

5E5061

Roll No. _____

Total No of Pages: 7**5E5061****B. Tech V Sem. (Main/Back) Exam. Nov-Dec. 2015****Civil Engineering****5CE1A Theory of Structures-I****Time: 3 Hours****Maximum Marks: 80****Min. Passing Marks Main: 26****Min. Passing Marks Back: 24***Instructions to Candidates:*

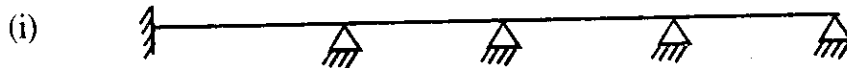
Attempt any five questions, selecting one question from each unit. All questions carry equal marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.

Units of quantities used/calculated must be stated clearly.

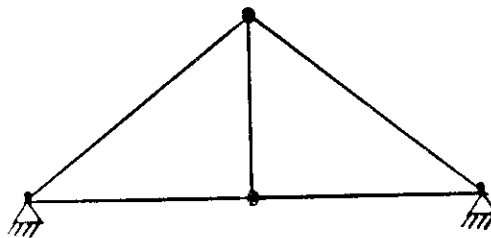
Use of following supporting material is permitted during examination.

1. NIL2. NIL**UNIT-I**

Q.1 (a) Define kinematic indeterminacy. Determine kinematic degree of indeterminacy for the following structures shown in Fig 1 [4]



(ii)



(iii)

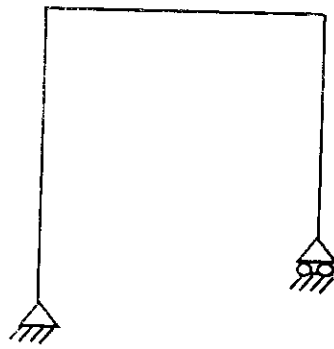


Fig - 1

- (b) Solve the continuous beam using slope – deflection method (Fig 2) and draw B M. D. [12]

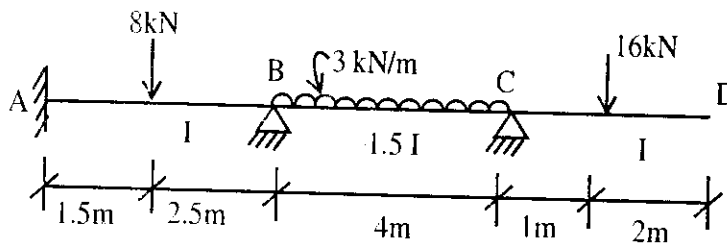


Fig.2

OR

- Q.1 (a) Write Maxwell – Betli's generalized theorem. A vertical downward load of 40 KN acting at F in the portal frame shown in Fig 3 produces a horizontal deflection at E of 2mm towards left and a clockwise rotation of 0.1 radian at D. Determine the vertical deflection at F due to a horizontal load of 20KN at E towards right and an anti clockwise moment of 1.6KN – m acting at D. [4]

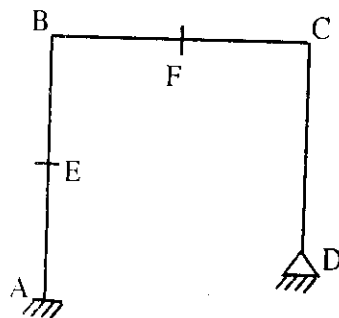
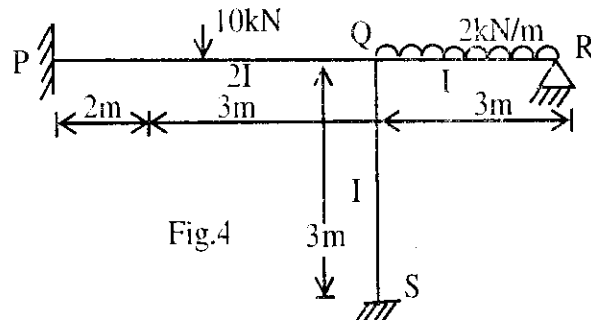


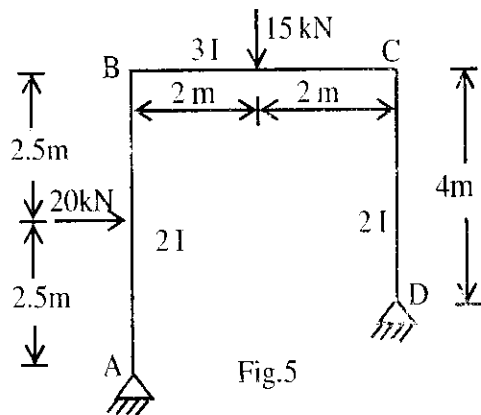
Fig.3

- (b) Solve using slope deflection method (Fig 4) and draw the bending moment diagram. Also draw the deflected shape for the frame PQRS. [12]



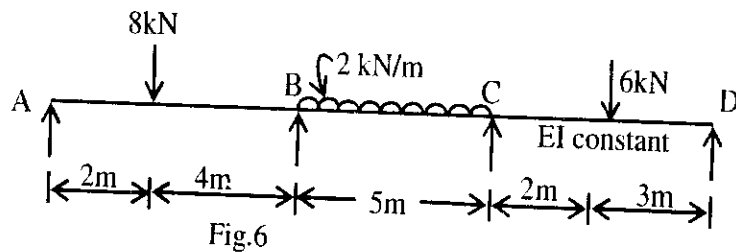
UNIT-II

- Q.2 Analyse the rigid frame shown in Fig 5 using moment distribution method. Draw BMD & deflected shape. [16]



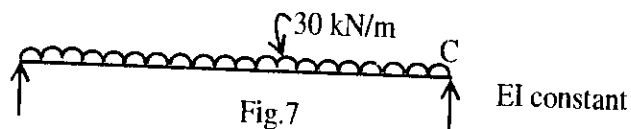
OR

- Q.2 A Beam ABCD, 16m long is continuous over three spans and is loaded as shown in Fig 6. The support B sinks by 5mm downwards. I for the beam is $93 \times 10^4 \text{ mm}^4$ throughout. Take $E = 2.1 \times 10^5 \text{ N/mm}^2$. Calculate the moments and draw the BMD. Also draw deflected shape. [16]

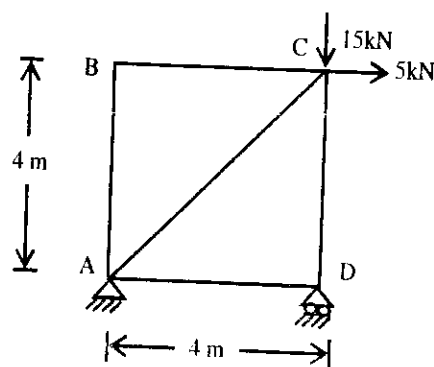


UNIT-III

- Q.3 (a) Define strain energy. Calculate the strain energy due to bending for the beam given in Fig 7 having span of 5m. [4]



- (b) Calculate the vertical deflection of point B in pin jointed truss shown in Fig 8 under the given loading. [12]



OR

Q.3 (a) Write Castiglione's theorems. [4]

(b) Determine the axial forces in the members of pin jointed frame shown in Fig 9.

