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10AL51

Fifth Semester B.E. Degree Examination, Dec.2018/Jan.2019
Management and Entrepreneurship

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, selecting atleast TWO questions from each part.

PART – A

- 1 a. Define management. List its characteristics. (04 Marks)
b. What are the various roles of a manager? Explain. (06 Marks)
c. Explain (i) Systems approach (ii) contingency approach to Management. (10 Marks)
- 2 a. Define the term planning. Explain steps involved in planning. (10 Marks)
b. List the importance and purpose of planning process. (06 Marks)
c. Explain MBO and MBE. (04 Marks)
- 3 a. List and explain principles of organization. (10 Marks)
b. Explain selection and recruitment process. (10 Marks)
- 4 a. Explain the following theories of motivation:
(i) Maslow's Hierarchy of needs theory (ii) McGregor's theory (iii) 2 factor theory (12 Marks)
b. List the techniques of coordination. (08 Marks)

PART – B

- 5 a. Classify Entrepreneurs by providing an example for each type. (10 Marks)
b. What role does an entrepreneur play in economic development of a country? (10 Marks)
- 6 a. Explain the steps to start a SSI. (08 Marks)
b. List the advantages of a SSI. (05 Marks)
c. Explain effect of WTO/GATT on SSI. (07 Marks)
- 7 Explain the nature of support and functions of TECKSOK, KIADB, NSIC and KSFC for an entrepreneur. (20 Marks)
- 8 a. Why should feasibility study be conducted? Explain various types of feasibility study. (12 Marks)
b. Explain contents of a Project Report. (08 Marks)

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Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and/or equations written eg. 42+8 = 50, will be treated as malpractice.

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Fifth Semester B.E. Degree Examination, Dec.2018/Jan.2019
Design of RCC Structural Elements

Time: 3 hrs.

Max. Marks:100

- Note: 1. Answer any FIVE full questions, selecting at least TWO questions from each part.**
2. Use of IS456-2000 is permitted.
3. Use of SP-16 is permitted.

PART – A

1.
 - a. Explain the necessity of reinforcement in concrete. (04 Marks)
 - b. Why do we need cover to reinforcement? (04 Marks)
 - c. What is meant by limit state? Discuss the different limit states to be considered in reinforced concrete design. (08 Marks)
 - d. Why is the partial safety factor for concrete greater than that for reinforcing steel in the consideration of limit states? (04 Marks)

2.
 - a. Obtain an expression for the limiting depth of neutral axis ($x_{u,lim}$) for a rectangular section with M20 grade concrete and Fe500 grade of steel with the help of strain diagram. (06 Marks)
 - b. Generate expression to calculate the limiting moment of resistance for a reinforced concrete flanged section, when $x_{u,lim} > D_f$ and $D_f < 3/7 x_{u,lim}$.
 D_f – Thickness of the flange
 $x_{u,lim}$ – Limiting value of neutral axis depth. (08 Marks)
 - c. Estimate the moment of resistance of a T-section with the following details :
 - i) Effective flange width = 2300 mm
 - ii) Thickness of flange = 150 mm
 - iii) Web width = 300 mm
 - iv) Effective depth = 700 mm
 - v) Reinforcement : 8 – #25
 - vi) Materials : M20 concrete and Fe415 steel. (06 Marks)

3.
 - a. What are the major factors which influence crack-widths in flexural members? (04 Marks)
 - b. Determine the short-term deflection as per IS code due to dead load and live load and long term deflection due to shrinkage of a cantilever beam of span 5 m subjected to dead load of 15 kN/m and live load of 15 kN/m at service state. The width and overall depth of beam are 400 mm and 750 mm respectively. It is reinforced with 6 – #25 at top and 2 – #25 at bottom with a clear cover of 25 mm. Materials used are M20 grade concrete and Fe415 steel. (16 Marks)

4. A T-beam and slab floor system has a slab 125 mm thick spanning between beams which are spaced at 3.5 m apart. The beams have a clear span of 7.5 m and end bearings are 230 mm wall. The live load on floor is 4 kN/m² and floor finish is 0.8 kN/m². Design the intermediate T-beam for flexure and shear. Sketch the details of reinforcement. Use M20 grade concrete and Fe-415 steel.
 Note : The beam is simply supported on walls. (20 Marks)

