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# B.E. (Civil Engineering) (Semester - VII) (Old)

## Examination, November - 2017

## EARTHQUAKE ENGINEERING

## Sub. Code: 47903

**Day and Date :Wednesday, 15 - 11- 2017** **Total Marks : 100**

**Time :2.30 p.m. to 5.30 p.m.**

**Instructions :**

1) **Attempt any three questions from each section.**
2) **Figures to the right indicate full marks.**
3) **Assume suitable data whenever necessary.**
4) **Use of non-programmable calculator and I.S. 1893: 2002 (Part I) are allowed.**

## SECTION-I

**Q1)** a) What are causes of earthquake? Explain in brief plate tectonic theory. **[8]**

b) Classify and describe with suitable sketches, different types of seismic waves generated by an earthquake. **[8]**

**Q2)** a) Define Logarithmic decrement, how it is measured and derive the equation of Logarithmic decrement. **[7]**

b) The building frame shown in the Fig.1 is given a 100 mm lateral displacement and released from the rest to vibrate freely. Find the logrithmatic decrement and displacement of the system afte 12 cycles and comments on the result. Consider 10% damping. Take $EI_{column} = 1.1 \times 10^{12}$Nmm. **[9]**

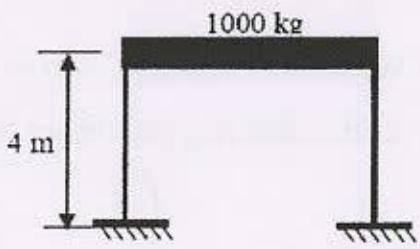


Fig. 1

*P.T.O.*

**Q3)** a) Explain in details Force Transmission Ratio. **[05]**

b) A SDOF system consists fo 5 m high column of 600 mm diameter which supports the heavy mass of 10500 kg at its top. The system is subjected to a harmonic force of 1800 sin50$t$ N. Consider 20% damping and E = $2 \times 10^5$. Calculate the maximum dynamic amplitude and also state whether the system will have resonance or not? **[11]**

**Q4)** Calculate the base shear for a five storey hospital building having special moment resisting frame (SMRF) located in Pune on medium soil with following data using seismic coefficient method. **[18]**

a) No. of bay in x and y-direction = 4

b) Width of each bay = 5m

c) Thickness of slab = 150 mm

d) Storey height = 3.2 m

e) Size of beam and column = 300 mm × 450 mm

f) Amount of damping = 5% of critical damping

g) Live load = 4kN/m$^2$

Assume any additional data if required and neglect the weight of the infill wall panels.

## SECTION-II

**Q5)** a) Explain earthquake design philosophy for building. **[8]**

b) Explain soft storey? Explain how soft storey probelms can be eliminated in the existing buildings. **[8]**

**Q6)** a) Explain how "ductility of building" can be effectively designed. **[8]**

b) What are the ductile detailing provisions for column? Explain with neat sketches. **[8]**

**Q7)** a) What points should be kept in mind while designing earthquake resistant brick masonry structure? **[8]**

b) Discuss in detail the advantage of horizontal bands and vertical reinforcement in the masonry buildings. **[8]**

**Q8)** Write a short note (Any three): **[18]**

a) Stud Wall Construction.

b) Strong column and weak beam.

c) Effect of soft storey of RC structure.

d) Jacketing of column.

*EEE*

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Total No. of Pages : 2

# B.E. (Civil) (Semester-VII) (Revised) Examination, November - 2017

## SOLID WASTE MANAGEMENT (Elective-I)

## Sub. Code : 67569

**Day and Date : Thursday, 23-11-2017** **Total Marks : 100**

**Time : 2.30 p.m. to 5.30 p.m.**

**Instructions :**
1) **All questions are compulsory.**
2) **Figures to the right indicate full marks.**
3) **Make assumptions wherever necessary.**
4) **Use of non-programmable calculator is allowed.**

### SECTION-I

**Q1)** Answer any two of the following: **[2×8=16]**

a) What is Solid Waste and Solid Waste Management? Write the objectives of SWM.

b) State the composition of MSW. Describe the compositions.

c) Write note on Biomedical Waste Management.

**Q2)** Answer any two of the following: **[2×9=18]**

a) Explain with the help of flow diagram, the functional elements of Municipal Solid Waste Management.

b) Explain the methods of solid waste collection with a neat sketch.

c) Explain in detail with help of figure the different types of Transfer Station.

**Q3)** Answer any two of the following: **[2×8=16]**

a) List out the different equipment used for processing solid waste and explain any one with neat sketch.

b) What is MRF? Explain the processes for MSW at these facilities with flow diagram.

c) Explain with the figure the different types of air classifiers methods.

*P.T.O.*

## SECTION-II

**Q4)** Answer any two of the following: **[2×9=18]**

a) What is Sanitary landfilling? Write the site selection criteria for sanitary landfilling.

b) Draw the cross section of sanitary landfill and explain the essential components.

c) Identify the adverse effects of a landfill leachate and its appropriate control measures.

**Q5)** Answer any two of the following: **[2×8=16]**

a) What is composting? Explain composting process of bio degradable MSW.

b) Explain mechanical composting plant with flow diagram.

c) Explain the different factors affecting composting.

**Q6)** Answer any two of the following: **[2×8=16]**

a) Explain the working of an incinerator with a neat sketch.

b) Write the air pollution problem associated with incineration system and its control techniques.

c) Describe pyrolysis and its products.

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Total No. of Pages : 2

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# B.E. (Civil) (Semester-VII) Examination, November - 2017
## GROUND IMPROVEMENT TECHNIQUES (Elective-I)
### Sub. Code : 67571

**Day and Date : Thursday, 23-11-2017** **Total Marks : 100**
**Time : 2.30 p.m. to 5.30 p.m.**

**Instructions :**
1) **Que. No. 1 from section-I and Que. No. 5 from section-II are compulsory.**
2) **Solve any two other questions from each of the section.**
3) **Figures to the right indicates full marks.**

## SECTION-I

**Q1)** Answer the following: **[4×5=20]**

a) Explain the various types of vertical drains used in ground improvement.

b) What is mean by dynamic consolidation.

c) Explain use of stone column as ground improvement method.

d) Enlist various ground improvement technique according to their suitability.

**Q2)** a) How do vertical drains improve the functioning of pre-loading? Explain with neat sketch. **[8]**

b) Explain various components of ground Anchor. **[7]**

**Q3)** a) Explain design procedure of stone column. **[8]**

b) Explain construction sequence of soil nailing. **[7]**

**Q4)** Write a short note on **[3×5]**

a) Classification of ground improvement technique

b) Soil nailing

c) Rock Anchor in grannuar soil

*P.T.O.*

## SECTION-II

**Q5)** Answer the following: **[4×5=20]**

a) Enlist various factor affecting the soil stabilization.

b) Explain the earth reinforcement mechanism.

c) Write down the various application of earth reinforcement.

d) Enlist different types of geosynthetics.

