Roll No. : _____

Total Printed Pages : 7

5E5061

5E5061

B. Tech. (Sem. V) (Main & Back) Examination, November 2018
Civil Engineering
5CE1A Theory of Structures - I

Time : 3 Hours

Maximum Marks : 80
Min. Passing Marks : 26

*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. NIL _____   2. NIL _____

UNIT - I

1 (a) Determine the static and kinematic indeterminancy of following structures shown in fig 1(a) and 1(b).
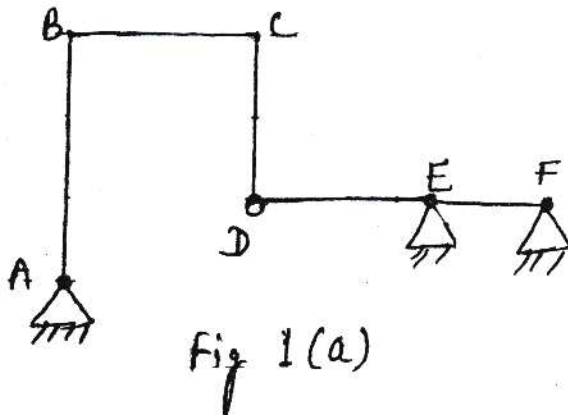

Fig 1 (a)   Fig 1 (b)
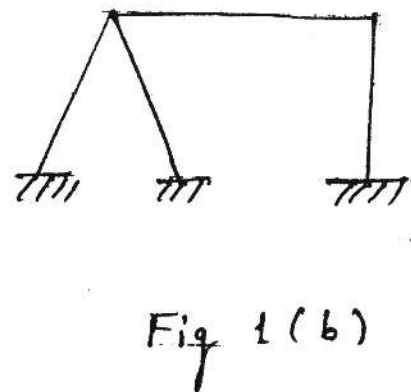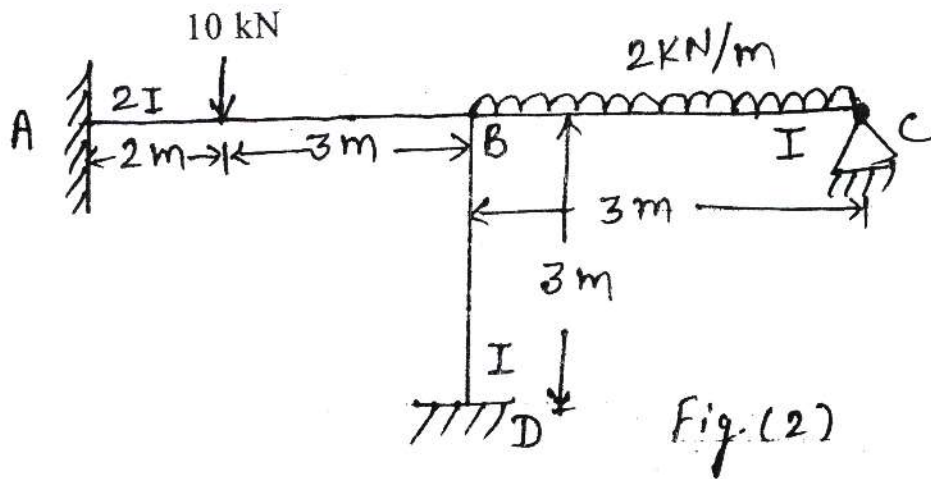
4

333

(b) Analysis the continuour beam ABC supported on an elastic column BD using Slope-Deflection method. Draw Bending Moment Diagram.
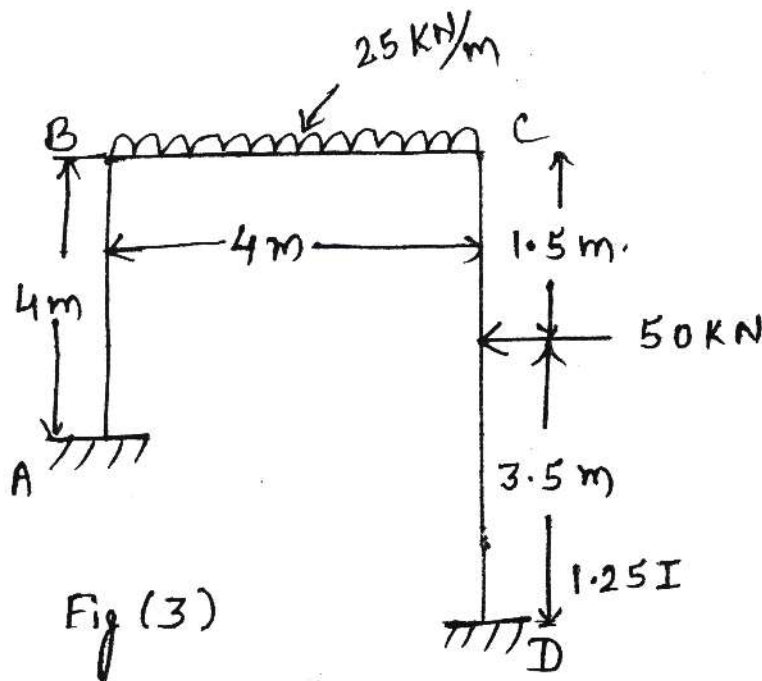

Fig. (2)

12

OR

1 (a) Write Betti's theorem.

