Total No. of Questions : **08** Roll No. : 0701.......................................

B.Tech FIFTH SEMESTER EXAMINATION JUNE-2025

(Branch : Civil Engineering)

CE 5301 DESIGN OF CONCRETE STRUCTURES

Time : Three Hours ***Maximum Marks : 70***

Min. Pass Marks : 22

Note : **Attempt any five questions. Use of IS 456 – 2000, IS 875 part – 1, 2 and 3 and SP – 16 is permitted. Assume any missing data if needed and state clearly.**
Draw reinforcement details whenever required. Design the problem by limit state method & Assume concrete grade M25 and steel HYSD bars of grade Fe 500 in design if not specified

1(a) The term balanced section is used in both WSM and LSM. Discuss the difference in meaning? ***02***

(b) Determine the moment of resistance of a singly reinforced beam 160 mm wide and 300 mm deep to the centre of reinforcement. If the stresses in steel and concrete are not to exceed 140 N/mm^2 and 5 N/mm^2. The reinforcement consists of 4 bars of 16mm diameter. Take m = 18. If the above beam is used over an effective span of 5 m. Find the maximum load the beam can carry, inclusive of its own weight. ***12***

2(a) Design the reinforcement for a reinforced concrete beam 300 mm wide and 400 mm deep of grade M20 to resist an ultimate moment of 150 kN-m, using mild steel bars of grade Fe 250. ***07***

(b) Find the moment of resistance of an existing T-beam having the following data: b_f = 740 mm; d = 400 mm; b_w = 240 mm; A = 5-20 mm dia mild steel bars D_f = 100 mm. M 15 concrete. ***07***

3(a) The provision of minimum stirrup reinforcement is mandatory in all RCC beams. Why? ***02***

(b) A reinforced concrete beam is supported on two walls of 500 mm thick, spaced at a clear distance of 3.5m. The beam carries a superimposed load of 50kN/m. Design the beam completely. ***12***

4(a) RCC slabs are generally safe in shear and do not require shear reinforcement. Why? ***02***

(b) Design a simply supported roof slab for a room 4 m x 9 m clear in size . The slab is carrying an imposed load of 4 kN/m^2 . ***12***

5(a) Inclined stirrups and bent up bars are considered suitable for shear reinforcement, but not for torsional reinforcement. Why? ***02***

(b) Design a RCC slab for a room of size 4 m x 3 m , The slab is simply supported on walls of width 300 mm, with corners held down and carries a live load of 5 kN/m^2 and floor finish 1.0 kN/m^2 ***12***

6(a) Briefly describe the various bond failure mechanisms? ***02***

(b) Design a square footing of uniform thickness for a R.C. Column of 600 mm x 600 mm, transmitting an axial load of 1500 kN. The SBC of soil as taken as 200 kN/m^2. ***12***

7(a) Design a short RCC column to carry an axial load of 2000 kN. It is 3.5m long effectively held in position and restrained against rotation at both ends. ***07***

(b) Design a reinforced concrete square column of size 500 mm to carry an ultimate load of 1700 kN at an eccentricity of 160 mm. ***07***

8(a) Enumerate the main factors that influence bond strength? ***02***

(b) A straight stair in a residential building supported on wall on one side and stringer beam on other side. The risers are 150 mm and treads are 250 mm and the horizontal span of the stairs may be taken as 1.2 meter. Design the stairs. Use M20 concrete and Fe 415 steel bars. ***12***

*****

Total No. of Questions : **08** Roll No. : 0701.....................................

B.Tech FIFTH SEMESTER EXAMINATION JUNE-2025

(Branch : Civil Engineering)

CE-5302 TRANSPORTATION ENGINEEERING

Time : Three Hours

Maximum Marks : 70

Min. Pass Marks : 22

Note : Attempt any five questions. Each question carries equal marks. Assume suitable data wherever necessary

1(a) What are the salient features of Roman Roads? How do these differ from the present day road construction?

(b) Explain obligatory points. Discuss how these control the alignment.

2(a) Explain total reaction time of driver and the factors on which it depends. Explain 'PIEV' theory.

(b) Enumerate the factors governing the width of carriage way. State the IRC specifications for width of carriage way for various classes of roads.