**Q6)** a) Compare and enlist the various method of soil stabilization. **[8]**

b) Explain the various application of geosynthetics with respect to

i) reinforcement ii) separator

iii) filter iv) drainage **[7]**

**Q7)** a) Explain the stress-strain relationship of reinforced soil. **[8]**

b) Explain the various types of grout used in ground improvement. **[7]**

**Q8)** Write a short note on: **[5×3]**

a) Function of geosynthetics

b) Fly-ash soil stabilization

c) Selection of geosynthetics

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Total No. of Pages : 3

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# B.E. (Civil) (Part - IV) (Semester - VIII)
# Examination, November - 2017
# DESIGN OF CONCRETE STRUCTURES - II
## Sub. Code : 67748

**Day and Date : Wednesday, 1 - 11 - 2017** **Total Marks : 100**

**Time : 10.00 a.m. to 1.00 p.m.**

**Instructions :**
1) **Attempt any three questions from each section.**
2) **Figures to the right indicate full marks.**
3) **Assume suitable data wherever necessary and mention it clearly.**
4) **Use of non programmable calculator is allowed.**
5) **Use of relevant IS Codes are allowed.**

## SECTION - I

**Q1)** Design rectangular beam for limit state of collapse in torsion for following data. **[16]**

Size of beam = 400 × 700mm, over all

Factored Shear force = 95 KN

Factored Bending moment = 180 KN.m

Factored Torsion Moment = 55 KN.m

Effective cover = 50mm

Use M20 and Fe 415

**Q2)** A RCC beam ABCD spanning over four supports carries a live load of 12KN/m and dead load from walls 300mm, 2.8 high. If M20 grade concrete and Fe 415 grade steel is to be used. Design the continuous beam using IS-456 - 2000 provision. Span AB = BC = CD = 6m Take unit weight brick wall 19KN/$m^3$. Draw a sketch showing reinforcement details. **[16]**

**Q3)** Design a square water tank resting on ground having dimensions 4m × 4m and height of water is 3m. Assume free board of 0.2m. Use M20 and Fe 415 grades. **[16]**

*P.T.O.*

**Q4)** a) Write a note on balanced, under reinforced and over reinforced section as per WSM. **[9]**

b) Explain the concept of moment of redistribution. **[9]**

## SECTION - II

**Q5)** a) Explain in details three concepts of pre-stress concrete section in analysis. **[8]**

b) Explain systems of pre-stressing with figures. **[8]**

**Q6)** A pre-stressed concrete beam of rectangular section 300mm × 600mm has a span of 10m. The effective pre-stressing force is 980KN at constant eccentricity of 120mm. The dead load of beam is 4.5KN/m and the beam has to carry a live load of 7.5KN/m **[16]**

Determine the extreme stresses,

a) At the end section

b) At the midsection without action of live load

c) At mid section with action of live load.

**Q7)** A post tensioned pre-stressed concrete beam of 16m span is subjected to an initial pre-stress of 1458KN. The profile of the cable is parabolic with the maximum eccentricity of 520mm at the center of span. **[16]**

$A = 2.42 \times 10^5 mm^2$, $I = 5.30 \times 10^{10} mm^4$, $As = 1386 mm^2$,

$Es = 2.1 \times 10^5 N/mm^2$, $Ec = 3.82 \times 10^4 N/mm^2$

$\mu = 0.25$, $k = 0.0015/m$, anchorage slip = 2.5mm, creep coefficient = 1.5, $\alpha = 0.13$

Determine the following losses in pre-stress,

a) Elastic shortening.

b) Shrinkage in concrete.

c) Creep in concrete.

d) Slip in anchorage.

e) Frictional loss.

**Q8)** Design a pre-tensioned concrete rectangular section for the following details

Effective span of beam = 12m.

Live load of intensity = 30 KN/m.

Concrete grade = M 35

Ultimate stresses tendon = 1450 N/mm$^2$

Loss of pre-stress = 20%

Assume Safe stress is 0.6 times Ultimate stress in tendon.

Permissible stress in concrete at transfer stage is 0.5 $\sigma_{CK}$

Permissible stress in concrete at working stage is 0.4 $\sigma_{CK}$

Permissible tensile stress in concrete at transfer and working stage is 1.2 N/mm$^2$ **[18]**

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Total No. of Pages :3

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# B.E. (Civil Engineering) (Semester - VIII)
## Examination, November - 2017
## STRUCTURAL DESIGN OF FOUNDATION AND RETAINING STRUCTURES (Elective - II)
### Sub. Code: 67753

**Day and Date :Monday, 06 - 11- 2017** **Total Marks : 100**

**Time :10.00 a.m. to 1.00 p.m.**

**Instructions :**
1) **Solve any two questions from each section.**
2) **Figures to the right indicate full marks.**
3) **Use of IS 456- 2000 is allowed.**
4) **Assume suitable data if necessary and mention it clearly.**
5) **Use of non-programmable calculator is allowed.**

## SECTION-I

**Q1)** Two columns A and B 5 m apart between centres carry loads 840 kN and 1200 kN. Design a 2 m wide combined rectangular footing for the columns. The footing shall consist of a central longitudinal beam with cantilevering slabs on either side. Each column is 400 mm × 400mm. The safe bearing capacity of soil is 150 kN/m$^2$. Use M 20 grade concrete and Fe 415 steel.**[25]**

**Q2)** A column carrying a load of 2500 kN has to be supported on 4 piles each of size 300 mm × 300 mm. The piles are spaced at 1.00 m centres as shown in figure.1. The column size is 600 mm × 600 mm. Design the pile cap. Use M 20 grade concrete and Fe 415 steel. **[25]**

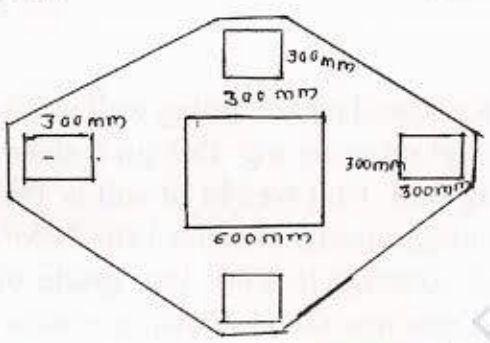



Fig. 1



*P.T.O.*

**Q3)** Design a suitable continuous raft foundation connecting the columns of a building 12 m × 12 m shown in figure to suit the following data. **[25]**

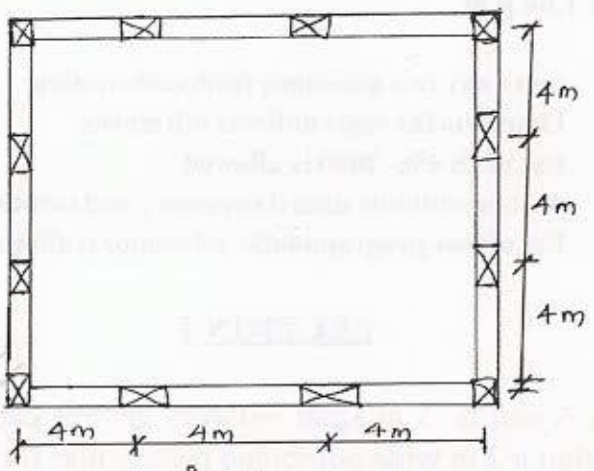
a) Spacing of column = 4 m C/C

b) Service load transmitted = 500 kN on each column.