2

(b) Analysis the portal frame shown in fig. (3) by using Slope-Deflection Method.
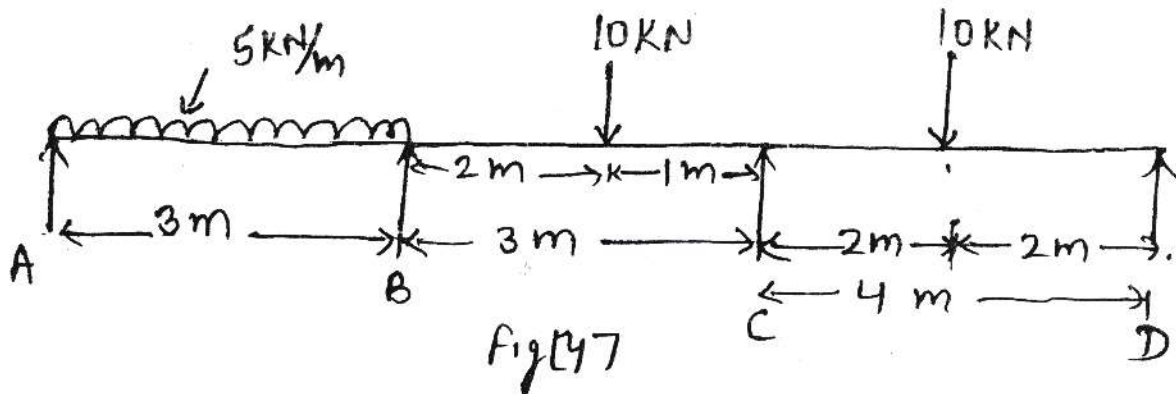

Fig (3)

14

UNIT - II

2 (a) Define distribution factor and carry over factor using Moment Distribution Method.

2

(b) Analysis given continuous beam ABCD, if the support A sink by 10 mm, B sink by 30 mm and c settles by 20 mm. The moment of Inertia I is 2.4×10^6 mm^4, take E = 2×10^5 N/mm^2.

Fig[47

Also draw B.M.D. and deflected shape.

14

OR

2 Analyze the give frame shown in fig. (5). Draw B.M.D. and deflected shape.

Fig. [5]
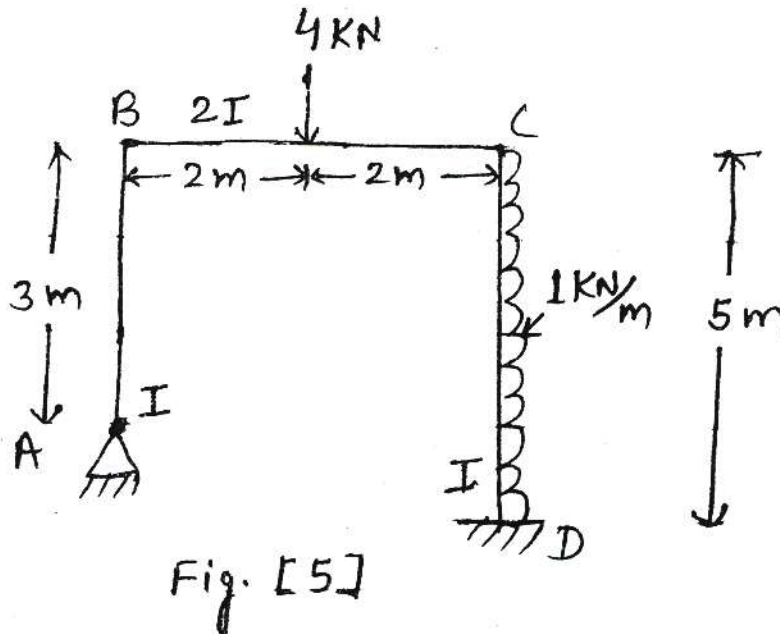
16

UNIT - III

3 Compute the forces in all the members of cantilever truss shown in fig. (6).
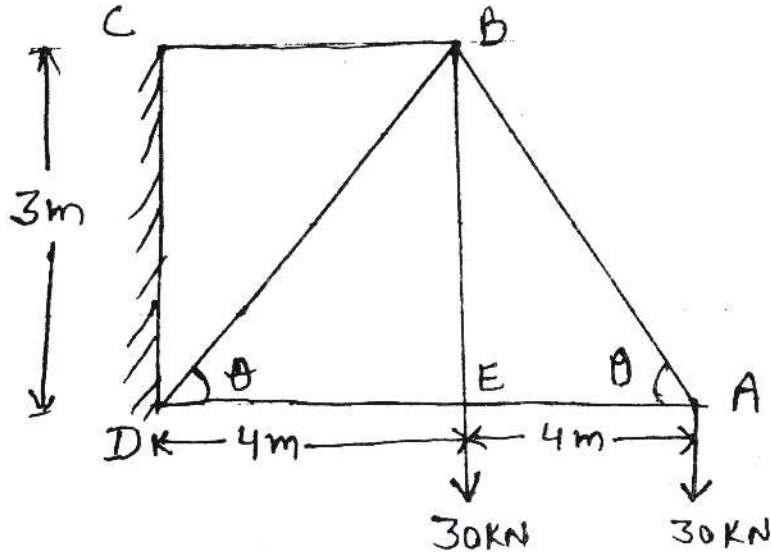
Fig [6]