3(a) Distinguish between flexible and rigid pavements in brief. Explain group index method of pavement design and write its limitation.

(b) What do you understand by C.B.R.? Discuss its use in pavement design.

4(a) What are the recent developments in cement concrete pavement design?

(b) What are the various test carried out on bitumen. Explain any two.

5(a) What do you mean by "Ballast"? Enumerate functions and characteristics of good ballast.

(b) The sleeper density for a broad gauge track is N+5. Find the number of sleepers required for one kilometer of track length.

6(a) What do you mean by creep of rails? Explain various theories for creep of rails.

(b) Explain composite sleeper index.

7(a) Draw a neat sketch of various imaginary surface for airport obstruction. Explain their Significance.

(b) Write short notes on any two :

(i) Beacon light (ii) Runway threshold lighting (iii) Apron and hanger lighting.

8(a) What is Windrose diagram? How the runway alignment is decided, using the diagram?

(b) Discuss the different factors affecting airport site selection.

*****

Total No. of Questions : **08** Roll No. : 0701..

B.Tech FIFTH SEMESTER EXAMINATION JUNE-2025

(Branch : Civil Engineering)

CE-5303 ADVANCE STRUCTURAL ANALYSIS

Time : Three Hours ***Maximum Marks : 70***
Min. Pass Marks : 22

Note : Attempt any five questions. Each question carries equal marks.

1 Analyze the double span single storeyed frame by MD method and Draw BMD and deflected shape of the structure shown in ***fig.1***. The ends A, E and F are hinged and the joints B, C and D are rigid.

2 Analyze the continuous beam shown in ***fig.2***. The beam is fixed at A and D and is loaded as shown in the Fig. Plot bending moment diagram and deflected shape for the structure. Use slope deflection method or any other suitable method for analysis.

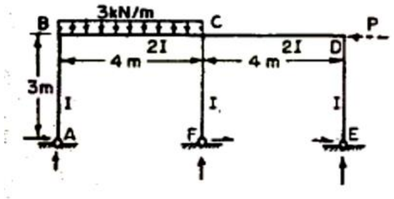

Fig.1

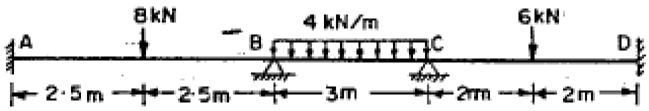

Fig.2

3 Determine the value of W at collapse for the portal frame loaded as shown in ***fig.3***. All the vertical members have the same plastic moment of resistance Mp which is twice the plastic moment of beam member.

4 Determine the influence line for the Shear Force at D, the middle point of span AB, of a continuous beam shown in ***fig.4***. Compute the ordinates at 1 m interval.

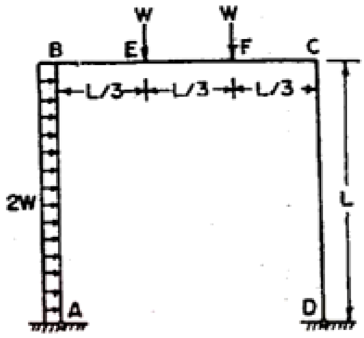

Fig.3

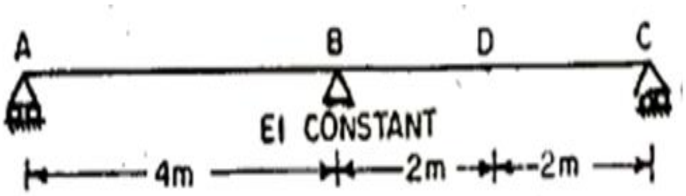

Fig.4

5 Analyze the frame shown in the ***fig.1*** by kani's method. The ends A, F and E are hinged. Plot the bending moment diagram and the deflected shape of the frame.

P.T.O.

6 A pair of shear leg ***fig.5*** has length of each leg as 5m and distance between their feet is 4m The line joining the feets of the leg is 7m from the foot of guy rope. If the length of the guy rope is 10 m find the thrust in each leg and pull in the guy rope when a load of 100kN is suspended from the tripod.