c) Size of column = 300 mm × 300 mm.

d) Safe bearing capacity = 150 kN/m$^2$.

e) M 20 concrete and Fe 415 steel.



figure

## SECTION-II

**Q4)** a) Draw neat sketch of well foundation and explain function of each component part in detail. **[12]**

b) Enlist different types of well foundation explain each in detail wiht neat sketch. **[13]**

**Q5)** A steam of cantilever retaining wall is 3.8m tall, The cantilever retaining wall retains soil up to its top. Design a steam, toe and heel slab of a cantilever retaining wall. Unit weight of soil is 19KN/M$^3$. The angle of repose is 30°. Safe bearing capacity of soil is 180KN/M$^2$. The coefficient of friction between soil and concrete is 0.60. Use grade of concrete $M_{20}$ and grade of steel Fe 415. Draw neat sketch showing reinforcement details of cantilever retaining wall. **[25]**

**Q6)** a) Explain breakwater and its application? Draw a neat sketch and explain vertical wall break water. **[12]**

b) Design armor of rubble mound breakwater if depth of water is 17.0m. Wind velocity is 165Km/Hour. Fetch of wave is 260KM. Allowable bearing pressure on rock is 800KN/$M^2$. **[13]**

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b) Differentiate between free hold property and lease hold property. [5]

c) Write the significance of sinking fund and derive its expression. [5]

**Q8)** Write short note on (any three): [18]

a) Building lease and occupational lease.

b) Valuer and his duties.

c) Different types of values.

d) Arbitration.

EEE





Total No. of Pages :4

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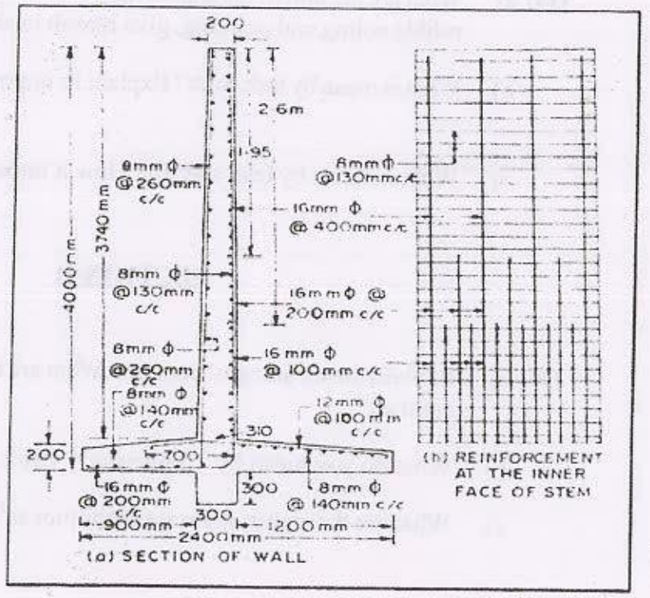
# B.E. (Civil) (Semester - VII) (New Course)
## Examination, November - 2017
## QUANTITY SURVEYING & VALUATION
### Sub. Code: 67560

**Day and Date :Wednesday, 15 - 11- 2017** **Total Marks : 100**
**Time :2.30 p.m. to 6.30 p.m.**

**Instructions :**
1) **Q.No. 1 is compulsory.**
2) **Attempt any two questions from remaining questions of section I.**
3) **Attempt any three questions from section II.**
4) **Assume any other additional data if required and state it clearly.**

## SECTION-I

**Q1)** Work out the quantities of below retaining wall 50m in length as stated. **[20]**




*P.T.O.*

a) Calculate concrete quantity in standard format.

b) Prepare a BBS of given figure in standard format.

**Q2)** a) Write different types of estimate and state various items to be included in it. **[5]**

b) What is DSR? Prepare analysis of rate for a RCC isolated box footing of area 2.5Ssq.M, and 3.1Sq.M each for a concrete depth 350mm. **[10]**

**Q3)** a) Which are the various extra charges taken in to account for preparing detailed estimate and why? Explain in detail. **[8]**

b) Write unit of measurement of any three civil engineering items. Write mode of measurement for excavation and concrete. **[7]**

**Q4)** a) What are the unit of measurement for skirting, door handle, steel sections, rubble soling and pointing, give reason in short. **[5]**

b) What is mean by task work? Explain its importance with suitable example. **[5]**

c) What is mean by lead and lift? How it impacts the cost? **[5]**

## SECTION-II

**Q5)** a) Explain the meaning of contract. What are the reasons of for rejection of contract? **[7]**

b) What do you mean by "Tendering"? Draft a sample tender notice. **[5]**

c) What are the rights and responsibilities of parties of contract. **[5]**





**Q6)** a) Explain valuation by development method. **[6]**

b) A plot shown in figure is to be valued according to the following details: **[10]**

i) Front width is 50m

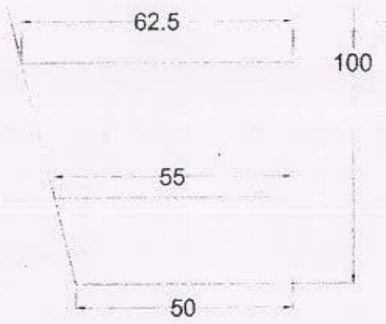
ii) Rear width is 75m

iii) Initial depth is 20m

iv) Market rate of land in the same locality is Rs. 375psm.

Use belting method of valuation.

75




**Q7)** a) A plate compactor was purchased at Rs. 80,000/-. Assume salvage value to be 10% after 8 years, Calculate depreciation for every year by following methods: **[6]**

i) Straight line method

ii) Constant percentage method.

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Total No. of Pages : 3

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# B.E. (Civil) (Semester-VII) (Revised) Examination, November - 2017
## PROJECT MANAGEMENT AND CONSTRUCTION EQUIPMENT
### Sub. Code : 67561

**Day and Date : Tuesday, 21 - 11 - 2017** **Total Marks : 100**

**Time : 2.30 p.m. to 5.30 p.m.**

**Instructions :** 1) **Attempt any THREE questions from each Section.**
2) **Figures to the right indicate full marks.**

## SECTION-I

**Q1)** a) Explain the role of various agencies involved in a construction project. **[8]**

b) A project consists of following activities with their duration in days. **[9]**

| Activity | 1-2 | 1-3 | 1-4 | 2-5 | 3-6 | 4-5 | 4-6 | 4-7 | 5-7 | 6-7 |
|---|---|---|---|---|---|---|---|---|---|---|
| Duration (days) | 6 | 3 | 4 | 0 | 4 | 12 | 10 | 8 | 5 | 6 |

Draw the network. Find out critical path and project duration.

Following conditions exists at the end of 10th day,

i) Activities 1-2, 1-3, 1-4 have been completed as per schedule.

ii) Activities 4-5, 4-6, 3-6 are in progress and will require 6,6 and 1 more days for its completion, respectively.

iii) Other activities have not been started and their duration holds good except activity 5-7 which will require only 3 days instead of 5 days as planned originally.

Update the network.



