 2 | 3,4,5 |
| | b. |  <br>Determine the lateral earth pressure at rest per unit length of the wall showing in figure .Also determine the location of the resultant earth pressure. Take $K_0$=1-SinnΦ' and $\Upsilon_w$=10kN/m$^3$. | 8 | 2 | 3,4,5 |
| | | **OR** | | | |
| 5 | a. | Describe design aspects of retaining wall. | 8 | 2 | 3,4,5 |
| | b. | (i)<br>  <br>Determine the active pressure on the wall shown in the figure using Rankine theory.<br>(ii) Describe different types of retaining wall with proper diagram. | 8 | 2 | 3,4,5 |
| | | **Unit-III** | | | |

| | | | | | |
|---|---|---|---|---|---|
| 6 | a. | Describe different types of shallow foundation with appropriate diagram. | 8 | 3 | 1,2 |
| | b. | Describe different modes of shear failure with appropriate diagram. | 8 | 3 | 1,2 |
| | | **OR** | | | |
| 7 | a. | Determine the allowable gross load and the net allowable load for a square footing of 2m side and with a depth of a foundation of 1.0m.Use Terzaghi's theory and assume local shear failure. Take a factor of safety of 3.0.The soil at the site has $\Upsilon$=18kN/m$^3$, C'=15kN/m$^2$ and $\Phi$'=25$^0$.<br>(Nc =14.8, Nq=5.6, N$\gamma$=3.2). | 8 | 3 | 3,4,5 |
| | b. | (i)Write the assumptions of Terzaghi's bearing capacity theory.<br>(ii)How water table influences the bearing capacity of the foundation. | 8 | 3 | 1,2,3 |
| | | **Unit-IV** | | | |
| 8 | a. | A concrete pile, 30cm diameter, is driven into medium dense send ($\Phi$=35$^0$,$\Upsilon$=21kN/m$^2$,K=1.0,tan $\sigma$=0.70) for a depth of 8m.Estimate the safe load ,taking a factor of safety of 2.50.Given $D_c/B$=12.0.$N_q$=60. | 8 | 4 | 3,4,5 |
| | b. | How the load carrying capacity of piles are estimated? | 8 | 4 | 2,3,4 |
| | | **OR** | | | |
| 9 | a. | (i) How could you measures group efficiency of pile?<br>(ii) What is under reamed pile? What is its primary objectives? | 8 | 4 | 2,3,4 |
| | b. | Describe various types of pile foundation. | 8 | 4 | 1,2,3 |
| | | **UNIT-V** | | | |
| 10 | a. | Write components of a well foundation with appropriate diagram. | 8 | 5 | 1,2 |
| | b. | In order to design a stable foundation on expansive soil,What measures should be taken? | 8 | 5 | 1,2,3 |
| | | **OR** | | | |
| 11 | a. | What are the measures taken for rectification of tilts and shifts of well foundation? | 8 | 5 | 2,3,4 |
| | b. | Write construction stages of well foundation. | 8 | 5 | 2,3 |

***Best of luck***

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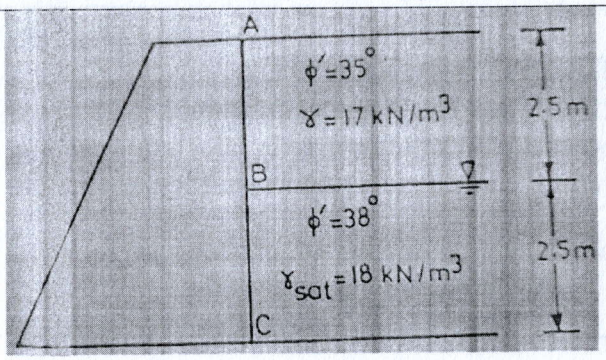
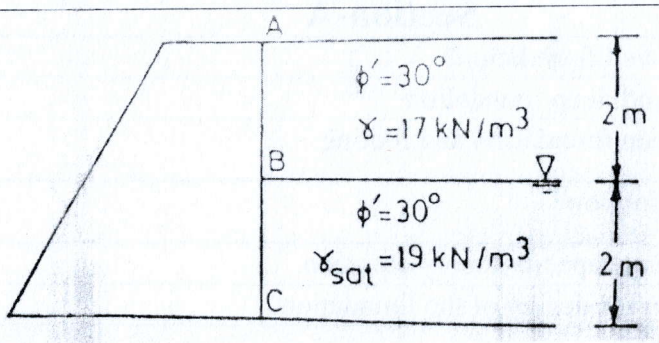
| 4 | a. |  <br>Determine the active pressure on the retaining wall shown in the figure .Take $\Upsilon w=10kN/m3$. | 8 | 2 | 3,4,5 |
| | b. |  <br>Determine the lateral earth pressure at rest per unit length of the wall showing in figure .Also determine the location of the resultant earth pressure. Take $K_0$=1-Sinn$\Phi$' and $\Upsilon_w=10kN/m^3$. | 8 | 2 | 3,4,5 |
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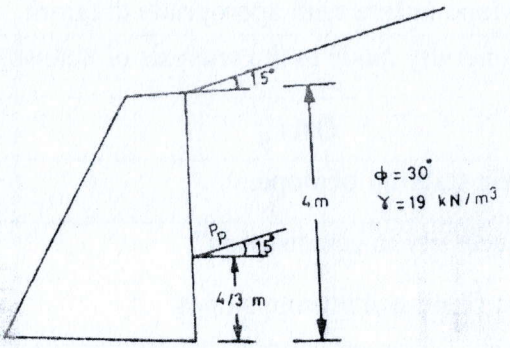
| | b. | (i)<br>  <br>Determine the active pressure on the wall shown in the figure using Rankine theory.<br>(ii) Describe different types of retaining wall with proper diagram. | 8 | 2 | 3,4,5 |
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