The cross sectional area of bars AB & AC is '2a' and that of other members is 'a' [12]

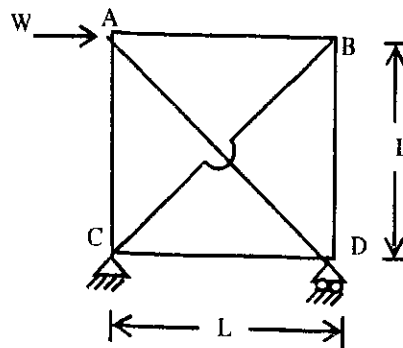


Fig.9

UNIT-IV

Q.4 A portal frame ABCD is fixed at A and D, has rigid joints at B and C. It is loaded as shown in Fig 10. Solve the frame using column analogy method and plot the B. M. D.

[16]

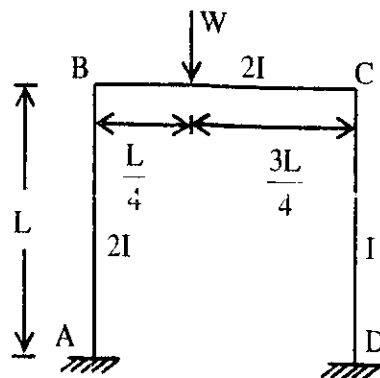


Fig 10

OR

Q.4 Solve the frame using Kani's method (Fig 11). Sketch the B. M. D. for the frame. [16]

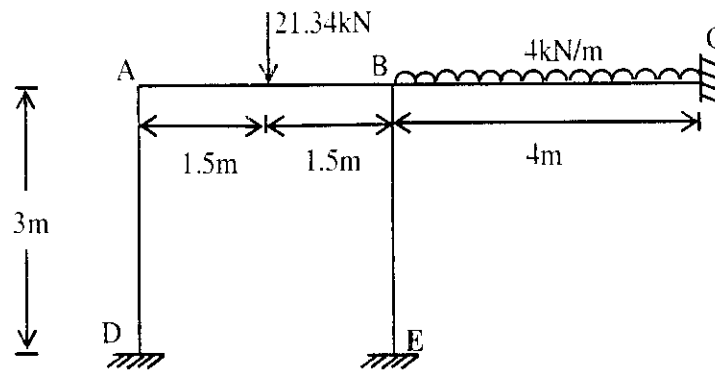


Fig 11

UNIT-V

Q.5 Solve the building frame shown in Fig 12 using portal method. [16]

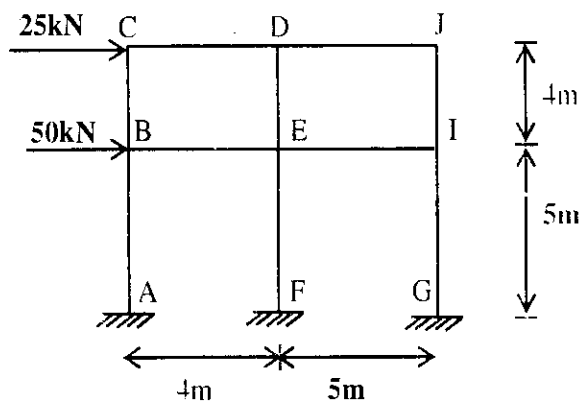


Fig 12

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OR

Q.5 Fig 13 shows plan of a Tripod. The feet A, B and C being in the same plane and the open D being 3.75m above the plane. Horizontal loads of 100 kN and 150 kN are applied at D in the directions shown. Find the forces in the members assuming that all joints are pin – joints [16]

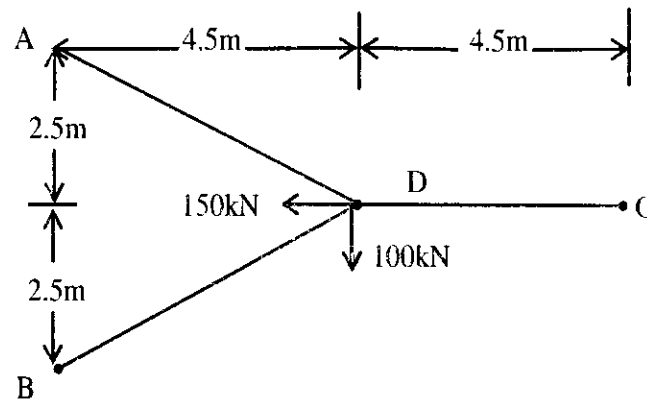


Fig 13

RC

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B. Tech V Sem. (Main/Back) Exam. Nov-Dec. 2015

Civil Engineering

5CE2A Environmental Engineering-I

Time: 3 Hours

Maximum Marks: 80

Min. Passing Marks Main: 26

Min. Passing Marks Back: 24

Instructions to Candidates:

*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.

1. NIL

2. NIL

UNIT-I

Q.1 (a) What do you mean by the term "per-capita demand"? How is it estimated? What are the factors which affect per capita demand? [8]

(b) What is population forecasting? Discuss various methods used for this purpose with their merits and demerits. [8]

OR

Q.1 (a) Explain different types of water demands. How are they estimated? [8]

- 128 128
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- (b) What do you understand by design period? Describe the factors which govern design period? What are the values of design period as per the manual on water supply for the following components: - [8]

- (i) Pump houses.
- (ii) Water Treatment Plant.
- (iii) Reservoirs.
- (iv) Distribution System.

UNIT-II

- Q.2 (a) What are the common sources of water for a water supply scheme? Explain the method of finding the yield of ground water. [8]

- (b) What are the permissible limits of the following for public drinking water as per the Indian Standards: - [8]

- (i) Turbidity
- (ii) Colour
- (iii) Hardness
- (iv) pH
- (v) Chloride
- (vi) Nitrate
- (vii) Total dissolved Solids
- (viii) Alkalinity

OR

- Q.2 (a) What is meant by porosity and permeability? How do they affect the ground water storage? [8]

- (b) Explain the following terms: - [8]

- (i) B. coli.
- (ii) M. P. N.
- (iii) Water borne diseases.
- (iv) Physical characteristics of water.