***P.T.O.***

)2) a) Explain the concept of Normal and Beta Distribution in P.E.R.T. [8]

b) With the information given in the table draw the network for a construction project. Determine the critical path and its standard deviation. Find Probability of completion of project in 40 days. (For Z = 1.7, Pr. = 95.54%; For Z = 1.8, Pr. = 96.41%) [9]

| Activity | Optimistic time | Most likely time | Pessimistic time |
|---|---|---|---|
| 1-2 | 2 | 5 | 8 |
| 2-3 | 8 | 11 | 20 |
| 3-4 | 0 | 0 | 0 |
| 2-4 | 4 | 7 | 16 |
| 2-5 | 4 | 9 | 20 |
| 4-6 | 7 | 10 | 13 |
| 5-6 | 3 | 7 | 17 |
| 3-7 | 3 | 5 | 13 |
| 6-7 | 2 | 3 | 10 |
| 7-8 | 2 | 4 | 6 |

)3) a) Explain various safety equipment used on construction sites. [8]

b) What are the common risks on construction projects? How will you identify these risks? [9]

)4) Write notes on any FOUR. [16]

a) Objectives of Project Management.

b) Milestone Chart.

c) Resource Allocation.

d) Safety Policy.

e) Safety Training.





## SECTION-II

)5) a) Explain the construction and operation of Bulldozer with neat sketch. [8]

b) Explain working of Scraper with neat sketch. [8]

)6) a) Explain the construction and working of 'Clamshell'. [8]

b) Enlist various types of compacting equipment. Explain any ONE with sketch. [9]

)7) a) Explain the 'safety measures' in blasting operations. [8]

b) Explain in detail 'Well Point System' of dewatering with neat sketches. [9]

)8) Write notes on any FOUR. [16]

a) Mechanical v/s Manual Construction.

b) Use of Tractors in construction.

c) Tippers.

d) Detonators.

e) Necessity of drainage in excavations.

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# B.E. (Civil Engineering) (Semester - VII)
## Examination, November - 2017
## EARTHQUAKE ENGINEERING (New)
## Sub. Code : 67559

**Day and Date : Monday, 13-11-2017** **Total Marks : 100**

**Time : 2.30 p.m. to 5.30 p.m.**

**Instructions :**
1) **Figures to the right indicate full marks.**
2) **Assume any suitable data whenever necessary.**
3) **Use of non-programmable calculator and I.S. 1893: 2002 (Part I) are allowed.**

## SECTION - I

**Q1)** a) What is mean by plate boundaries? Explain in details. **[8]**

b) Classify ad describe with suitable sketches, different types of waves generated by an earthquake? **[8]**

**Q2)** a) Derive the equation of motion and its solution for free damped vibration system. **[8]**

b) Find the natural frequency and natural period for the building frame shown in the fig. 1. During test the frame is given 40 mm initial lateral displacement and released from the rest to vibrate freely. Find the displacement after 4 seconds and number of cycles when amplitude reduced to 1/20 of maximum.Consider 10% damping. Take $EI_{Column} = 1.5 \times 10^{12}$ N.mm$^2$, $EI_{Beam} = \infty$. **[10]**

OR

b) A SDOF system consists of 5 m high column of 450 mm diameter which supports the heavy mass of 20 tonne at its top. The system is subjected to a harmonic force of 200 Sin 40t kN. Consider 20% damping & $E = 2.1 \times 10^5$ N/mm$^2$. Calculate the maximum dynamic amplitude. Also, state whether system will have resonance or not? **[10]**

***P.T.O.***

Q3) Calculate base shear in the critical direction only for BSNL office in Pune with following data by seismic coefficient method. **[16]**

a) No. of storey = 4

b) No. of bay in x direction = 3

c) No. of bay in y direction = 1

d) storey height = 3 m

e) Width of each bay = 5 m

f) Total DL on roof = 12 $kN/m^2$

g) Total DL on floor = 10 $kN/m^2$

h) LL = 4 $kN/m^2$,

i) Thickness of slab = 120 mm

All columns having their longer side in X direction. Neglect weight of infill walls. Assume suitable data if required. Write all your assumptions & clauses of IS 1893 (2002). Building is provided with additional viscous dampers which will increase damping by 10%.

## SECTION - II

Q4) a) Explain ductile detailing of beam as per IS 13920: 1993. Also give limitation of this code. **[10]**

b) Explain four virtue of good earthquake resistant design. **[8]**

OR

b) Explain soft storey & discuss its performance of soft storey building in past earthquakes. How will you avoid soft storey? **[8]**





Q5) a) Define the shear wall and its classification? Describe the structural behavior of shear wall? **[8]**

b) Draw the detailed sketch of **[8]**

i) Different ways of beam jacketing as IS code and.

ii) Different ways of columns as per IS code.

Q6) a) Explain in details concept of Friction Pendulum Bearings? **[8]**

b) Explain Tuned Liquid Dampers with its working principal? **[8]**

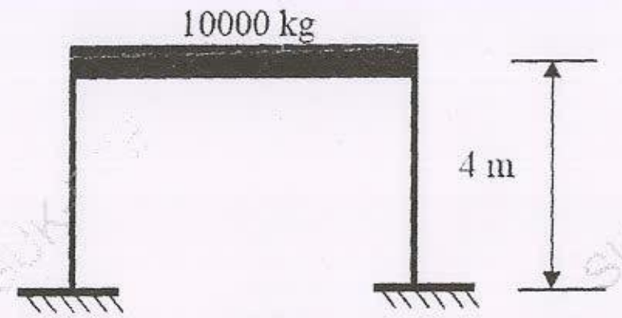


Fig 1.

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# T.E. (Civil) (Semester - VI) (Revised) Examination, November - 2017
## GEOTECHNICAL ENGINEERING - II
### Sub. Code: 66874

**Day and Date :Thursday, 02 - 11 - 2017** **Total Marks : 100**
**Time :2.30 p.m. to 5.30 p.m.**

**Instructions :**
1) **All questions are compulsory.**
2) **Figures to the right indicate full marks.**
3) **Make assumptions wherever necessary.**
4) **Use of non-programmable calculator is allowed.**

## SECTION-I

**Q1)** Solve any three from following. **[18]**

a) Explain bore hole logging with sketch for soil and rock exploration.

b) List engineering properties of rock. Explain any one with method for determination.

c) Explain elastic settlement of shallow foundation.

d) List types of bearing capacity failure of soil. Explain any one with sketch.

**Q2)** Solve any two from following. **[16]**

a) Explain standard penetration test for determination of bearing capacity.

b) A plate load test was carried out on a ground having uniform sand strata up to sufficient depth. The size of the plate used was 30cm×30cm. Determine the bearing capacity and load that can be taken by a column foundation of size 1.2 m× 1.2 m in the above strata for an allowable settlement of 2 cm.

| Load(kN) | 4.5 | 9 | 18 | 27 | 36 | 45 | 54 |
|---|---|---|---|---|---|---|---|
| Settlement (mm) | 0.75 | 1.25 | 2.0 | 3.5 | 5.38 | 7.75 | 10.75 |



***P.T.O.***

c) Write and explain equation of net ultimate bearing capacity of soil for general shear failure by IS code method with shape, depth, inclination of load and water table factor.