16

OR

3 Find the downward displacement of joint B in the thurx. Area of cross section is 900 mm². Take $E = 2 \times 10^5$ N/mm².
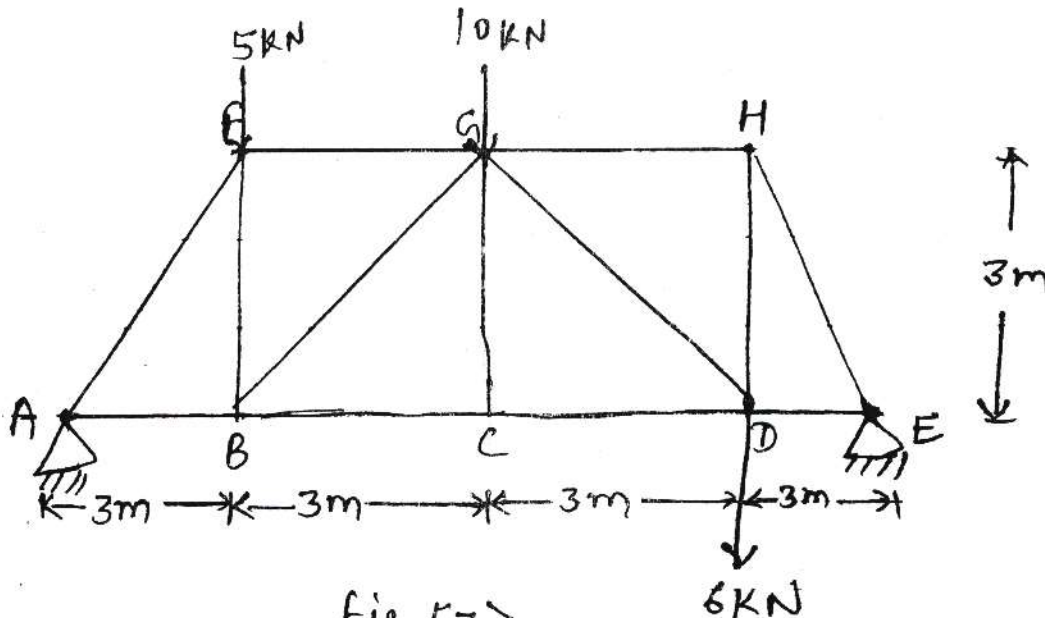
Fig [7]

16

UNIT - IV

4   Using column analogy method, analyze the rigid joint structure.
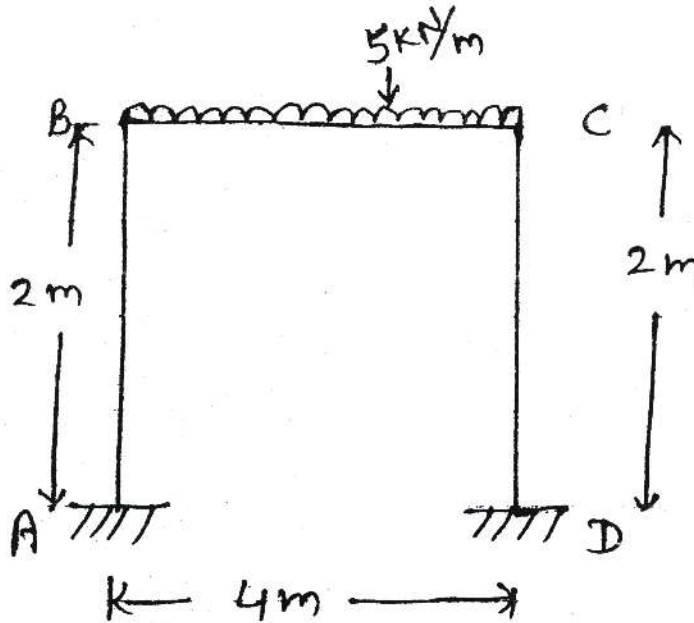
Fig [8]

16

OR

4   Analyze the given frame by using Kani's method.

EI Constant

fig [9]

16

UNIT - V

5   Using cantilever method, analyze the frame shown in fig. (10) below. Assume that all columns have equal area of cross-section.

Fig. [10]