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UNIT-III

- Q.3 (a) Water has to be supplied to a town with one lakh population at the rate of 150 litres per capita per day from a source, 1.8 km away. Determine the size of the supply main assuming suitable data where necessary. Also find head loss using Hazen- William's formula. [10]
- (b) Explain the sedimentation process with a neat sketch of a plain sedimentation tank. [6]

OR

- Q.3 (a) Estimate the hydraulic gradient in a 2 m dia smooth concrete pipe carrying a discharge of 3 cumecs at 10°C temperature, by using Davey- Weisbach formula. Assume dimensionless friction factor $f' = 0.011$ (10)
- (b) What do you mean by sedimentation aided with coagulation? Explain the laboratory method to find out the optimum quantity of coagulant. [6]

UNIT-IV

- Q.4 (a) What are the differences between slow sand filters and rapid gravity filters? Explain in detail. [8]
- (b) Explain the following terms:- [8]
- (i) Pre- chlorination.
 - (ii) Break- point chlorination.
 - (iii) Super- chlorination.
 - (iv) Double chlorination.

OR

- Q.4 (a) What are the differences between line-soda process and zeolite process? Explain in detail. [8]
- (b) What is meant by disinfection of water? What is its importance? Explain the different methods used for this purpose. [8]

UNIT-V

- Q.5 Write short notes on the following (**any four**):- [4×4=16]
- (a) Hardy- Cross Method.
 - (b) Components of House water connection.
 - (c) Fire hydrants.
 - (d) Distribution reservoirs.
 - (e) Stand Pipes.

OR

- Q.5 What do you mean by layout of distribution system? Illustrate with sketches the different types of layouts of pipe system in distributing water. Compare them with their merits and demerits. [16]
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5E5063

B. Tech V Sem. (Main/Back) Exam. Nov-Dec. 2015
Civil Engineering
5CE3A Geotechnical Engineering-I

Time: 3 Hours

Maximum Marks: 80

Min. Passing Marks Main: 26

Min. Passing Marks Back: 24

Instructions to Candidates:

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.

1. NIL

2. NIL

UNIT-I

Q.1 (a) A 10cm dia, 30cm long sample was extracted from ground weighs 4125gm. A moist specimen of the sample weighing 12.7gm was oven dried and its weight was found 9.2gm. If specific gravity of soil is 2.65 find - [10]

(i) Water content

(ii) Bulk Density

(iii) Dry Density

(iv) Void ratio

(v) Degree of saturation

(b) What do you understand by following classification of soils [6]

(i) CL

(ii) SW

(iii) MH

[5E5063]

OR

- Q.1 (a) Explain the IS Classification of soils. [10]
(b) The bulk unit weight of soil is 19.10 kN/m^3 and water content is 12.5%, specific gravity of soil is 2.67, Determine - [6]
(i) Void ratio
(ii) Porosity
(iii) Degrees of saturation

UNIT-II

- Q.2 (a) Explain the structure of cohesive soils. [8]
(b) Explain the structure of montmorillonite mineral. What makes it different from other minerals? [8]

OR

- Q.2 (a) What do you understand by permeability of soil. Explain Darcy's law to compute rate of flow through soil. [8]
(b) A soil sample has length of 3.5m and cross-sectional area of 2 m^2 . If water flows through such soil sample and fluid energy lost is 1650Nm for every cubic meter flow of water, estimate Darcy's velocity and permeability. The time of flow for 1 m^3 of water is 26 hours. [8]

UNIT-III

- Q.3 (a) Explain total and effective stress taking example of dry and saturated soils. Show the variation of total stress, effective stress and pore water pressure for soil deposit having water table at ground surface. [8]
(b) In the process of an excavation for a wall footing, the water table was lowered from depth of 1.5m to a depth of 4.5m in clayey sand deposit. Considering the soil above water table remains saturated at water content 30%, compute the following - [8]
(i) The effective stress at 4m after lower water table, take $G=2.68$.
(ii) Increase in effective stress at depth 5m.

OR

- Q.3 (a) What do you understand by 'Piping'? Why it occurs in dams and how it can be prevented? [8]
- (b) Show a flow net through an earthen dam and explain the applications of flow net. [8]

UNIT-IV

- Q.4 (a) What different drainage conditions are considered in shear strength test of soil. Explain their relevance for actual site conditions. [8]
- (b) A specimen of dry sand when subjected to triaxial test, failed at deviator stress 400kN/m^2 . It failed with a pronounced failure plane with an angle 24° to the axis of the sample. Compute the lateral pressure which has caused the failure. [8]

OR

- Q.4 (a) Explain Mohr-Coulomb shear strength theory. [8]
- (b) In a triaxial test on dry sand the sample failed when major and minor principal stresses were 980kN/m^2 and 280kN/m^2 respectively. What would be shear strength of same sample when tested in direct shear test under a normal stress of 300kN/m^2 . [8]

UNIT-V

- Q.5 (a) Enumerate the factors affecting compaction and explain how they affect the compaction. [8]
- (b) If a proctor mould which has diameter 125mm and height 130.4mm is used for compaction, what would be the number blows to each layer if rammer is used is same as used in standard proctor and compaction is done in three layers. [8]

OR

- Q.5 (a) What is a Proctor Needle? How it is used in compaction control in the field? [8]
- (b) What do you understand by mechanical stabilization? For what type of soil it will be suitable? [8]

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5E5064 B. Tech V Sem. (Main/Back) Exam. Nov-Dec. 2015 Civil Engineering 5CE4A Surveying-II		

Time: 3 Hours

Maximum Marks: 80

Min. Passing Marks Main: 26

Min. Passing Marks Back: 24

Instructions to Candidates:

*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.