**)3)** Solve any two from following. **[16]**

a) Explain stepwise procedure for design of strap foundation with required equations and sketch.

b) Design a trapezoidal combined foundation for following data:

| Column | Size | Load | Remark |
|---|---|---|---|
| A | 0.50×0.50 m | 2000kN | Column A is on boundary of plot.C/c distance between columns is 5.0 m.Safe bearing capacity of soil is 200kN/m² |
| B | 0.30×0.30m | 1500kN | |

c) A rectangular foundation of 6.0 mt × 4.0 mt size carries a uniform load intensity 160kN/sq.m and is located at a depth of 1.5 m in a layer of clay having $E=4\times10^4$kN/sq.m and Poisson's ratio as 0.38. This clay layer underlain by second layer of silty soil having $E=7\times10^4$kN/sq.m and Poisson's ratio as 0.48. A hard strata lies below the second layer. Determine the elastic immediate settlement of the foundation.

## SECTION-II

**)4)** Solve any three from following: **[18]**

a) What is group efficiency of pile group? Explain Feld's rule.

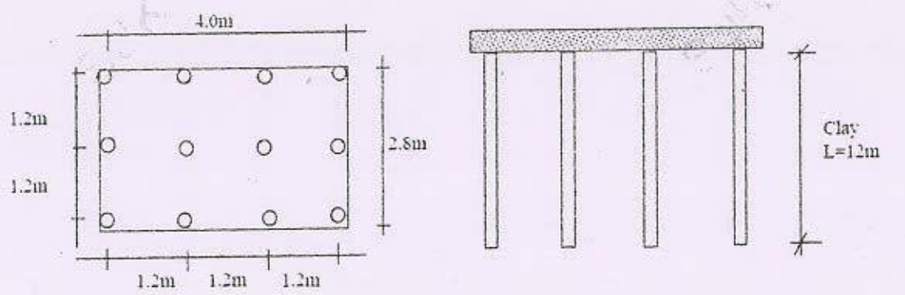
b) Explain with neat sketch under reamed pile and their uses.

c) A rectangular pile of section 0.60 m ×0.75 m and length 12 m penetrates a deposit of clay with c=42 kN/m². Assuming m=0.75, determine the magnitude of negative skin friction.





d) Find the allowable bearing capacity of a single pile in the group of piles given below, by using: Converse-Labarre Formula. Given data:- Diameter: 400mm,Cu=50kPa, $\gamma=18$kN/m³ F.S.=2.5




**)5)** Solve any two from following: **[16]**

a) Describe the methods of rectifying the tilt in the well during sinking operation.

b) Explain with fig. sand island method.

c) Write the different types and material used for sheet pile.

**)6)** Solve any two from following: **[16]**

a) Explain the friction circle method of slope stability analysis.

b) Name the techniques used in ground improvement and explain any one.

c) A slope 1 in 2 with a height of 8 m has the following properties of soil are Cu = 28 kN/m², angle of internal friction = 10° and unit weight of soil is 18 kN/m³, Stability Number = 0.064. Calculate factor of safety with respect to cohesion. What will be critical height of the slope in this soil?

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# T.E. (Civil) (Semester - VI) (Revised) Examination, November - 2017
## THEORY OF STRUCTURES
### Sub. Code: 66873

**Day and Date :Wednesday, 01 - 11 - 2017** **Total Marks : 100**

**Time :2.30 p.m. to 5.30 p.m.**

**Instructions :**
1) **All questions are compulsory.**
2) **Figures to the right indicate full marks.**
3) **Use of non-programmable calculator is allowed.**
4) **Assume suitable data if necessary.**

## SECTION-I

**Q1)** a) Explain in brief 'Static Indeterminacy of Structures'. **[5]**

b) Analyze the propped cantilever beam AB of 5m span, fixed at A and propped at B when subjected to a point load of 5kN at 3m from left end A. Take fixed end moment '$M_A$' as a redundant. Also draw SFD and BMD. **[12]**

OR

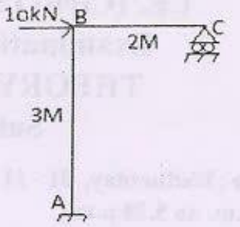
A fixed beam AB 5m in span is subjected to a point load 5kN at 3m from left end A. Analyze the beam by taking '$R_B$' and '$M_B$' as redundants. Draw SFD and BMD.

**Q2)** a) Explain 'Unit load Method' to find slope and deflections in structural members. **[5]**



*P.T.O.*

b) The bent ABC is subjected to lateral load of 10kN as shown in the fig.1 below. Determine the reactions at support C by strain energy method. Draw SFD and BMD **[12]**



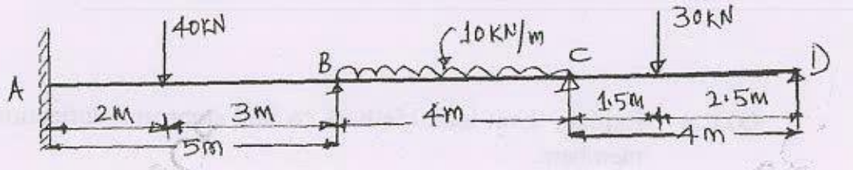

(FIG.1)

3) A continuous beam ABCD is fixed at A and simply supported at B and C with CD as a overhang wherein AB=4m BC=3m and CD=2m. The span AB is subjected to a udl of 10kN/m throughout, span BC to a point load of 25kN at its midpoint and point D is acted upon by a clockwise couple of 50kNm. During loading support C settles by 5mm. Draw SFD and BMD. Take $EI_{BC} = 2\times10\text{^}4kN/m\text{^}2$. $EI_{AB} = 2EI_{BC}$. **[16]**

## SECTION-II

4) A two span continuous beam ABC has span AB of 6 m and Span BC of 4 m. End A is fixed while end C of the beam is simply supported. Span AB carries through u.d.l of 20 KN/m and BC carries central point load 40kN.Span AB has its inertia double that of span BC. Analyse the beam using slope deflection method. Draw SFD and BMD. **[17]**

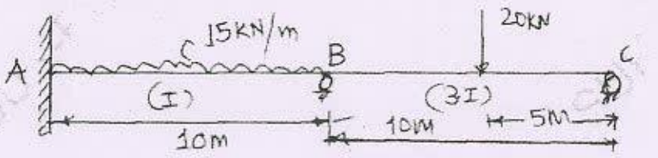
5) Analysis the continuous beam loaded as shown in fig.by method of moment Distribution method. Sketch the BMD and SFD. **[17]**





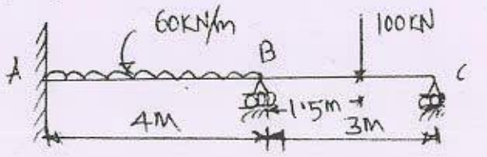



6) Analysis the two span continuous beam as shown in fig. by stiffness matrix method. Also draw BMD. **[16]**




OR

Analysis the continuous beam as shown in fig.by flexibility matrix method. Take EI constant throughout. **[16]**



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Total No. of Pages :3

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# T.E. (Civil) (Semester - V) (Revised) Examination, November - 2017
## GEOTECHNICAL ENGINEERING - I
### Sub. Code: 66238

**Day and Date :Monday, 20 - 11 - 2017** **Total Marks : 100**
**Time :10.00 a.m. to 1.00 p.m.**

**Instruction :**
1) **All questions are compulsory.**
2) **Figures to the right indicate full marks.**
3) **Make assumptions wherever necessary.**
4) **Use of non-programmable calculator is allowed.**

## SECTION-I

**Q1)** Answer any three of the following. **[18]**

a) Derive the relation for bulk unit weight of soil in terms of Sp. Gravity, water content, void ratio of soil and unit weight of water.

b) List and explain corrections applied to hydrometer reading in wet mechanical analysis.

c) Explain soil structures according to structural composition of sedimented soil.

d) A soil has a dry density of 1.72 gm/cc in the natural condition. When the 840 gm of the dry soil was poured in a container in a loose state its volume was 602 cc. The same soil when vibrated and compacted was found to have volume of 440 cc. Determine relative density of the soil.