7 Analyze the continuous beam shown in ***fig.6*** by Flexibility Matrix method. Flexural rigidity is constant throughout.

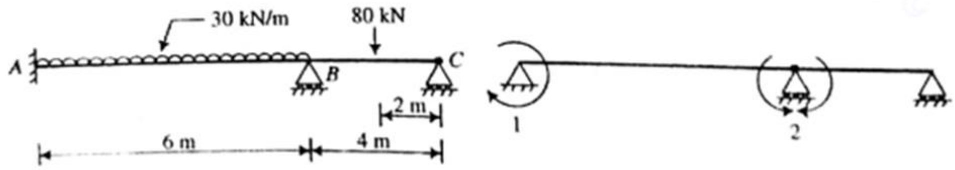

Fig.6

8 Find the axial force in the member BC of the frame shown in ***fig.7***. The members are of the same material and figures in bracket indicates cross sectional area of members in sq.cm.

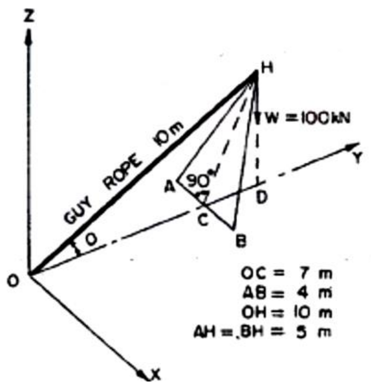

Fig.5

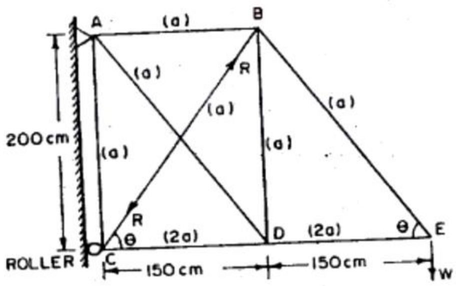

Fig.7

*****

Total No. of Questions : **08** Roll No. : 0701..

B.Tech FIFTH SEMESTER EXAMINATION JUNE-2025

(Branch : Civil Engineering)

CE-5304 QUANTITY, ESTIMATION & CODING

Time : Three Hours

Maximum Marks : 70
Min. Pass Marks : 22

Note : Solve any five questions. All questions carry equal marks. Assume suitable data if required

1(a) Define term : Detailed estimate, Preliminary estimate. What is the purpose of estimate? *07*

(b) Write short note on **any two** : (i) Supplementary Estimate (ii) Cubical content estimate (iii) Annual repair and maintenance estimate *07*

2(a) Describe briefly long wall and short wall method with example. Note down various items of work and there units of measurement. *07*

(b) Estimate the quantity of following item of works as shown in the ***fig.1*** : *07*
(i) RCC in foundation footing **or** (ii) Damp proof Course.

3(a) Define term "Task or Overturn" and Overhead Costs. Describe various factors that affect rate of a particular item of work. *07*

(b) Prepare analysis of rate of 12 mm thick plaster work in Cement mortar 1:6. *07*

4(a) What is Rate analysis? Describe briefly various Factor that affect rate analysis of an item of work. *07*

(b) Write short note on : (i) Scrap value and Salvage value (ii) Purpose of valuation (iii) Depreciation. *07*

5(a) Prepare a detailed estimate for the earthwork for a portion of a road from the following data. *07*

Distance in meter	0	100	200	300	400	500	600	700	800	900	1000	1100	1200
R L of Ground	114.5	114.75	115.25	115.2	116.1	116.85	118.0	118.25	118.1	117.8	117.75	117.9	117.5
RL of Formation	115.0	←Upward gradient 1 in 200 up to 600.0 m→						←Downward gradient 1 in 400 →					

(b) Write short note on **any two** : (i) Security Deposit (ii) Muster Roll (iii) Contingencies and work charge establishment *07*

6(a) Analyze the rates for 1st class brick work in 1:6 cement mortar. *07*

(b) Analyze the rates for RCC 1:2:4 cement concrete work. *07*

7(a) Define the following : (i) Book value (ii) Earnest Money (iii) Years Purchase *07*

