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5E3154-P

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5E3154-P

B.Tech. (Sem. V) (Main/Back) Examination, Dec. - 2011
Civil Engg.
5CE4 Surveying - II

Time : **3** Hours] [Maximum Marks : **80**
[Min. Passing Marks : **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 clarly. 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) Derive an expression to find out the level difference by trigonometric levelling between two stations P and Q, by single observation of angle of elevation from P to Q. The expression derived above should include effect of curvature and refraction, also the axis signal correction. **12**

(b) Find out the corrected angle from the given data -
Distance between P and Q = 4050 m
Angle of elevation from P to Q = 2° 37' 13"
Height of instrument at P = 1.45 m
Height of signal at Q = 3.56 m
Coefficient of refraction m = 0.07
Radius of earth (R) = 6370 km. **4**

OR

1 (a) Following observation were taken to determine the reduced level of the top of an overhead tank (0) from two stations P and Q being in different planes with respect to object :

Angle of elevation from P to object (α_1) - 6° 13' 20"

Horizontal angle (θ_1) at P - 85° 30' 20"

Reading on level staff from P - 1.45 m

Angle of elevation from Q to object (α_2) - 6° 7' 40"

Horizontal angle (θ_2) at Q - 80° 32' 40"

Reading on level staff from Q - 1.56 m

Distance between P and Q is 44.5 m, staff is placed on 8.N.

Make a neat sketch of the problem and determine the R.L. of the top of the overhead tank (0) if R.L. of bench mark is 258.70 m.

12

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

4

UNIT - II

2 (a) Two straights AV and VB intersects at a chainage 1190m, the deflection angle being 36°. Calculate all necessary data for setting but a simple circular curve by Rankine's tangential angle method if radius of curve is 250m and peg interval is 20m. The least count of the theodolite used is 20".

16

OR

(a) In a compoud curve radius of the arcs of two curves are R_1 and R_2 respectively, the total deflection angle for the curve is 'Δ' and total distance between point of curve (T_1) and point of intersection V is 'T_S' are known, get the expressions for computation of T_2 (distance between point intersection and point of tangency), deflection angles Δ_1 and Δ_2.

12

(b) Two straights intersect at an angle Δ. The common tangent of the two curves of equal radius L as a length 380m. The angles between the tangents and the straight lines is 138°30' at the first tagent point and 130°45' at the second tangent point. Find the common radius of arcs. If the chainage of the first tangent point is 980m, find the chainages of the common point of the arcs and the second tangent point.

4

UNIT - III

3 (a) What do you understand by a well conditioned triangle ? What is the importance of well conditional triangle in triangulation survey. Derive the condition for base angles for well conditioned triangle.

12

(b) Compute the phase of signal correction from the following data :

Distance between two stations 5 km, diameter of signal 20 cm and sun rays make an angle 60° with line AB. Compute correction if observations were made (a) on the bright portion (b) on the bright line.

4

OR

3 (a) Two stations A and B are 100 km apart. The elevation of A is 185 m and B is 885 m. In the line of sight between A and B there are two intervening points C and D. C is 42 km from A and D is 81 km from A. The elevations of peak C and D are 318 m and 750 m respectively. Check wether two stations A and B are intervisible or not. With a minimum clearance of 3m above ground level. Determine height of signal at B for intervisibility.

12

(b) Write four important criterion for selection of site for base line measurement.

4

UNIT - IV

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

4

(b) What do you understand by weight of a quantity ? What are the rules for assigning the weight to a quantity ? Also explain laws of weights with examples.

12

OR

4 In a quadrilateral PQRS, the angles measured were as follows

$\angle 1 = 59^{\circ}27'16.8''$, $\angle 2 = 40^{\circ}17'47.6''$, $\angle 3 = 35^{\circ}16'12.8''$,

$\angle 4 = 44^{\circ}58'48.8''$, $\angle 5 = 45^{\circ}23'28.6''$, $\angle 6 = 54^{\circ}21'27.9''$,

$\angle 7 = 41^{\circ}17'15.5''$, $\angle 8 = 38^{\circ}57'54.8''$, odd angles are left angles and even angles are right angles. Adjust the angles using method of least square.

16

UNIT - V

5 (a) Explain following with the help of neat sketch (i) plane of Ecliptic (ii) variation of declination of sun with salient dates and features.

8

(b) Show the spherical triangles when star is at (i) prime vertical (ii) star of elongation. Explain how would you compute hour angle, declination and azimuth of the star.

8

OR

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

16

1 (a) An ISMC 300 is used to transmit a factored load of 800 kN. The channel section is connected to a gusset plate 12 mm thick as shown in Fig. 2. Design a fillet weld, if the overlap is limited to 280 mm. Use slot welds if necessary.

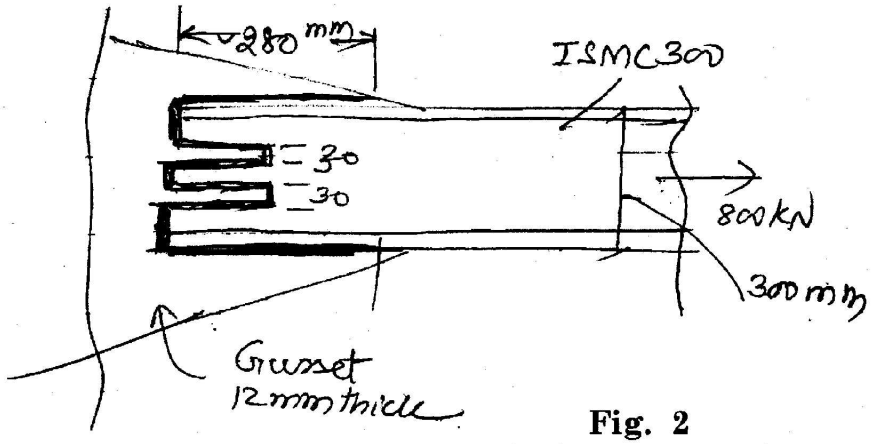

Fig. 2

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(b) Determine the size of the bolts required to connect the bracket (supporting a crane girder) to the column shown in fig. 3.