1. NIL

2. NIL

UNIT-I

- Q.1 (a) Derive an expression to find out the level difference by trigonometrical leveling between two station 'A' and 'B' by single observation of angle of depression from 'A' to 'B'. Apply following for correction in your expression- [8]
- (i) Correction for curvature
 - (ii) Correction for refraction
 - (iii) Correction for axis signal.
- (b) Two observation were made on the top P of a flag PQ on a hill from two stations A and B, 100m apart, the stations A and B being in the same line with P. The angle of elevations of P at A and B were $31^{\circ}05'$ and $16^{\circ}42'$ respectively. The staff reading on the B.M. (R.L. = 242.23m), were respectively 2.530 and 3.615m when the instrument was at A and B, the telescope being horizontal. Determine the R.L. of the foot of the signal if PQ is 4.5m. [8]

OR

Q.1 The following reciprocal observations were made from two points P and Q: [16]

Horizontal distance = 16440m

Angle of depression of Q at P = $0^{\circ}3'45''$

Angle of depression of P at Q = $0^{\circ}2'6''$

Height of signal at P = 4.07m

Height of signal at Q = 3.87m

Height of instrument at P = 1.27m

Height of instrument at Q = 1.48m

Determine (a) R.L. of Q, if the of P is 326.39m and (b) the average coefficient of refraction at the time of observation.

Take $R \sin 1'' = 30.88\text{m}$

UNIT-II

Q.2 (a) Explain the function of following curves: [2×4=8]

(i) Simple circular curve

(ii) Compound curve

(iii) Reverse curve

(iv) Transition curve.

(b) Describe the method of setting out a simple circular curve by deflection angles using a tape and a theodolite. [8]

OR

Q.2 (a) What is a transition curve? Derive an equation for an ideal transition curve. [8]

(b) A reverse curve AB is to be set out between two parallel railways lines, 30m apart. If the two arcs of the curve are to have same radius and the distance between the tangent points A and B is 180m, calculate the radius. The curve is to be set out from AB at 10m intervals along it. Compute the length of the off sets. [8]

UNIT-III

- Q.3 (a) What is triangulation? How is it different from traversing and trilateration? [8]
- (b) Two triangulation stations A and B are 40 km apart and have elevations of 178m and 175m, respectively. Find the minimum height of signal required at B so that line of sight may not pass nearer the ground than 3m. The intervening ground may be assumed to have a uniform elevation of 150m. [8]

OR

- Q.3 (a) What is meant by extension of a base line? Explain with neat sketch how a base line is extended in the field. [8]
- (b) From a satellite station S, 15m from a triangulation station A, the angles measured to three stations B, C and A are as follows:

$$\angle CSA = 35^\circ 12' 55''; \angle BSC = 60^\circ 38' 40''$$

The length of sides AC and AB are 5815m and 1673m respectively. Calculate the angle BAC. [8]

UNIT-IV

- Q.4 (a) Discuss types of errors in surveying. State laws of accidental errors. [8]
- (b) Find the most probable values of the angles A, B and A+B from the following observations. [8]

$A = 42^\circ 20' 30.4''$	Weight = 3
$B = 36^\circ 18' 25.2''$	Weight = 2
$A+B = 78^\circ 38' 50.3''$	Weight = 4

OR

Q.4 The following eight angles of a braced quadrilaterals ABCD were observed and adjusted for the closing errors at four stations A, B, C and D. Adjust the angles by approximate methods. [16]

$$\theta_1 = 44^\circ 31' 35''$$

$$\theta_2 = 43^\circ 38' 07''$$

$$\theta_3 = 37^\circ 46' 36''$$

$$\theta_4 = 54^\circ 05' 09''$$

$$\theta_5 = 47^\circ 04' 31''$$

$$\theta_5 = 41^\circ 05' 15''$$

$$\theta_7 = 50^\circ 29' 37''$$

$$\theta_8 = 41^\circ 21' 28''$$

UNIT-V

- Q.5 (a) What is a spherical triangle? Discuss its properties. [8]
- (b) What are different methods of determination of azimuth of a star? Discuss ex-meridian observation system. [8]

OR

- Q.5 (a) Make a neat sketch and explain following - [8]
- (i) Observer's meridian.
 - (ii) Ecliptic
 - (iii) Declination circle
 - (iv) Solstices
- (b) Discuss briefly the preparations required for measurements with total stations. [8]
-

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5E5065

B. Tech V Sem. (Main/Back) Exam. Nov-Dec. 2015

**Civil Engineering
5CE5A Building Design**

Time: 3 Hours

Maximum Marks: 80

Min. Passing Marks Main: 26

Min. Passing Marks Back: 24

Instructions to Candidates:

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.

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Use of following supporting material is permitted during examination.

1. IS 1893-Part-I

2. IS 875-Part-III

UNIT-I

- Q.1 (a) Explain briefly dead and live load for the design of school building. [6]
(b) Define shear walls. Discuss the utility of these walls in a building. [6]
(c) Define strength and stiffness of buildings. Differentiate between soft storey and weak storey. [4]

OR

- Q.1 (a) Describe symmetry and un-symmetry building forms with the help of suitable figures. [6]
(b) Discuss briefly about torsional effects in unsymmetrical buildings. [4]
(c) Explain salient features of Tubular Structural System. [6]

UNIT-II

- Q.2 An industrial rectangular clad building with pitched roof is situated in industrial area on a fairly levelled topography at Jaisalmer. Calculate wind load on wall and roof if

[5E5065]

roof angle is 10° and opening in wall may be assumed as 10%. The building is 12 m wide and 22 m long with over hangs on either side as 0.50m. [16]

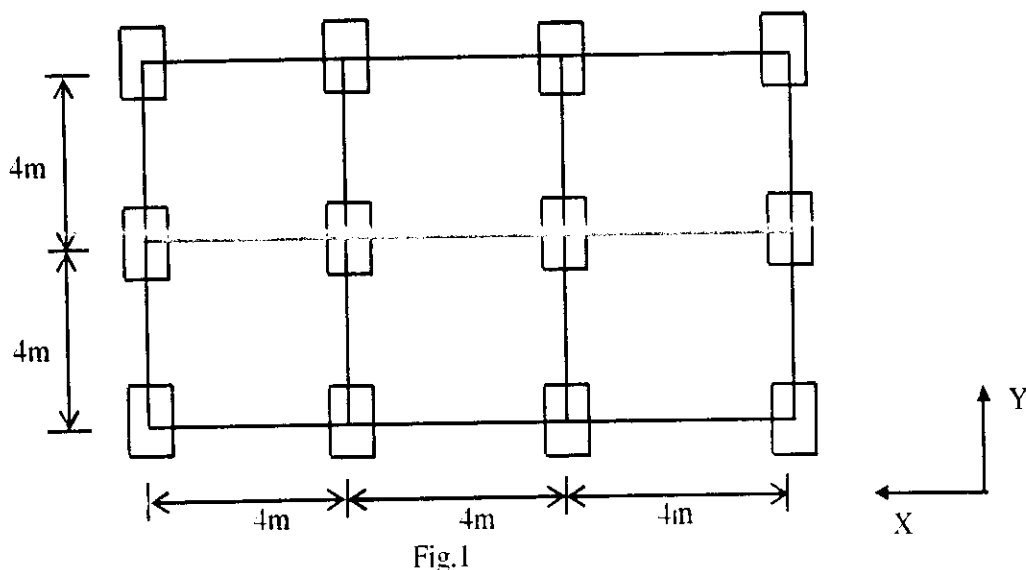
OR

Q.2 (a) Differentiate between external pressure coefficient and internal pressure coefficient with proper figure. [4]