16

OR

5   Determine the forces in the members of the pin jointed truss (using tension coefficient method).

16

Roll No. : _____

Total Printed Pages : 3

5E5062

B. Tech. (Sem. V) (Main / Back) Examination, November 2018
Civil Engg.
5CE2A Environmental Engineering - I

Time : 3 Hours

Maximum Marks : 80
Min. Passing Marks : 26

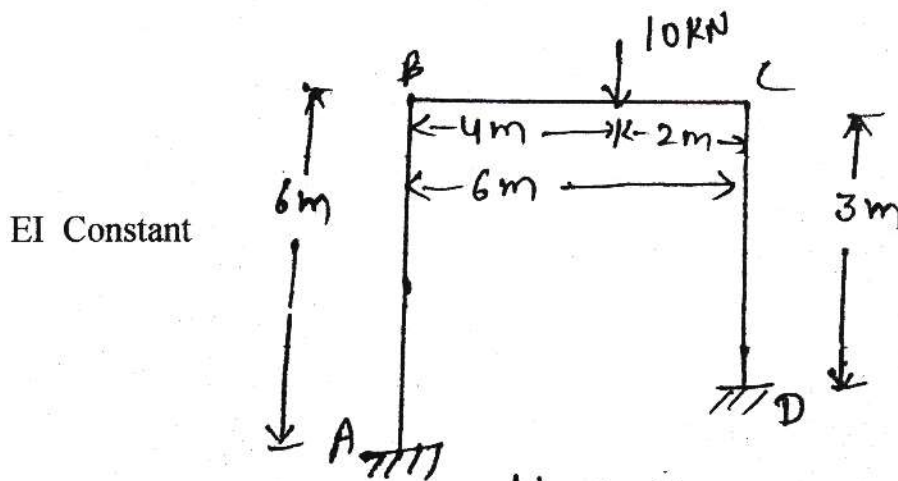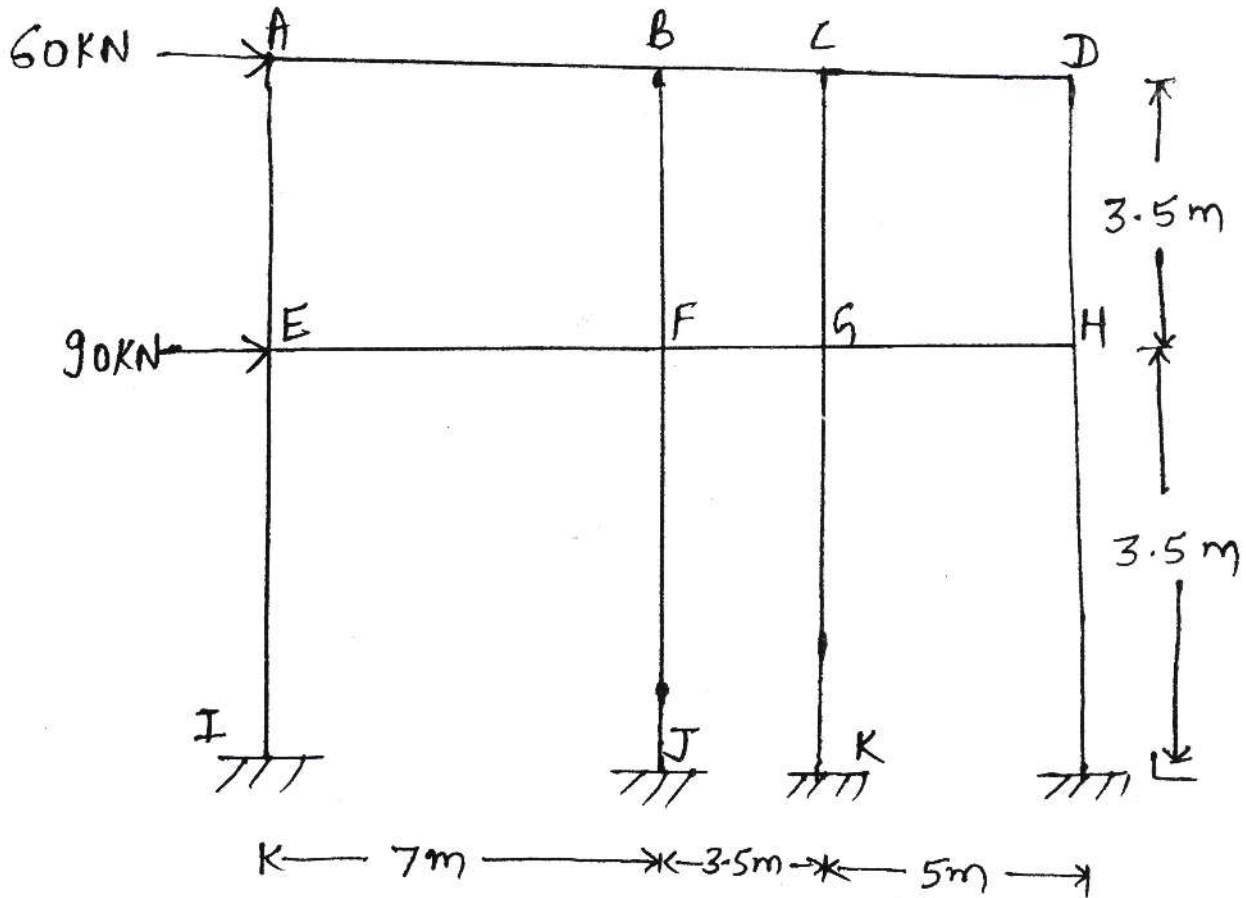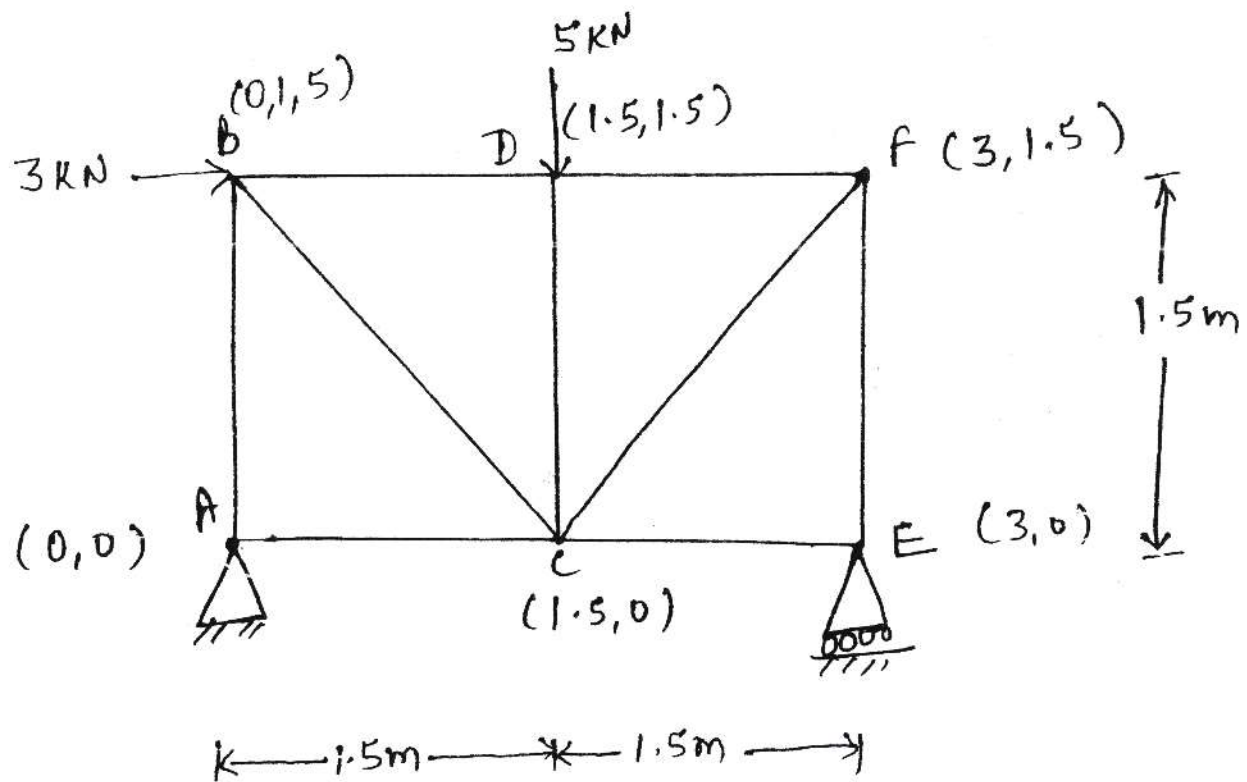*Attempt any **five** questions, selecting **one question** from **each unit**. All questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.*