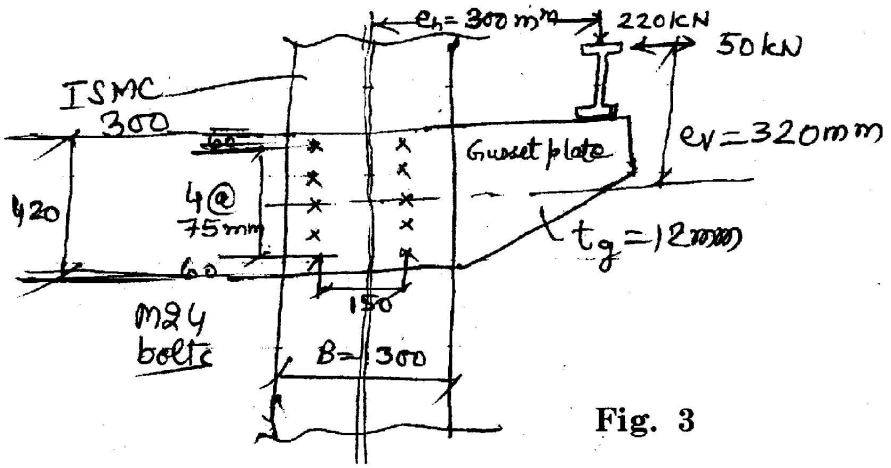

Fig. 3

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UNIT - II

2 A column in a building is 4 m in height. Its bottom end is fixed and top end is hinged. The reaction load due to the beam is 550 kN at an eccentricity of 60 mm from the major axis of the section. Check whether ISHB 300 @ 0.58 kN/m section is adequate.

16

OR

2 (a) A single angle section ISA 100 x 100 x 10 is used to carry axial compression P. It is connected at the ends by means of three bolts of 20 mm ϕ. Find the maximum force P resisted by the section for a length of 2.5 m.

10

(b) A built up section of column in a building consists of two I sections ISMB 300 placed side by side at centre to centre distance 225 mm. Design end and intermediate batten plates, if the column is carrying an axial load of 850 kN. Effective length of the column about both axes is 5 m.

6

UNIT - III

3 Design a laterally unrestrained beam to carry a uniformly distributed load of 20 kN/m. The beam is unsupported for a length of 3.5 m and is simply placed on longitudinal beams at its ends.

16

OR

3 Design a laterally supported beam of effective span 6.5 m for the following data :
Grade of steel - Fe410
Maximum bending moment, M = 200 kNm
Maximum shear force, V = 270 kN
If the case falls under 'high shear', apply appropriate checks for design bending strength. Check for deflection is not required.

16

UNIT - IV

4 A column ISHB 300 carries an axial compressive factored load of 1100 kN. Design a suitable welded gussetted base. The base rests on M15 grade of concrete.

16

OR

4 Design an I-section truss member for the following data :
Length of the member, L = 3.2 m, factored axial tension = 400 kN; factored moment at the two ends of the member about strong axis, M_z = 30 KNm and 20 KNm, respectively. Steel Grade Fe410.

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UNIT - V

5 (a) Determine the plastic and elastic section moduluii, and the shape factor of the I section shown in fig.4.

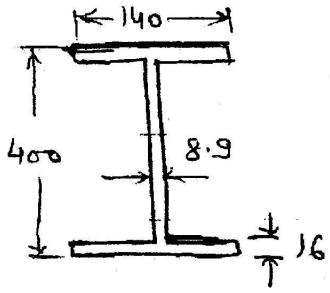

Fig. 4

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(b) Determine the collapse load of the fixed beam as shown in Fig.5.

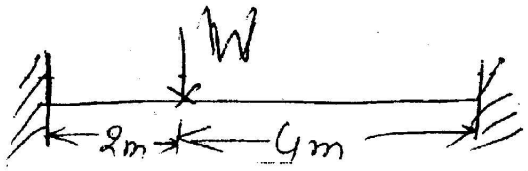

Fig. 5

6

OR

5 Compute the collapse load for the portal frame as shown in Fig. 6.
Given f_y = 250 N/mm^2 and the
value of Z_p for columns AB and DE
equal to 1100 x 10^3 mm^3 and that for the member BD as 2200 × 10^3 mm^3.

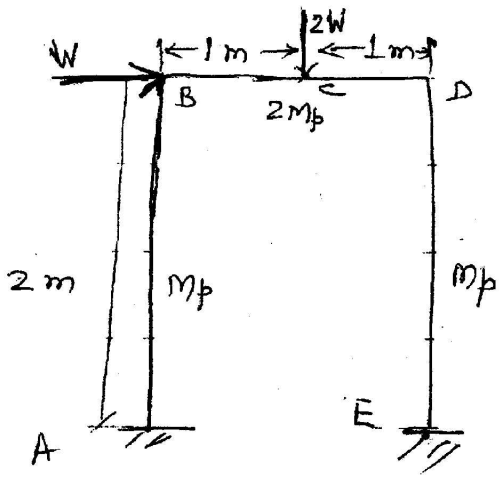

Fig. 6

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