**Q2)** Answer any two of the following. **[16]**

a) Explain Darcy's law and its validity used for permeability of soil.

b) Explain flow net. Derive Laplace equation in two dimensional flow used for flow net construction.



***P.T.O.***

c) The results of constant head permeability test on soil are follows:-

Internal diameter of permeameter - 7.5 cm.

Head lost over a soil sample length of 18 cm- 24.7 cm

Quantity of water collected in 60 seconds - 626 cc

Porosity of the soil sample - 44%

Determine the coefficient of permeability of soil and also discharge velocity and seepage velocity during the test.

**Q3)** Answer any two of the following. **[16]**

a) List laboratory methods for determination of compaction factors. Explain any one.

b) Explain fixed ring type consolidometer test for determination of compressibility characteristics of soil with neat sketch.

c) The following are the results of the standard Proctor compaction test.

| | | | | | |
|---|---|---|---|---|---|
| Mass of mould and compacted soil (gm) | 2925 | 3095 | 3150 | 3125 | 3070 |
| Water content (%) | 10.0 | 12.0 | 14.3 | 16.1 | 18.2 |

Volume of mould - 1000 cc, Mass of mould - 1000 gm,

Sp. Gravity of soil solids - 2.70

Plot the compaction curve showing OMC and MDD. Determine the degree of saturation at MDD.

## SECTION-II

**Q4)** Answer any three of the following. **[18]**

a) With a neat sketch explain pressure bulb and its significance.

b) Write a note on Newmark's chart.

c) Prove that maximum vertical stress on a plane at a distance '$r$' from concerned load Q acting at ground surface will be at a depth $z = 1.225r$.





d) A water tank is supported by a ring foundation having outer diameter of 8 m and inner diameter of 6m. The uniform load intensity on the foundation is 300kN/m$^2$. Compute the vertical stress caused by the water tank at a depth of 4 m below the center of the foundation.

**Q5)** Answer any two of the following. **[16]**

a) Explain unconfined compression test procedure with neat sketches.

b) An unconfined cylindrical specimen of clay fails under an axial stress of 240 kN/m$^2$. The failure plane was inclined at an angle of 55° to the horizontal. Determine the shear strength parameters of the soil.

c) The results of two drained triaxial tests on a saturated clay follows:-

Specimen I :- $\sigma_3$=70 kN/m$^2$ and $\sigma_d$=130 kN/m$^2$

Specimen II :- $\sigma_3$= 160 kN/m$^2$ and $\sigma_d$= 223.5 kN/m$^2$

Determine the shear strength parameters. Solved by analytical method.

**Q6)** Answer any two of the following. **[16]**

a) Derive an expression for Rankine's active earth pressure due to submerged cohensionless backfill with neat sketch.

b) A cantilever retaining wall of 7 m high retains sand. The properties of the sand are e = 0.5, $\phi$=30°, and G = 2.7. Using Rankine's theory determine the active earth pressure at the base when the backfill is

i) dry

ii) saturated and

iii) submerged.

c) A retaining wall 6 m high retains a clay backfill with c= 20 kN/m$^2$, $\phi$=15° and $\gamma$= 18 kN/m$^3$. Assume that the wall is smooth and the back vertical. It is expected that tension cracks may develop to the full theoretical depth. Calculate the total active earth force a acting on the wall.

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# T.E. (Civil) (Semester - V) (Revised) Examination, November - 2017
## ENVIRONMENTAL ENGINEERING - I
## Sub. Code :66237

**Day and Date : Tuesday, 14- 11 - 2017** **Total Marks : 100**

**Time : 10.00 a.m. to 1.00 p.m.**

**Instructions :** 1) **All questions are compulsory.**
2) **Assume and mention data if necessary.**

**Q1)** Answer Any Three of following. **[3 × 6 = 18]**

a) Explain the basis on which the water source is selected for water supply.

b) 'Water should be necessarily treated before municipal supply.' Explain.

c) State details of intake well from its place and importance point of view.

d) Explain design steps for intake well.

e) Write a note on Population Forecasting.

**Q2)** a) Design a cascade aerator for 10 MLD flow. **[8]**

b) Explain the concept of destabilization of colloidal particles during coagulation. **[4]**

c) Explain the concept of tube & plate settler. **[4]**

**Q3)** a) What is demineralization? Explain any one process in detail. **[6]**

b) Explain detailed operation of filtration process in rapid sand filter with diagram. **[6]**

OR

b) Explain water softening process. Explain any one in detail. **[6]**

c) Explain forms of chlorination. **[4]**



***P.T.O.***

## SECTION - II

**Q4)** Answer any three of following. **[3 × 6 = 18]**

a) Explain details of steel pipes with respect to strength, durability, leakage, laying, transportation, availability and advantages.

b) Mention necessity and types of reservoirs in detail.

c) Write a note on

i) Pumping mains

ii) Gravity mains

d) Explain the pressure testing process in detail.

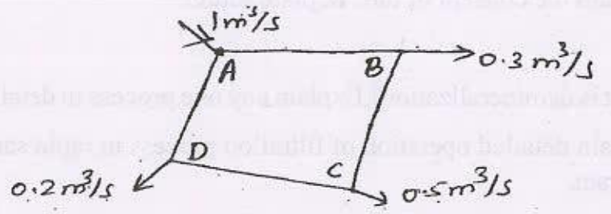
e) Explain factors considered for choice of pipe materials.