(b) A rectangular building with flat roof supported on masonry walls is situated at Jaipur. The building is having plan dimensions of $14\text{m} \times 56\text{m}$ and height 6m. Calculate wind pressure on wall and roof if the topography of the area is fairly leveled and terrain is with numerous closely spaced obstructions having the size of structure less than 10m in height. Assume 25 openings of $1.2\text{m} \times 1.3\text{m}$ size in the building. [12]

UNIT-III

Q.3 Calculate total base shear for a four story R.C. framed building to be constructed at Ahmedabad. The proposed building has three bays in X direction and two bays in Y direction as shown in Fig.1 All the beams are of $250\text{mm} \times 450\text{mm}$ and column of $450\text{mm} \times 600\text{mm}$ with floor thickness of 120mm. Configuration of building is special moment resisting frame type and 13 resting on rock ground. Assume live load of 4kN/m^2 floor finish of kN/m^2 and Damping coefficient as 5%. [16]



OR

Q.3 (a) A building is built on a plot of 16m×28m. Determine the centre of mass, centre of rigidity and design torsional eccentricity in X and Y direction for the building shown in Fig.2. The building is single storeyed and covered with rigid diaphragm roof. Desired data for the building as follows: [12]

- (i) Height of building = 3.5m
- (ii) Thickness of floor and roof slab = 120mm
- (iii) Thickness of wall = 150mm
- (iv) Self weight of roof/slab = 3kN/m²
- (v) Self weight of wall = 5kN/m²
- (vi) Relative lateral rigidity of North wall = 0.46
- (vii) Relative lateral rigidity of South wall = 0.55
- (viii) Relative lateral rigidity of East and West walls = 0.50

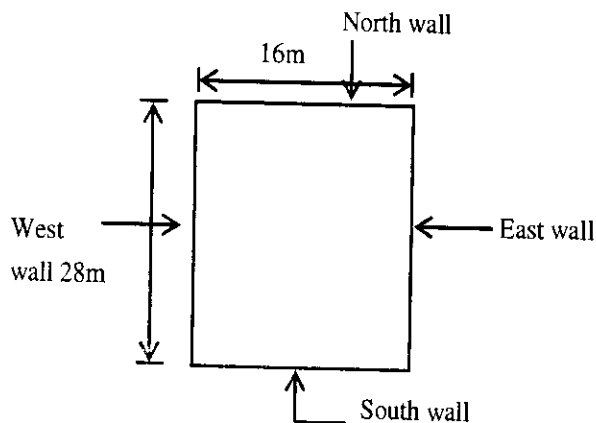


Fig.2

(b) Define torsional moment and torsional force generated in un-symmetrical buildings. Write down expressions for torsional moment and torsional forces. [4]

UNIT-IV

- Q.4 (a) Discuss the importance of ductile detailing of RC structure. Show the ductile detailing of a typical joint of beam and column of a RCC framed building. [8]
- (b) Explain short column effect in R.C. building. [4]
- (c) Write down briefly about floating columns. [4]

OR

- Q.4 (a) Discuss briefly construction practices to be adopted to make a masonry building earthquake resistant. [7]
- (b) Define effective length of masonry wall. Explain the procedure to design a masonry building. [5]
- (c) Discuss various methods to retrofit a masonry building. [4]

UNIT-V

- Q.5 (a) Define Grid flooring with proper figures. Discuss advantage of these floors. [6]
- (b) Explain the utility of precast elements for mass housing construction. [5]
- (c) Discuss advantages and disadvantages of folded plates. [5]

OR

- Q.5 (a) Write down different types of cylindrical shell. Discuss various components of spherical dome with proper figure. [8]
- (b) Differentiate between folded plate and cylindrical shell. Discuss advantage of cylindrical shells. [8]

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B. Tech V Sem. (Main/Back) Exam. Nov-Dec. 2015

Civil Engineering

5CE6.3A Solid Waste Management

Time: 3 Hours

Maximum Marks: 80

Min. Passing Marks Main: 26

Min. Passing Marks Back: 24

Instructions to Candidates:

*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.

1. NIL

2. NIL

UNIT-I

- Q.1 (a) Describe the environmental concerns of solid waste disposal sites. [8]
- (b) Describe the factors that affect generation of solid waste. How the per capita generation of waste differs from place to place? [8]

OR

- Q.1 (a) Describe the various types of classifications of solid waste. [8]
- (b) What are the physical and chemical characteristics of solid waste and how do they affect the management of solid waste? [8]

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5E5068

B. Tech V Sem. (Main/Back) Exam. Nov-Dec. 2015

Civil Engineering

5CE6.3A Solid Waste Management

Time: 3 Hours

Maximum Marks: 80

Min. Passing Marks Main: 26

Min. Passing Marks Back: 24

Instructions to Candidates:

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Use of following supporting material is permitted during examination.

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UNIT-I

Q.1 (a) Describe the environmental concerns of solid waste disposal sites. [8]

(b) Describe the factors that affect generation of solid waste. How the per capita generation of waste differs from place to place? [8]

OR

Q.1 (a) Describe the various types of classifications of solid waste. [8]

(b) What are the physical and chemical characteristics of solid waste and how do they affect the management of solid waste? [8]

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UNIT-II

- Q.2 (a) Describe the methods of solid waste management for aesthetical handling for the protection of public health. [8]
- (b) Describe various types of dust bins and community containers. [8]

OR

- Q.2 (a) Describe the process of onsite handling of solid waste. [8]
- (b) What are the onsite processing methods and what is the significance of onsite processing? [8]

UNIT-III

- Q.3 (a) What are the key steps in collection and transfer system design? [8]
- (b) What are the factors to be considered in selecting solid waste collection equipment? [8]

OR

- Q.3 (a) How do we design a transfer station and determine its capacity? [8]
- (b) Compare the various collection and transfer alternatives for solid waste management. [8]

UNIT-IV

- Q.4 (a) Describe the design and operation of a sanitary land fill with a neat sketch. [8]
- (b) Describe various techniques of waste processing and methods of disposal. [8]

OR

- Q.4 (a) Describe incineration. What are the merits of incineration? [8]
- (b) Describe the various types of bio remediation and their advantages. [8]

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UNIT-V

- Q.5 (a) Describe the calorific value and moisture content of some constituents of solid waste and their effect on energy recovery. [8]
- (b) Describe the ways of reuse of waste in industry and its limitation. [8]

OR

- Q.5 (a) What are the special techniques of treatment for industrial solid waste? [8]
- (b) Describe suitable disposal methods for industrial solid waste and differentiate them with municipal solid waste disposal. [8]

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Total No of Pages: 4

5E3152

B. Tech V Sem. (Old Back) Exam. Nov-Dec. 2015

Civil Engineering

5CE2 (O) Concrete Structures-I

Time: 3 Hours

Maximum Marks: 80

Min. Passing Marks Back: 24

Instructions to Candidates:

*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.