(b) Write short notes on following : (i) Work charge establishment (ii) Earnest money deposit and security money deposit *07*

8(a) Prepare detailed Estimate of a RCC beam 8 m clear span and 75 cm × 40 cm in section as shown in ***fig.2***. Steel in detail and RCC shall be calculated separately. *07*

(b) Prepare a preliminary estimate of building project with a total plinth area of all building of a 2000 m^2 given that – *07*

(i)	Plinth area rate	:	Rs. 1100 per m^2
(ii)	Extra for special architectural treatment	:	2 % of the building cost
(iii)	Extra for services	:	6 % of the building cost
(iv)	Contingencies	:	3 % of the building cost

Supervision charges – 8 % of the building cost

P.T.O.

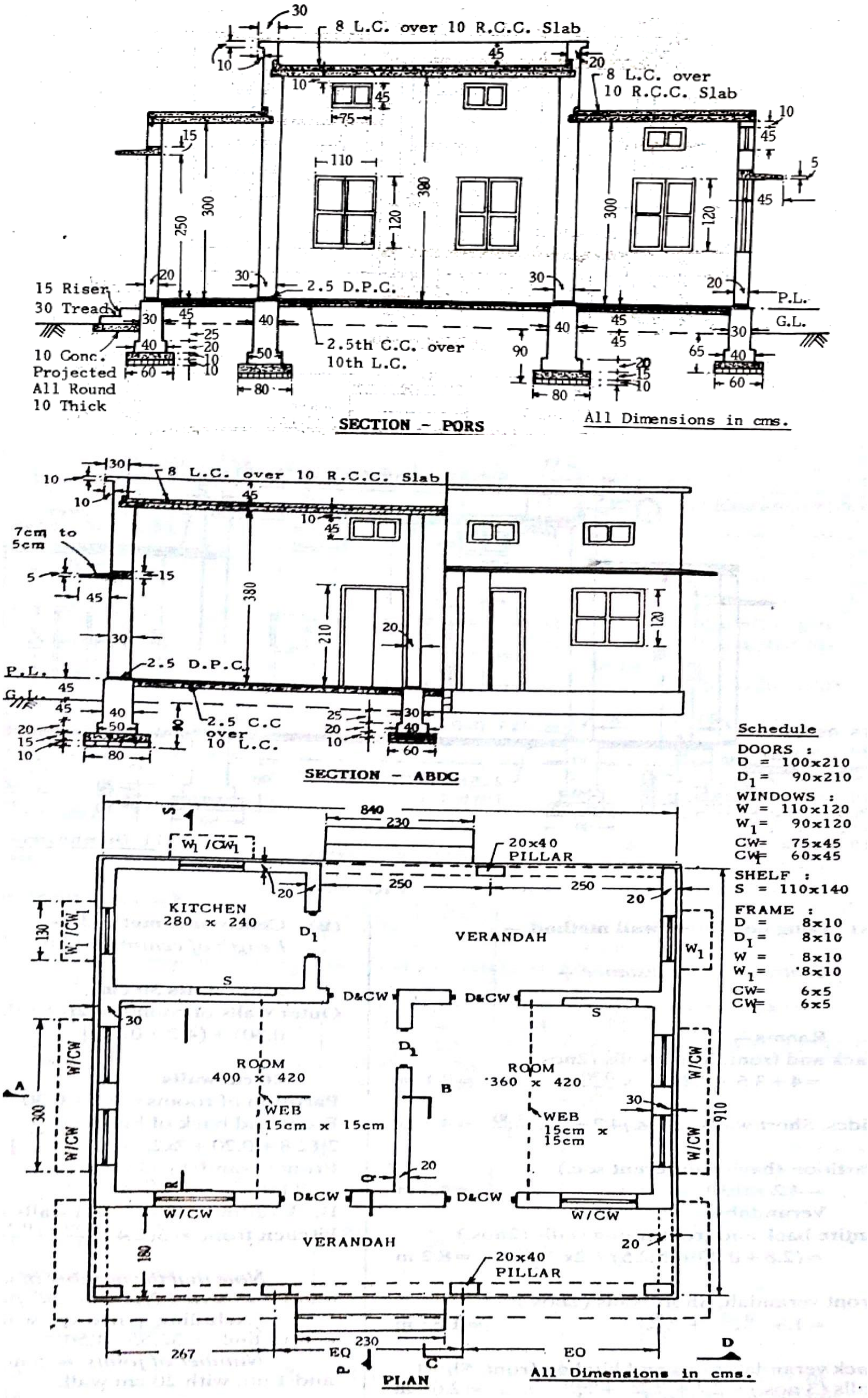
8 L.C. over 10 R.C.C. Slab
8 L.C. over 10 R.C.C. Slab
15 Riser
30 Tread
10 Conc. Projected All Round 10 Thick
2.5 D.P.C.
2.5th C.C. over 10th L.C.
P.L.
G.L.
SECTION - PQRS
All Dimensions in cms.
7cm to 5cm
2.5 D.P.C.
2.5 C.C over 10 L.C.
SECTION - ABDC
Schedule
DOORS :
D = 100x210
D1 = 90x210
WINDOWS :
W = 110x120
W1 = 90x120
CW = 75x45
CW1 = 60x45
SHELF :
S = 110x140
FRAME :
D = 8x10
D1 = 8x10
W = 8x10
W1 = 8x10
CW = 6x5
CW1 = 6x5
KITCHEN
280 x 240
VERANDAH
20x40 PILLAR
ROOM
400 x 420
ROOM
360 x 420
WEB
15cm x 15cm
D&CW
W/CW
VERANDAH
PLAN
All Dimensions in cms.