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

1. NIL _____   2. NIL _____

UNIT - I

1 (a) What do you mean by "per capita demand" ? Describe the factors affecting per capita demand and state the reasons for variations in demand.

8

(b) What is meant by "design period" ? Describe various methods of population forecasting.

8

OR

1 (a) What are the various types of water demands ? Describe them with the ways by which they are estimated.

8

(b) In two periods each of 20 years, a city has grown from 40,000 to 1,60,000 and then 2,80,000. Determine the saturation population using logistic curve method.

8

5E5062]

1

[P.T.O.

UNIT - II

2   (a)   What are the different sources of water supplies ? Describe each one of them.

8

(b)   Describe the quality standards for drinking water as per the Indian Standards.

8

OR

2   (a)   Explain various important characteristics of water.

8

(b)   Explain the terms : Precipitation, Rainfall, Run-off, Yield.

8

UNIT - III

3   (a)   What is meant by "water hammer" and how is it produced in pipes conveying water under pressure ? What precautions should be taken and arrangement made to reduce its effects ?

8

(b)   How do you find out the most economical size of a rising main ? List out the appurtenances necessary to be installed on rising main betwen the pumps and an overhead tank.

8

OR

3   (a)   What are the different materials, which are commonly used for water supply pipes ? Discuss their merits and demerits.

8

(b)   Calculate the head loss in friction in discharging 150 cu m/minute of water through a 1.2 m diameter steel main 900 m long.
Assume coefficient of friction (f) for steel pipe as 0.007.

8

UNIT - IV

4 (a) Draw a neat sketch of a rapid gravity filter and describe how it works. What are its advantages over the slow sand filter ?

8

(b) What are the effects of excess fluoride in water on human health ? Describe the methods of defluoridation.

8

OR

4 (a) Find the area of slow sand filter required for a town having a population of 20,000 with average rate of demand as 150 lpcd.

8

(b) What are the major requirements of a disinfectant ? What is break point chlorination and under what conditions is it advocated ?

8

UNIT - V

5 (a) What are the different layouts of distribution networks ? Describe each one of them with their merits and demerits.

8

(b) Describe the design principles involved in the design of a water supply network to be paid in a multi-storeyed residential building.

8

OR

5 Write short notes on the following :

(a) Hardy Cross Method

(b) Distribution Reservoirs

(c) Fire hydrants

(d) Stand pipes.

4×4=16

5E5063

Roll No. ———

Total No. of Pages : 4

5E5063

B. Tech. V-Sem. (Main & Back) Exam; Nov./Dec. 2018
Civil Engg.
5CEA Geotechnical Engg.

Time : 3 Hours

Maximum Marks : 80
Min. Passing Marks : 26

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. _____ NIL _____   2. _____ NIL _____

Unit – I

1 (a) What is the definition of soil mechanics ? Why each problem in soil engineering is a unique problem? What are the index properties of coarse and fine grained soils? Explain in brief.