PART – B

- 5 Design a two-way slab for a hall of size $4.2\text{m} \times 5.2\text{m}$. The slab is supported all around on walls of width 230 mm. The slab has to carry a live load of 4 kN/m^2 and floor finish is 0.6 kN/m^2 . All the edges are discontinuous and corners are held down. Use M20 concrete and Fe415 steel. Also sketch the details of reinforcement. (20 Marks)
- 6 a. Why does the code require all columns to be able to resist a minimum eccentricity of loading? (04 Marks)
b. Enumerate the functions of the transverse reinforcement in a reinforced concrete column. (04 Marks)
c. Design a reinforced rectangular short column of size $300\text{mm} \times 400\text{mm}$ which has to carry an ultimate axial load of 733 kN and an ultimate moment of 100 kN-m with respect to major axis. Use M20 concrete and Fe415 steel. Also sketch the details of reinforcement. (12 Marks)
- 7 Design an isolated rectangular footing of uniform depth for a column of size $300\text{mm} \times 450\text{mm}$ which has to carry a load of 800 kN. Safe bearing capacity of soil is 200 kN/m^2 . Use M20 concrete and Fe415 steel. Also show the details of reinforcement through sketches. (20 Marks)
- 8 a. Explain the basic difference in structural behaviour between “Stair slabs spanning transversely” and “Stair slabs spanning longitudinally”. (04 Marks)
b. The clear dimensions of a stair case hall is $2.6\text{m} \times 5.2\text{m}$. The floor to floor height is 3.6m. Design one of the flights of dog-legged stairs considering live load as 3.0 kN/m^2 . Use M20 concrete and Fe415 steel. Assume that the landings span in the same direction as the stairs and are supported on 230 mm walls at the ends. Sketch the reinforcement details. (16 Marks)

Fifth Semester B.E. Degree Examination, Dec.2018/Jan.2019
Structural Analysis – II

Time: 3 hrs.

Max. Marks: 100

**Note: Answer any FIVE full questions, selecting
atleast TWO questions from each part.**

PART – A

- 1 a. Two point loads of 10 kN and 5 kN, spaced 3 m apart, cross a girder of 10 m span, as shown in Fig.Q1(a). The smaller load leading, from left to right. Calculate maximum S.F. and B.M. at a section 4 m from left hand support. (12 Marks)

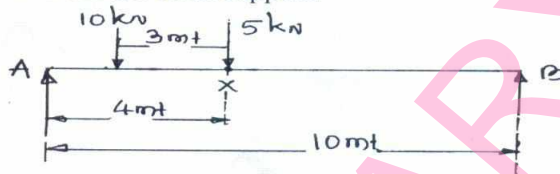


Fig.Q1(a)

- b. Two loads of an electrical crane, 50 kN each, spaced at 4 m centre to centre cross a girder of 8 m span as shown in Fig.Q1(b). Find the absolute maximum bending moment in the beam. (08 Marks)

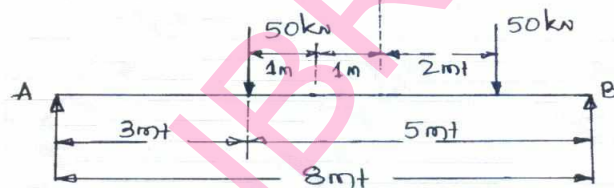


Fig.Q1(b)

- 2 Analyse the frame shown in Fig.Q2 using "Slope Deflection method", and draw BMD and SFD. (20 Marks)

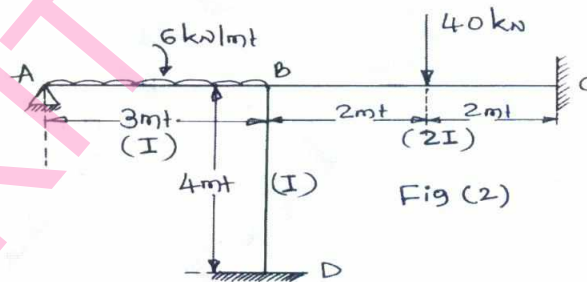


Fig.Q2

- 3 Analyse the continuous beam loaded as shown in Fig.Q3 by the moment distribution method. Draw Shear Force {SF} and Bending Moment {BMD} diagrams. (20 Marks)

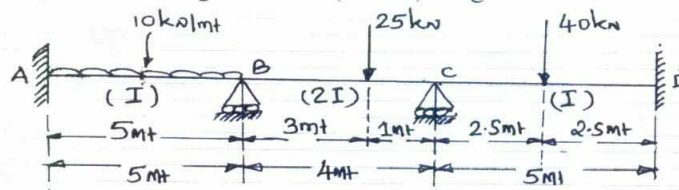


Fig.Q3

- 4 Analyse the portal frame loaded as shown in Fig.Q4 by using moment distribution method and draw the BMD and SFD. Take EI is constant. (20 Marks)