1. IS:456-2000

2. NIL

UNIT-I

- Q.1 (a) A cantilever beam of 2.5m span is subject to super imposed live load of 15 kH/m (excluding self weight). The beam section is restricted to 250mm width and 450 mm overall depth. Using M-20 concrete and Fe-415 steel, determine and provide tension reinforcement at an effective cover of 50mm. Give the neat sectional diagram of beam at support, showing all details. [10]
- (b) Determine the ultimate moment resisting capacity of the doubly reinforced beam show in Fig.1, if grade of concrete is M-20, grade of steel is Fe-415 stress level in compression steel = 347N/mm^2 . [6]

effective cover
to both tension
and compression
reinforcement = 45mm

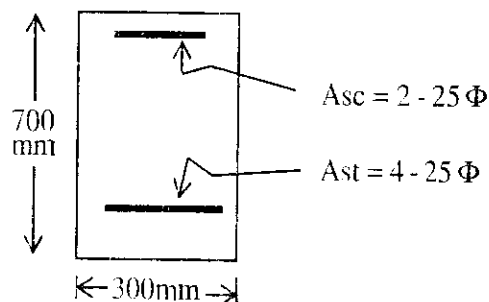


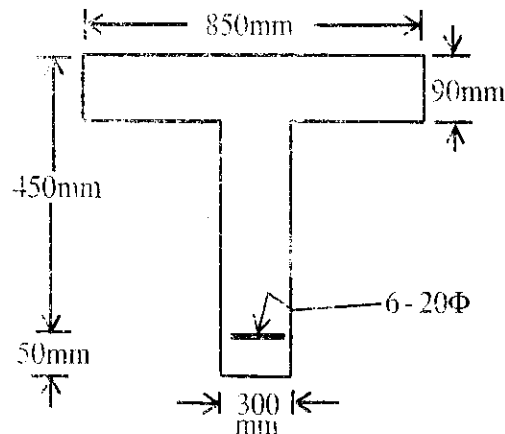
Fig. - 1

OR

(i) Discuss the salient features of working stress method and limit state design. [4]

(ii) Determine the following for the T-beam shown in fig.-2 [12]

- (a) Neutral Axis depth.
- (b) Ultimate moment of resistance
- (c) Draw the neat sketch showing Neutral Axis and Stress block parameters.



(Use $m = 20$ & $Fe - 415$)

Fig. - 2

UNIT-II

Q.2 A hall of size $3m \times 8m$ is planned to be covered by a R.C.C. slab such that short effective span becomes 3.2m. The slab is subjected to total ultimate u.d.l. (inclusive of self weight of slab) $= 20 \text{ kN/m}^2$. Using M-20 and Fe-415, determine and provide main and distribution reinforcement in slab. Take effective depth of slab $= 130\text{mm}$, effective cover to main reinforcement $= 20\text{mm}$. Also apply the check for deflection as per codal provisions. Give the neat sectional elevation along the shorter span showing all details. [16]

OR

- Q.2 (a) Discuss the purpose and provisions of providing distribution reinforcement in one-way slab as per I.S.-456. [4]
- (b) A simply supported R.C.C. beam is having width $= 250\text{mm}$, effective depth $= 500\text{mm}$, grade of concrete M-20, grade of steel Fe-250. The beam is subjected to a load of 180 kN at support and is provided with 5 bars of $18\text{mm } \Phi$ (Fe-250) at mid span and at support 2 bars out of 5 bars are bent up at 45° . Design and

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provide shear reinforcement at support using 2 legged vertical stirrups of 6mm Φ (Fe-259). [12]

UNIT-III

- Q.3 (a) Determine the design ultimate moments at mid span and at edge for short span and long span for the slab shown in fig.-3. The slab is subjected to total ultimate design load of 15kN/m^2 and corners of the slab are held down. Use M-20 and Fe-415. [10]

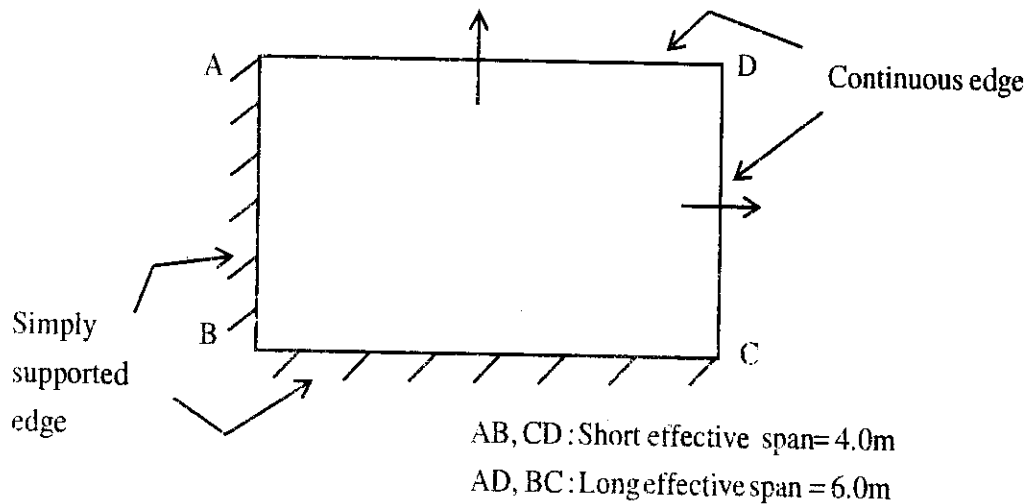


Fig. - 3

- (b) With the help of neat sketch discuss the provisions and purpose of torsion reinforcement in two-way slab. [6]