Fig.1

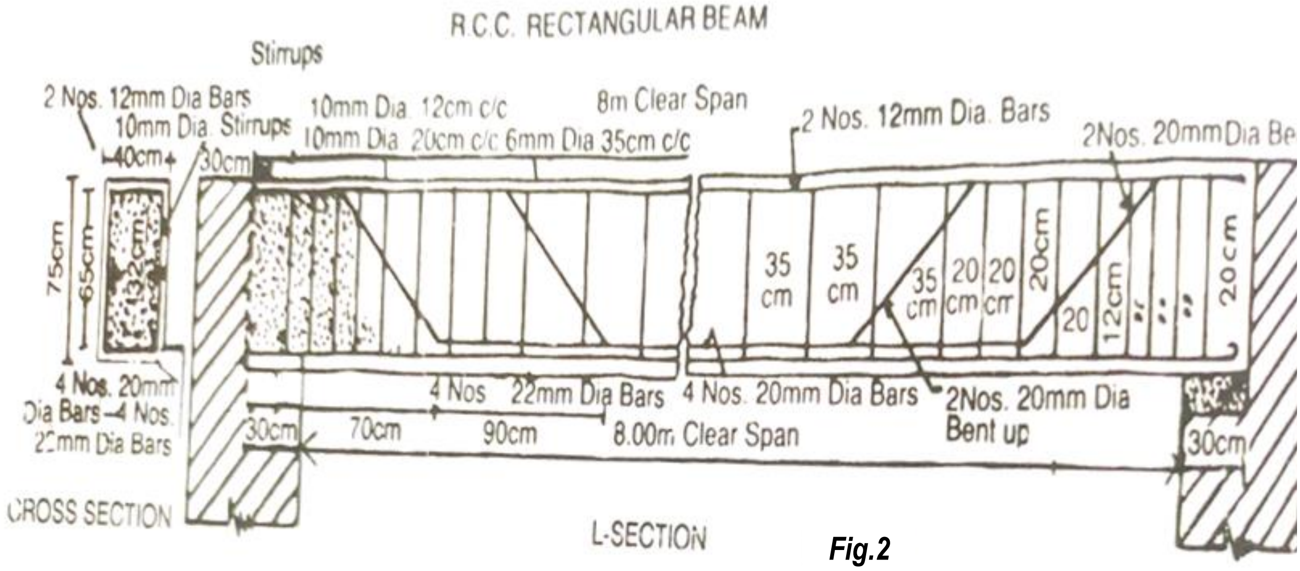
R.C.C. RECTANGULAR BEAM
Stirrups
2 Nos. 12mm Dia Bars
10mm Dia. Stirrups
40cm
30cm
75cm
65cm
32cm
10mm Dia. 12cm c/c
10mm Dia. 20cm c/c 6mm Dia 35cm c/c
8m Clear Span
2 Nos. 12mm Dia. Bars
2Nos. 20mm Dia Be
35 cm
35 cm
35 cm
20 cm
20 cm
20cm
20
12cm
20cm
4 Nos. 20mm Dia Bars -4 Nos. 22mm Dia Bars
4 Nos 22mm Dia Bars
4 Nos. 20mm Dia Bars
2Nos. 20mm Dia Bent up
30cm
70cm
90cm
8.00m Clear Span
30cm
CROSS SECTION
L-SECTION