  (b) Derive relationship between bulk unit weight, specific gravity, void ratio and degree of saturation. Also write the expression for dry unit weight and saturated unit weight.

OR

1 (a) What is soil classification? Draw plasticity chart as per Indian Soil Classification Systems. Give explanation of different symbols used in the chart.

  (b) What is particle size distribution curve? How soil can be classified based on the particle size distribution curve ?

 An air dry soil sample weighing 1.0 kg was sieved in a laboratory. The mass of soil retained on different sieves are given below :

IS Sieve	4.75 mm	2.0 mm	600 μ	425 μ	300 μ	212 μ	150 μ	75 μ
Mass retained (gm)	50	78	90	150	160	132	148	179

Determine the percentage finer than the corresponding sizes.

5E5063]

1

[**P.T.O.**

Unit – II

2 (a) Discuss the construction and characteristics of Kaolinite and Montmorillonite mineral groups in brief.

(b) The following figure shows a x-section through the strata underlying a site. Calculate the equivalent permeability of the layered system in the vertical and horizontal directions. Assume that each layer is isotropic.

3 m	K = 0.2 cm/sec
1 m	K = 3.0 × 10⁻⁴ cm/sec
1.5 m	K = 0.06 cm /sec
3 m	K = 5.0 × 10⁻² cm/sec
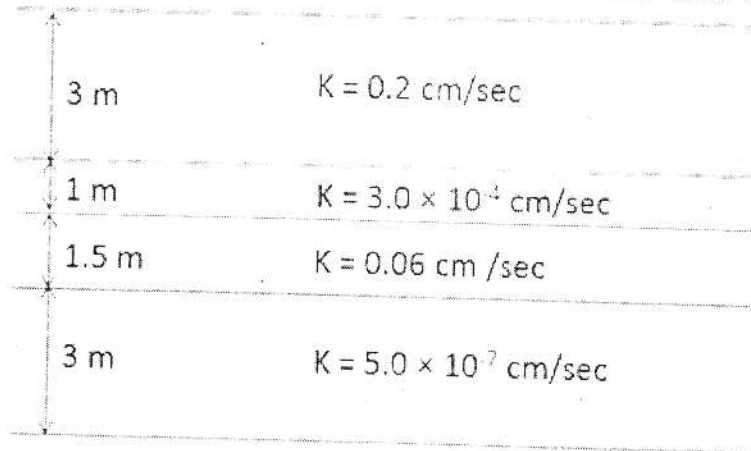
OR

2 (a) What are the different types of soil water? Describe in brief.
Also discuss the phenomenon of capillary rise in soils in brief.

(b) During a pumping test, a well was sunk through a stratum of dense sand 10 m deep overlying an impervious stratum. Observation holes were drilled at 15 m and 6.75 m from the well. Initially the water level in the well was 2.5 m below the ground surface. After pumping until steady conditions had been achieved, the water levels in the observation wells had dropped 1.95 m and 0.50 m, respectively. If the steady discharge was 5 liters/sec, determine the coefficient of permeability.

Unit – III

3 (a) Define total stress, neutral stress and effective stress. What is the quick sand condition?

(b) A soil profile consists of a surface layer of clay 4 m thick (γ = 19.5 kN/m³) and a sand layer 2 m thick (γ = 18.5 kN/m³) overlying an impermeable rock. The W.T. is at the ground surface. If the water level in a stand pipe driven into the sand layer rises 2 m above the ground surface. Draw the plot showing the variation of σ, u and $\bar{\sigma}$. Take γ_w = 10 kN/m³.

OR

3   (a)   Prove that the discharge through the earth mass is given by $q = k \cdot \dfrac{h}{N_d} \cdot N_f$.

Determine the discharge through the foundation of an earth dam if the flow net has 10 equipotential drops and 3.5 flow channels. The length of the dam is 300 m and the coefficient of permeability of the soil is 2.5×10^{-4} cm/sec. The level of water above the base of the dam is 12 m on upstream and 4 m on downstream.

(b)   With the help of schematic diagram of flow field, describe the characteristics of flow net.

Unit – IV

4   (a)   Illustrating the significance of both the stages of a tri-axial test, define UU, CU and CD tests.

(b)   A sample of dry cohesionless soil was tested in a triaxial machine. If the angle of shearing resistance was 36° and the confining pressure 100 kN/m², determine the deviator stress at which the sample failed.

OR

4   (a)   What is Mohr–Coulomb theory for soils? Sketch Mohr–Coulomb failure envelop.

(b)   A series of shear tests were performed on a soil. Each test was carried out until the soil sample failed and the principle stresses for each test were as follows.

Test	$\sigma_3 \left(kN/m^2 \right)$	$\sigma_1 \left(kN/m^2 \right)$
1	300	875
2	400	1160
3	500	1460

Plot the Mohr circle of stress and determine the strength envelope and angle of internal friction of the soil.

345

Unit – V

5 (a) The following results were obtained from a standard compaction test on a sample of soil.

Water Content (%)	0.12	0.14	0.16	0.18	0.20	0.22
Mass of moist soil (kg)	1.68	1.85	1.91	1.87	1.87	1.85

The volume of mould used was 1000 ml. Make necessary calculations to plot the compactive curve and from the plot obtain the M.D.D. & the O.M.C.