OR

- Q.3 Design the interior panel of a flat slab of $6\text{m} \times 6\text{m}$ in size, with following data- grade of concrete- M-20, Grade of steel Fe-415, Thickness of slab-150mm, Total ultimate load on slab including self weight= 15kN/m^2 . Use direct design method as per IS:456. [16]

UNIT-IV

- Q.4 (a) Describe the salient features of interaction diagram for a short column under compression and uniaxial bending. [6]

- (b) A square column of RCC is of $400 \times 400 \text{ mm}$ in size. It is provided with 8 bars of 16 mm diameter of Fe-415. Can it be analyzed as short axially loaded column if the load is placed centrally on it? Determine the ultimate load carrying capacity of this column. Use M-20 grade of concrete. [10]

OR

- Q.4 A RCC column of 400 mm diameter is hinged at both the ends. Its unsupported length is 4.5 m . Design the column as helically reinforced column to carry an ultimate load of 900 kN . Use M-30 concrete and Fe-415 steel. Give the neat longitudinal sectional diagram showing all details. [16]

UNIT-V

- Q.5 (a) With the help of neat sketches, describe isolated, combined and raft footings. [6]
(b) Determine size of combined footing and draw the detailed plan to support the two columns A & B carrying 1000 kN and 1500 kN respectively (as shown in fig.-4). [10]

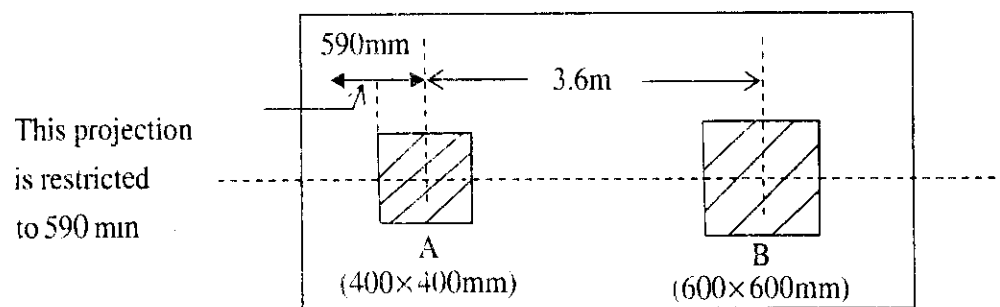


Fig. - 4

OR

- Q.5 Design an isolated footing to support a square column ($500 \text{ mm} \times 500 \text{ mm}$) carrying an axial load of 1500 kN . Column is reinforced with 4 bars of $20 \text{ mm } \Phi$ (Fe-415). Use M-20 concrete and take safe bearing capacity of soil $= 225 \text{ kN/m}^2$. [16]

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Total No of Pages: **4**

5E3153

B. Tech V Sem. (Back) Exam. Nov-Dec. 2015

Civil Engineering

5CE3 (O) Steel Structures-I

Time: 3 Hours

Maximum Marks: 80

Min. Passing Marks Back: 24

Instructions to Candidates:

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.

1. NIL

2. NIL

UNIT-I

Q.1 A 120mm diameter and 6mm thick pipe is fillet welded to a 14mm plate. It is subjected to a vertical factored load of 4.5kN at 1.0m from the welded end and a factored twisting moment of 1.8 kNm. Design the joint assuming shop welding and steel of grade Fe 410.

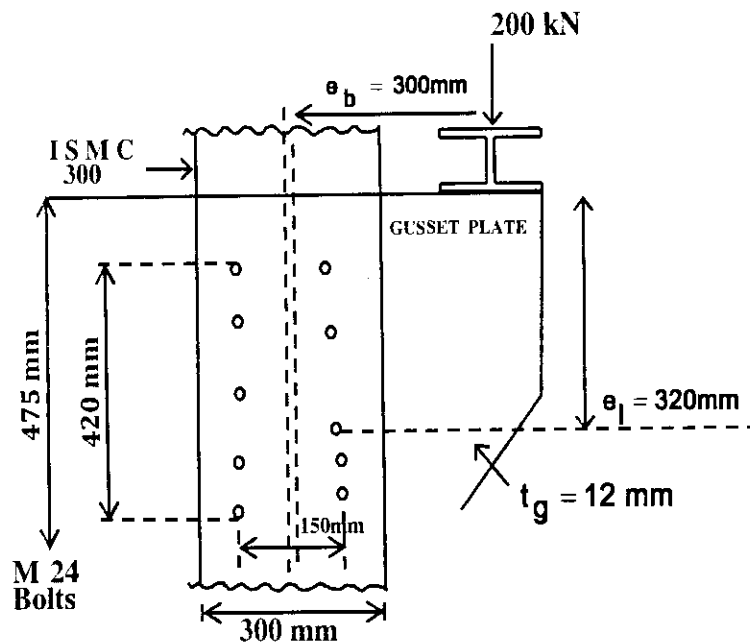
[16]

OR

Q.1 (a) Briefly discuss merits and demerits of welded connections.

[6]

- (b) Determine the size of the bolts required to connect the bracket (supporting a crane girder) to the column shown in fig. [10]



UNIT-II

- Q.2 (a) Design a stanchion 3.5m long, in a building, subjected to a factored load of 550 kN. Both the ends of the stanchion are effectively restrained in direction and position. Use steel of grade Fe 410. [10]
- (b) An ISA 125×75×8mm is used in a steel roof truss as discontinuous struts. Find its compressive strength if it is 2.1m long between centre of bolted connection. [6]

OR

- Q.2 Design a built-up column with four angles. The column is 12 m long and supports a factored axial compressive load of 700kN. The ends of the column are held in position and restrained against rotation. Design a suitable connecting system. Use steel of grade Fe 410. [16]

UNIT-III

- Q.3 A simply supported steel joist of 4.0m effective span is laterally supported throughout. It carries a total uniformly distributed load of 40kN (inclusive of self weight). Design an appropriate section using steel of grade Fe 410. [16]

OR

- Q.3 Design a grillage foundation for a column ISHB 450@ 87.2kg/m. carrying a factored axial load of 2000kN. The allowable bearing pressure on soil is 160kN/m^2 . The base plate has size $800\text{mm} \times 700\text{mm}$ whose large dimension is placed parallel to the web of I section. [16]

UNIT-IV

- Q.4 (a) Draw the view of a gusseted base connection with bolts, for a column and label the components. [6]
- (b) A Column ISHB 350@ 6612.2N/m carries an axial compressive factored load of 1700kN. Design a suitable bolted gusset base. The base rests on M15 grade concrete pedestal. Use 24mm diameter bolts of grade 4.6 for making the connections. [10]