**Q5)** a) What are the various layout patterns of water distribution system? **[5]**

b) A pipe network consist of following pipes- **[8]**

| Pipe | Length(m) | Dia(mm) | Friction factor |
|---|---|---|---|
| AB | 400 | 300 | 0.014 |
| BC | 600 | 300 | 0.010 |
| AD | 500 | 400 | 0.012 |
| DC | 500 | 250 | 0.011 |

Inflow at A is 1 m3/s, while outflow at B,C and D are 0.3, 0.5 and 0.2 m3/s respectively. Find flow in pipes.




c) "Software plays a vital role in network analysis." Explain. **[3]**





**Q6)** a) Explain fire hydrants and water meter in detail. **[6]**

b) Explain the maintenance of water distribution system. **[6]**

OR

b) Write a note on green building materials. **[6]**

c) What is water budgeting? **[4]**

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Total No. of Pages : 3

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# T.E. (Civil) (Semester - V) Examination, November - 2017

## DESIGN OF STEEL STRUCTURES (New)

## Sub. Code : 66236

**Day and Date : Saturday, 11 - 11 - 2017** **Total Marks : 100**

**Time : 10.00 a.m. to 01.00 p.m.**

**Instructions :**
1) **All questions Compulsory.**
2) **Use of IS 800:2007, IS 875, Steel table, Non programmable calculator permitted.**
3) **Figure to the right indicate full marks.**
4) **Draw sketches wherever necessary.**
5) **Assume suitable data if required.**

## SECTION - I

*Q1)* a) What is serviceability Limit state? Explain. **[4]**

b) Write note on "High Strength Friction Grip (HSFG) bolts." **[4]**

c) A tension member is subjected to force of 150 KN. The member consists of a plate 75mm × 8mm in size is connected to 10mm thick gusset plate. The grade of steel is Fe 410. Design fillet weld if (a) Weld is provided on two sides of plate in direction of force. (b) Weld is provided on three sides of plate. **[8]**

*Q2)* a) Explain in brief with sketches the modes of failure of tension members. **[6]**

b) A tension member of a truss consist of two angles 75×50×6 which are provided on either side of a 10mm thick gusset plate. 20mm dia. Bolts are used in one row for connecting the member to the gusset plate. Determine design tensile strength of the member and also the number of bolts required to develop the design tensile strength. **[12]**

OR

b) Design an angle section to carry a factored tensile force of 200 kN. Bolts of 20mm diameter are to be provided for the connection of the member to the gusset plate. Take fy = 250Mpa and fu = 410 Mpa. **[12]**

*P.T.O.*

23) a) Explain the terms with reference to compression members, (i) Effective length of struts, (ii) Slenderness ratio. **[4]**

b) Two angles 90×60×8 are used as strut 3m long and connected to 10mm thick gusset plate at each end. Determine the design strength of the strut for the following cases. **[12]**

i) When the longer leg of the angle are connected on either side of gusset plate.

ii) When the longer leg of the angle are connected to same side of gusset plate

## SECTION - II

24) a) Why lacing is provided for column? How much load is taken by lacing. **[4]**

b) Design a 8m long built up column to carry a factored axial load of 1250 KN . The column is restrained in position but not direction at each end. The column shall consist of two channels placed toe to toe at a suitable spacing. **[12]**

OR

b) An ISHB400 @759.3 N/m column carries a factored axial load of 2000 KN. Design a slab base for the column. Assume that the bearing surfaces of the column and base plate are machined. The concrete footing is of M20 grade. **[12]**

25) a) What is web buckling and web crippling? How the beam checked against web bucking and crippling? **[6]**

b) A 150mm thick slab is supported on steel beams of effective span 5.25m which are spaced at 3.25m c/c. Allow live load of 3.50 kN/m$^2$ and a 40mm floor finish at 20 kN/m$^3$.Design the beam and check it for shear. **[12]**

26) a) Draw neat sketch of (i) crane gantry girder assembly (ii) the typical cross sections for gantry girder. **[4]**





b) The Crane system has the following data. Determine the design forces acting on it. **[12]**

- Crane capacity = 100kN
- Weight of crane girder = 90kN
- Weight of crab,motor,hook = 20kN
- Minimum hook Approach = 1.1 m
- Wheel base = 2.5 m
- Span of gantry girder = 5.5 m
- Weight of gantry girder = 8 kN
- c/c spacing of crane rails = 20 m

The crane is electrically operated.

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Total No. of Pages : 3

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# T.E. (Civil) (Semester-V) (Revised) Examination, November - 2017

## WATER RESOURCES ENGINEERING - I

### Sub. Code : 66235

**Day and Date : Thursday, 09-11-2017** **Total Marks : 100**

**Time : 10.0 a.m. to 1.00 p.m.**

**Instructions :**
1) **Que. 1 and 5 are Compulsory. Attempt any two questions from remaining questions from both sections.**
2) **Assume any suitable data if necessary, wherever needed.**
3) **Figures to the right indicate full marks.**

## SECTION-I

**Q1)** a) Explain infiltration capacity of the soil with help of a graph. Explain the effects of infiltration. **[6]**

b) Describe the procedure to construct unit hydrograph from storm hydrograph. **[6]**

c) Explain how discharge of the water stream is measured? Explain any one method in detail. **[6]**

**Q2)** a) Exnlist different methods of assessment of average precipitation. Explain any one method in detail with a neat sketch. **[8]**

b) Define evaporation process. Describe the factors affecting evaporation and also the measures to reduce it. **[8]**

**Q3)** a) Define unit hydrograph. List the assumptions and limitations involved in unit hydrograph theory. **[8]**

b) Given below are the ordinates of 4 hour unit hydrograph. Derive and plot 16 hour unit hydrograph. Describe the procedure in detail. **[8]**

| Time(hours) | 0 | 4 | 8 | 12 | 16 | 20 | 24 | 28 | 32 | 36 | 40 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Observed flow($m^3$) | 0 | 16 | 58 | 89 | 145 | 80 | 55 | 36 | 16 | 8 | 0 |



***P.T.O.***

**Q4)** Write detailed notes on: **[16]**

a) Abstract losses from precipitation

b) Factors affecting runoff

c) Site selection criteria for discharge measurement of river.

d) Flood frequency analysis

## SECTION-II

**Q5)** a) Define porosity, specific yield and specific retention and obtain relation between them. **[6]**

b) The base period, intensity of irrigation and duty of water for various crops under a canal system are given below. Determine the reservoir capacity if culturable commanded area is 40000 hectors, canal losses are 20% and reservoir losses are 10%. **[6]**

| Crop | Base period (Days) | Duty of water at the field (Hectors/ cumec) | Intensity of irrigation (Percentage) |
|---|---|---|---|
| Cotton | 180 | 1400 | 10 |
| Sugar cane | 360 | 1700 | 20 |
| Wheat | 120 | 1800 | 20 |
| Rice | 120 | 800 | 15 |
| Vegetables | 120 | 700 | 15 |

c) Explain Bandhara irrigation scheme in detail. **[6]**

**Q6)** a) Derive an expression for discharge from a well in unconfined aquifer the well fully penetrates it. **[8]**

b) Briefly explain role of ground water in water resources development of country. **[8]**





**Q7)** a) Explain in detail following: **[6]**

i) Intensity of irrigation

ii) Kor watering

iii) Kor depth

iv) Kor period

v) Crop ratio

vi) Overlap allowance

b) Explain estimation of evapo-transpiration by penman method. **[5]**

c) Discuss in brief water logging and land drainage. **[5]**

**Q8)** a) Explain need and importance of water shed management. **[8]**

b) Explain with neat sketch the layout, main components and working of percolation tanks also explain its advantages and disadvantages. **[8]**

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Total No. of Pages : 3

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# T.E. (Civil) (Part - III) (Semester - V) (Revised)
## Examination, November - 2017
## TRANSPORTATION ENGINEERING - I
## Sub. Code : 66239