(b) What is mechanical stabilization? What are the factors that affect the mechanical stability of a mixed soil?

OR

5 (a) From the given figure, if a fill is needed to be compacted at 90% compactive effort, 2% dry of optimum, calculate the in-place density of the fill.
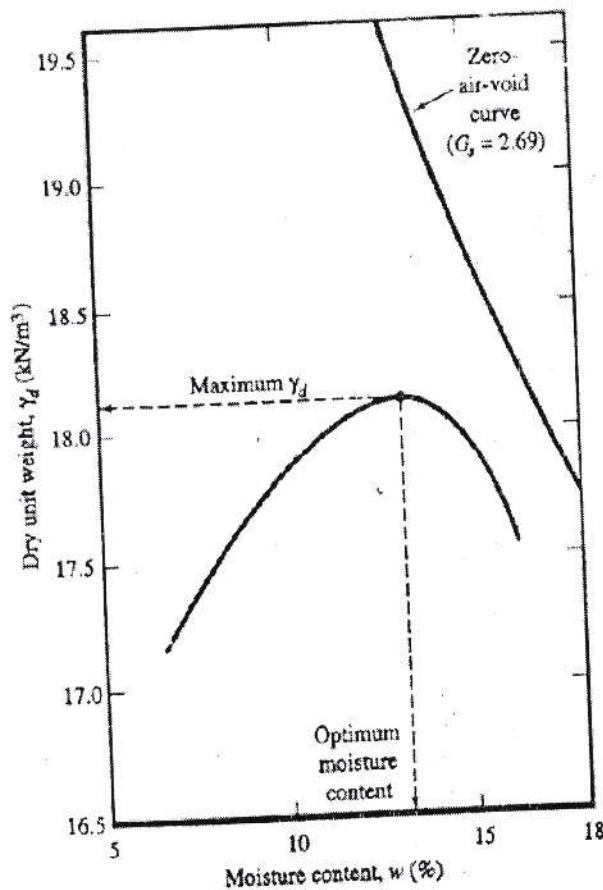
(b) What is soil stabilization? What are its uses?

Roll No. : _____

5E5064

5E5064

Total Printed Pages : 3

B. Tech. (Sem. V) (Mercy Back) Examination, November 2018
Civil Engineering
5CE4A Surveying - II

Time : 3 Hours

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. NIL _____   2. NIL _____

UNIT - I

1 (a) Explain how will you determine the elevation difference between two stations by single observation. Derive expression for elevation difference for angle of elevation.

8

   (b) Make a neat sketch and explain what do you understand by axis signal correction.

8

OR

1   Explain how will you determine the reduced level of top of a electric tower, when two instruments are in same vertical plane position. Also derive the expression for the same.

16

UNIT - II

2 (a) Enumerates the methods of setting out simple circular curve. Explain the method of perpendicular offset from long chord to set out the simple circular curve.

8

(b) Explain method of computing length of transition curve.

8

OR

2 (a) What do you understand by super elevation ? Explain how will you compute super elevation for roads.

8

(b) Explain empirical method of computing length of transition curve.

8

UNIT - III

3 (a) Explain what do you understand by strength of figure. Explain how will you calculate strength of figure.

8

(b) Describe various criteria for selection of triangulation stations.

8

OR

3 (a) What do you understand by well condition triangle ? What is the importance a well condition triangle in triangulation.

8

(b) What is the necessity of a satellite station in the triangulation survey work ? How the centre to reduction is done if satellite station is selected in triangulation network ?

8

UNIT - IV

4   (a)   What do you understand by weight of a quantity ? Explain the laws of weights with suitable example.

8

(b)   Explain with example the following :
(i)   Most probable error
(ii)   Indirect observation.

4×2=8

OR

4   (a)   Explain with suitable examples the difference between mistakes and systematic errors.

8

(b)   Explain what do you understand by station or figure adjustment.

8

UNIT - V

5   (a)   Explain astronomical corrections.

8

(b)   Explain following with the help of neat sketch :
(i)   Plane of equiliptic.
(ii)   Variation of declination of sun with salient dates and features.

4×2=8

OR

5   Calculate the sun's azimuth and hour angle at a place in latitude 42° 30' N, when its declination is
(i)   22° 12' N
(ii)   22° 12' S

16

349

B. Tech. (Sem. V) (Main / Back) Examination, November 2018
Civil Engg.
5CE5A Building Design

Time : 3 Hours

Maximum Marks : 80
Min. Passing Marks : 26

*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. IS : 875 Part-3   2. IS : 1893 Part-1

UNIT - I

1   (a)   What do you understand by over turning in a building ?

6

(b)   What are tube in tube structure of high rise building ?

6

(c)   Explain concept of load flow to different structural components with figure.

4

OR

1   (a)   Write different configuration of high rise buildings.

4

(b)   Calculate equivalent uniformly distributed load for bending moment and shear force for a beam if load trnsferred on such beam from a slab is triangular in nature.

8

(c)   Define stiffness of building and how this will affect design ?

4

350

UNIT - II

2 Calculate wind load on wall and roof of a rectangular clad building with pitched roof, having plan dimensions 10 m × 50 m and height 5 m. The building is situated in Delhi in an industrial area 500 m inside open land on a fairly level topography. Walls have 20 opening of 1.5 m × 1.5 m size, if roof angle is 15°.