Fig.2

Total No. of Questions : **08** Roll No. : 0701......................................

B.Tech FIFTH SEMESTER EXAMINATION JUNE-2025

(Branch : Civil Engineering)

CE-5311 (EL-I) ADVANCE SURVEY

Time : Three Hours

Maximum Marks : 70
Min. Pass Marks : 22

Note : Answer any five questions. All questions carry equal marks. Assume suitable data, wherever necessary and mention them clearly.

1(a) Define degree of curve. Enumerate the notations of simple circular curve. ***1,5***

(b) Tabulate the necessary data and draw up a table of deflection angles and chainages for setting out simple circular curve of 380 m radius to connect the two tangents intersecting at the chainage of 700 m, the deflection angle being 30^o by Rankine's method of deflection angles. Take peg interval being 30 m. ***08***

2 Two uniform grades (+ 0.4%) and (- 0.5%) are to be connected by a vertical curve having the chainage and elevation of the point of intersection of its two tangents as 3000 m and 350 m, respectively. Calculate the reduced levels of the various stations on the curve by tangent correction method, assuming the rate of change of grade to be 0.05% per 20 m chain. ***14***

3(a) Discuss classifications of triangulation. ***06***

(b) The elevations of two triangulation stations A&B, 100 km apart, are 210m and 900m above M.S.L. The elevations of two peaks C&D on the profiles between them are, respectively 340m and 560 m. The distance AC = 45 km and AD = 70 km. Design a suitable signal required at B, so that it is visible from the ground station A. ***08***

4(a) The telescope of a theodolite is fitted with stadia wires. It is required to find the most probable values of the constants K&C of tacheometer by theory of least squares. The staff was kept vertical at three points in the field and with line of sight horizontal the staff intercepts observed were as follows : ***06***

Distance of Staff from Tacheometer D (m)	150	200	250
Staff Intercept S(m)	1.495	2.000	2.505

(b) Adjust the following angles of the triangle ABC by Gauss´s rule :- ***08***

Angle-A	Angle-B	Angle-C
59° 25' 33"	58° 20' 13"	62° 14' 18"
59° 25' 28"	58° 20' 16"	62° 14' 19"
59° 25' 30"	58° 20' 16"	62° 14' 14"
59° 25' 28"	58° 20' 16"	62° 14' 16"
59° 25' 31"	58° 20' 16"	62° 14' 18"
	58° 20' 13"	

P.T.O.

5(a) Explain in brief about different types of aerial photographs. ***06***

(b) What are the various methods of locating Sounding? Write note on : ***1,4,3***

(i) Method of locating sounding by Cross rope and (ii) Sounding Machine.

6(a) Describe tacheometric method of setting out simple circular curve. ***06***

(b) Discuss in detail transition curve and compound curve. ***4,4***

7(a) State the objectives of triangulation and explain briefly about Base line correction. ***2,4***

(b) The following observations of three angles A, B & C were taken at one station : ***08***

Observed Angles			Weight
A	=	75° 32' 46.3"	2
B	=	55° 09' 53.2"	3
C	=	108° 09' 28.8"	3
A + B	=	130° 42' 41.6"	3
B + C	=	163° 19' 22.5"	1
A + B + C	=	238° 52' 09.8"	1

Determine the most probable values of angles A, B & C by method of difference.

8 Write technical short notes on **any four** : ***3½×4***

(i) Classification of Simple Circular Curve,
(ii) Terrestrial Photograph,
(iii) The Strength of figure,
(iv) Hydrographic surveying,
(v) Reverse curve.

*****