**Day and Date : Wednesday, 22 - 11 - 2017** **Total Marks : 100**

**Time : 10.00 a.m. to 1.00 p.m.**

**Instructions :** 1) **All questions are compulsory.**
2) **Figures to the right indicate full marks.**

## SECTION - I

**Q1)** a) Explain the classification of roads according to Lucknow Road Plan. **[8]**

b) Explain the factors controlling the highway alignment. **[8]**

OR

b) What do you understand by 'Stopping Sight Distance'? State the factors affecting Stopping Sight Distance. Calculate the SSD on a level road for design speed of 60 kmph for two-way traffic on a single lane road. Assume coefficient of friction 0.36 and reaction time of driver as 2.5 Seconds. **[9]**

**Q2)** a) What is the significance of 'Penetration Test on Bitumen'? Explain the procedure in detail. **[8]**

b) Explain functions of the components of a flexible pavement with sketch. **[8]**

OR

b) Explain 'CBR Test'. How the pavement thickness is determined by CBR method? **[9]**



*P.T.O.*

Q3) a) What are the objects of conducting 'Traffic Volume Study'? Explain the methods of Traffic Volume Study. [8]

b) Explain the steps of construction of Cement Concrete Pavements. [8]

OR

b) State the necessity and methods of Highway Drainage. [8]

## SECTION - II

Q4) a) Explain movement of aeroplane about three axes with a neat sketch. [8]

b) Explain with sketches, [8]

i) Fillets,

ii) Holding Apron

OR

b) Determine the length of runway required for following data, [9]

Basic runway length under standard conditions = 1200m

Site elevation above M.S.L. = 900 m

Aerodrome reference temperature = 16°C

Effective gradient = 0.5%

Q5) a) Explain with sketches, [8]

i) Wave action on a sea wall

ii) Littoral Drift

b) Explain Dry Docks and Wet Docks. [8]

OR

b) Explain the requirements of a harbour. State the factors to be considered while selecting a harbour. [8]

Q6) a) Explain: [8]

i) Lighting in tunnels;

ii) Ventilation in tunnels

b) Explain 'Shield Method' of tunneling in soft ground with sketch. [8]

OR

b) Explain the operations in sequence in one cycle of tunneling in hard rock. [9]

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Total No. of Pages : 3

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# T.E. (Civil Engg.) (Part - II) (Semester - VI) (Revised) Examination, November - 2017
# ENGINEERING MANAGEMENT
## Sub. Code: 66875

**Day and Date : Friday, 03 - 11 - 2017** **Total Marks : 100**
**Time : 2.30 p.m. to 5.30 p.m.**

**Instructions :** 1) **All questions are compulsory.**
2) **Figures to right indicates full marks.**
3) **Assume suitable data if necessary.**

## SECTION - I

**Q1)** a) Enumerate principles of management given by Henry fayol and explain any three of them? **[8]**

OR

a) With suitable example explain decision tree? **[8]**

b) Four salesman are to be assigned to four district Estimates of sales revenue in thousands of rupees for each salesman is given below.

Assign salesman to the district. **[10]**

| Salesman | District | | | |
|---|---|---|---|---|
| | A | B | C | D |
| 01 | 32 | 35 | 40 | 28 |
| 02 | 40 | 25 | 30 | 22 |
| 03 | 42 | 27 | 34 | 30 |
| 04 | 25 | 39 | 41 | 35 |



*P.T.O.*

**Q2)** a) Enumerate types of organization? With neat organization structure diagram explain any one along with its advantages and disadvantages? **[8]**

OR

a) Define planning? Explain process and characteristic of planning? **[8]**

b) Calculate total cost of inventory & EOQ from following annual consumption of 36000 units, inventory carrying cost is 20%per annum with ordering cost 25 RS associated with one order & cost per item is 1 Rs? **[8]**

**Q3)** Write any two **[16]**

a) Derive derivation for EOQ formula.

b) State and describe importance of management in construction industry.

c) Explain ABC analysis concept with neat graph?

## SECTION - II

**Q4)** a) Suggest which equipment should be purchased if rate of interest is 12% per year by using present worth method.

| | Equipment A | Equipment B |
|---|---|---|
| Initial Cost (Rs) | Rs 25000/- | Rs 35000/- |
| Annual O & M cost (Rs) | Rs 9000/- | Rs 7000/- |
| Salvage value (Rs) | Rs 2000/- | Rs 3500/- |
| Life (in Years) | 5 | 5 |

**[12]**

b) With suitable example explain the term equivalence. **[6]**

OR

b) With suitable example explain the term time value of money. **[6]**

**Q5)** a) Draw a typical layout for site of construction of multistoried building. **[5]**

OR

a) What do you know about child labour act? **[5]**

b) What are the factors considered for site layout? **[5]**

c) Write a detailed note on building and other construction workers act. **[6]**

**Q6)** Write Any 2 **[16]**

a) Write down procedure for value analysis?

b) Draw quality circle organization structure and explain benefits of quality circle?

c) With neat flow chart describe the procedure of work study?

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Total No. of Pages :3

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# T.E. (Civil) (Semester - VI) (New) Examination, November - 2017

## ENGINEERING GEOLOGY

### Sub. Code: 66876

**Day and Date :Monday, 06 - 11- 2017** **Total Marks : 100**

**Time :2.30 p.m. to 5.30 p.m.**

**Instructions :**
1) **All questions are compulsory.**
2) **Answer to the two sections must be written in one and same answer book.**
3) **Figures to the right indicate full marks.**

## SECTION-I

**Q1)** Attempt any two of the following:

a) Describe with neat sketches depositional features formed by river. **[9]**

b) What is meant by Igneous Rock? Give the classification of Igneous Rocks on the basis of mode of occurrence. Mention one rock from each group. **[9]**

c) What are the parameters of fault? Explain the causes of faulting. **[9]**

**Q2)** Attempt any two of the following:

a) Explain in brief various process of weathering. **[8]**

b) What is metamorphism? Describe in detial the agents of metamorphism. **[8]**

c) Describe with the help of neat sketches the part of folds. Give in brief the Civil Engineering significance of fold. **[8]**



*P.T.O.*

**Q3)** Write short notes on: [16]

a) Interior of the Earth.

b) Grain size classification of Sedimentary Rocks.

c) Types of unconformity.

d) Scope of Engineering Geology.

## SECTION-II

**Q4)** Attempt any two of the following:

a) Explain the various causes of earthquake. Write a brief note on RIS. [9]

b) Describe the internal causes of landslides. [9]

c) With a suitable sketch explain the zones of groundwater. [9]

**Q5)** Attempt any two of the following:

a) Explain the various steps in the preliminary geological investigation at a civil engineering site. [8]

b) Data obtained from a drill hole at foundation site is as follows. [8]

i) Top of borehole- R.L.410 m.

ii) Bottom of borehole- R.L. 380 m.

iii) Length of each piece of core obtained between 400m and 397m is, 16, 11, 13, 09, 08, 21, 23, 06, 05, 09, 08, 14, 19, 23, 21, 16, 18, 07, 06, 07, 10

Find,

1) Total length of core recovered

2) Core Recovery

3) Core loss

4) RQD

c) Explain the suitable and unsuitable conditions for excavating a tunnel. **[8]**

**Q6)** Write short notes on the following: **[16]**

a) Dams on Deccan Trap.

b) Overbreak.

c) Observations during drilling.

d) Confined aquifer.

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