16

OR

2 Calculate wind load on a rectangular Clad Building with monoslope roof with overhang. Consider height (h) = 5.0 m, length (l) = 20 m, width (w) = 10 m, roof angle α = 20° and overhang is 0.5 m, ground is flat, terrain category-2, life of building 25 years and building is situated at Surat.

16

UNIT - III

3 Calculate force in given frame building with following data :
(i) Column size = 400 mm × 400 mm
(ii) Beam size = 300 mm × 400 mm
(iii) Floor thickness = 120 mm
(iv) Live load on floor = 4.0 kN/m²
(v) Brick wall thickness = 150 mm
(vi) Storey height = 4.0 m each
(vii) No. of storeys = 5
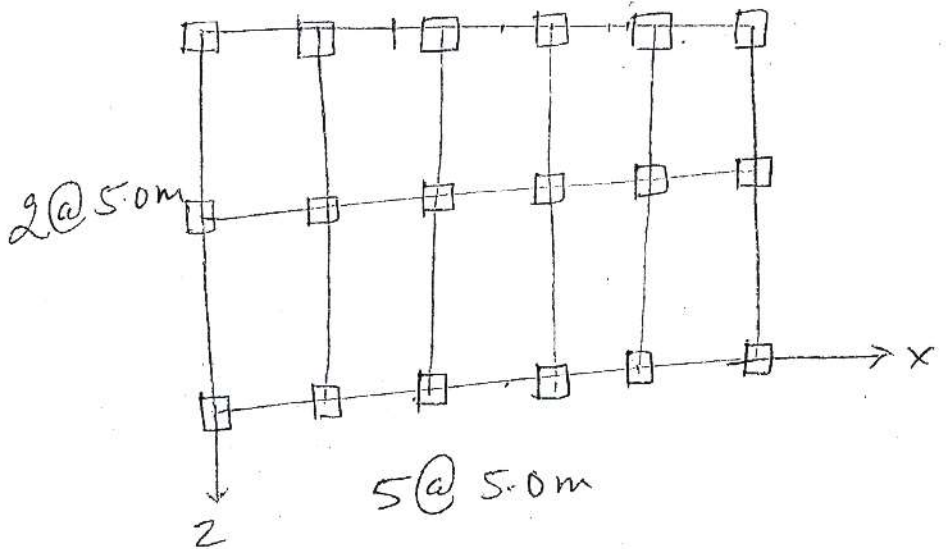
Plan of Building

OR

16

3 (a) What do you understand by centre of mass and centre of rigidity ?

4

(b) The plan of building have four shear wall. All four walls are in M25 grade concrete, 200 mm thick and 4 m long. Storey height is 3.5 m. Floor consists of cast in sita reinforced concrete. Design shear force on the building is 100 kN in either direction. Determine the design lateral force on different shear walls.

12

UNIT - IV

4 (a) How do you define wall and column in a masonry building. With the help of diagram draw effective length of walls for various cases as per code.

8

(b) Write construction practices required for ensure earthquake resistance in Masonry Building.

8

OR

4 (a) Explain the ductile detailing in column and beam connections.

8

(b) What do you understand by slenderness ratio of wall and column in design of Masonry.

4

(c) Explain the behaviour of infill wall in Masonry construction.

4

UNIT - V

5 (a) Explain the difference between grid floor and ribbed floor and draw the diagram to illustrate the difference.

8

(b) Explain in detail about panels and precast elements.

8

OR

5   Write short notes on :

(a)   Folded Plates roofs

(b)   North light shell roofs

(c)   Mass Housing

(d)   Retrofitting in masonry building.

$4 \times 4 = 16$

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353

Time : 3 Hours

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. NIL _____   2. NIL _____

UNIT - I

1   (a)   Define solid waste. What are the problems associated with solid waste disposal ?

2+6=8

(b)   Describe the objectives of Solid Waste Management.

8

OR

1   (a)   Write down the factors influencing generation of solid waste.

8

(b)   Explain physical characteristics of solid waste.

8

354

UNIT - II

2   (a)   Explain onsite storage of solid waste.

                8

    (b)   Discuss briefly public health and aesthetics associated with solid waste.

                8

OR

2   (a)   Explain various types of dust bins that are used in collecting solid waste.

                8

    (b)   Describe various onsite processing methods in handling solid waste.

                8

UNIT - III

3   (a)   How will you decide the collection routes in the collection of solid waste ?

                8

    (b)   Write short note on labour requirement and equipment for solid waste.

                8

OR

3   (a)   Explain various transport systems in transporting solid waste.

                8

    (b)   Write down the various options in the transfer of solid waste.

                8

UNIT - IV

4   (a)   Explain briefly sanitary land filling.

                8

    (b)   Write short note on bioremediation.

                8

OR

4   (a)   Describe various methods in the disposal of solid waste.

           8

      (b)   Explain various processing techniques in processing solid waste.

           8

UNIT - V

5   Write short notes on any **four** :

      (a)   Material recovery from solid waste

      (b)   Energy generation from solid waste

      (c)   Recovery operation from solid waste

      (d)   Reuse in other industry of solid waste

      (e)   Recycling of solid waste

           4×4=16

OR

5   (a)   Explain disposal methods adopted for industrial solid waste.

           8

      (b)   Describe various treatment methods for industrial solid waste.

           8

_____