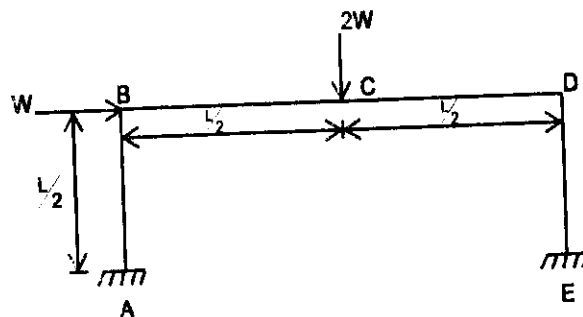
OR

- Q.4 (a) Briefly explain the modes of failures of tension member. [6]
- (b) A tie member in a bracing system consists of a single angle section of size $100 \times 75 \times 10\text{mm}$. Its longer leg is connected with a gusset plate 12mm thick with 2 bolts of 16mm diameter. Calculate the tensile capacity of member. [10]

UNIT-V

- Q.5 (a) What are the various methods of plastic analysis? Explain them. [6]

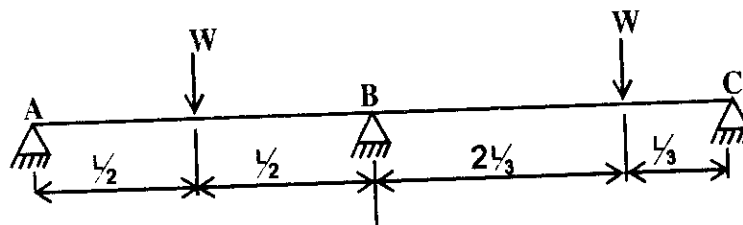
- (b) Determine the value of w at collapse for the portal frame shown in fig. All the members have the same plastic moment of resistance. [10]



OR

- Q.5 (a) Explain the principle of virtual work. [4]

- (b) Find out the collapse load for a continuous beam, shown in fig. The beam is of uniform cross section. [12]



5E3155

Roll No. _____

Total No of Pages: 3

5E3155

B. Tech V Sem. (Old Back) Exam. Nov-Dec. 2015

Civil Engineering

5CE5 (O) Quantity Surveying & Valuation

Time: 3 Hours

Maximum Marks: 80

Min. Passing Marks Back: 24

Instructions to Candidates:

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.

1. NIL

2. NIL

UNIT-I

- Q.1 (a) Explain the purpose and importance of estimates. [8]
(b) What are the different types of estimates? Explain in detail. [8]

OR

- Q.1 (a) Describe various principles of estimating in details. [8]
(b) What do you understand by measurement sheet, abstract sheet and bill of quantities? [8]

UNIT-II

- Q.2 (a) What is meant by rate analysis? Mention the factors affecting analysis of rates. [6]
(b) Perform the analysis of rate for lime concrete (1: 2: 6) in foundation with 40 mm size brick ballast with 1 line and 2 surkhi mortar. [10]

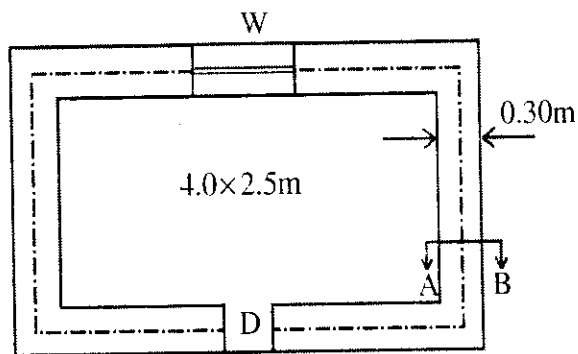
OR

- Q.2 (a) What do you mean by current schedule of rates? Also explain the term, "out-turn of work". [6]
- (b) Work out the analysis of rate for 25 mm thick cement concrete flooring (1: 2: 4) [10]

UNIT-III

Q.3 The figure shows a room of internal dimensions 4.0 m × 2.5 m. Calculate the quantities of following items of work by centre line method:- [16]

- (i) Excavation in foundation
- (ii) Lime concrete in foundation
- (iii) Brickwork in cement mortar (1: 4) in foundation and plinth
- (iv) Brickwork in cement mortar (1: 6) in superstructure
- (v) 2.5 cm thick DPC

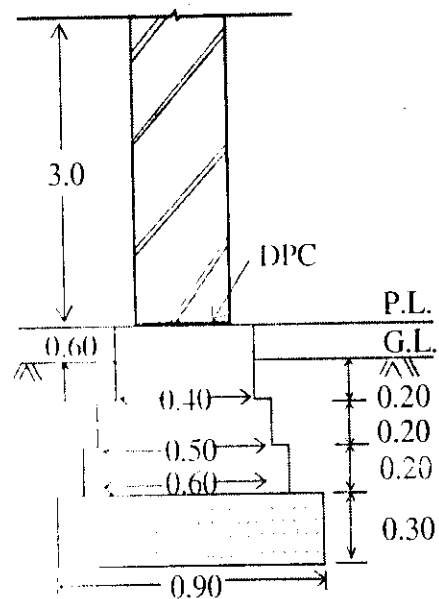


PLAN

W = 1.1 × 1.5 m

D = 1.2 × 2.1 m

All dimensions are in m.



section at AB

OR

Q.3 Calculate the quantities of items as described in the above question for the same figure by using Long wall – short wall method [16]

UNIT-IV

- Q.4 (a) List out and explain the factors affecting cost of work. [8]
- (b) Explain the terms – Overhead charges, Contingency and Work-Charged establishment. [8]

OR

- Q.4 (a) What are the different percentages generally adopted for a building based on the cost of - [8]
- (i) Various items of work, and
- (ii) Materials and labour
- (b) Explain the methods of taking out quantities of items of work. [8]

UNIT-V

- Q.5 (a) What do you mean by depreciation? Describe various methods of finding out the amount of deprecation. [8]
- (b) Explain the following – [4×2=8]
- (i) Scrap Value
- (ii) Salvage Value
- (iii) Outgoings
- (iv) Year's purchase

OR

- Q.5 (a) What do you understand by valuation? Describe the purpose and principles of valuation. [8]
- (b) Explain the following terms- [4×2=8]
- (i) Book value
- (ii) Mortgage lease
- (iii) Sinking fund
- (iv) Annuity

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