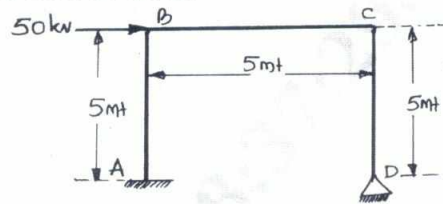


Fig.Q4

PART - B

- 5 Analyse the continuous beam shown in Fig.Q5 using Kani's method and draw BMD. (20 Marks)

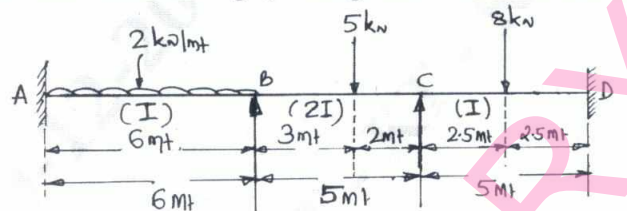


Fig.Q5

- 6 A continuous beam ABC as shown in Fig.Q6 fixed at 'A' and roller support at 'C' and the EI is constant throughout the beam. Determine the Reactions and Moments at the supports. Draw BMD and SFD by using Flexibility method. (20 Marks)

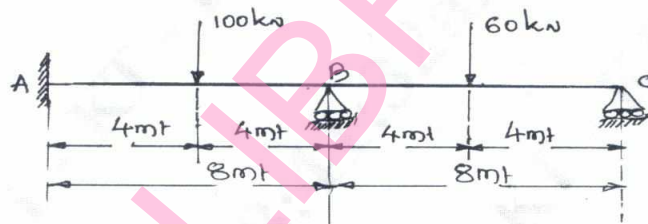


Fig.Q6

- 7 Analyse the three wire system shown in Fig.Q7, the number in parenthesis are the c/s area of the wire in mm². Take E = 2000 kN/mm², using stiffness method. (20 Marks)

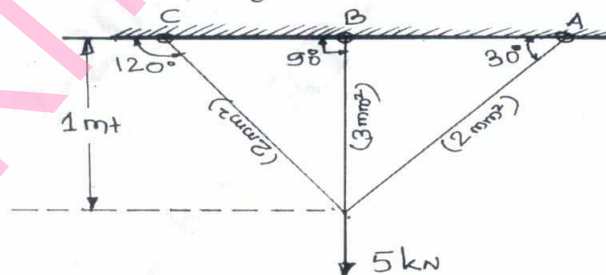


Fig.Q7

- 8 a. Explain the following :
- The equation of motion for damped vibrating system
 - Critical damping
 - Under damping
 - Over damping
 - Damping ratio.

(10 Marks)

- b. Determine the equivalent spring stiffness and natural frequency of vibration for the Fig.Q8(b) shown below. (10 Marks)

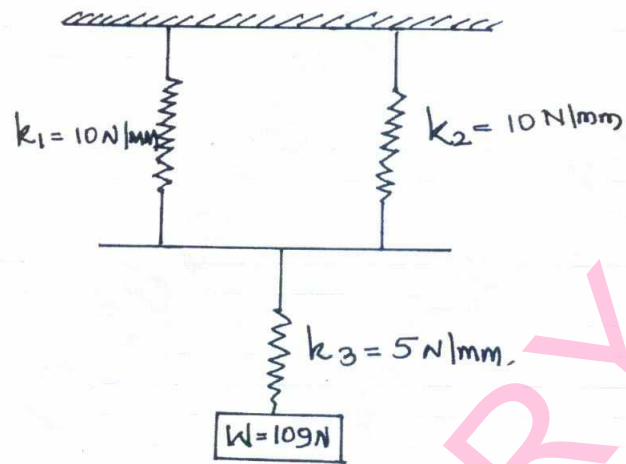


Fig.Q8(b)

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10CV54

Fifth Semester B.E. Degree Examination, Dec.2018/Jan.2019
Geotechnical Engineering – I

Time: 3 hrs.

Max. Marks:100

**Note: Answer any FIVE full questions, selecting
atleast TWO questions from each part.**

PART – A

- 1 a. What is phase diagram? Define the following with the help of three phase diagram.
 i) Porosity ii) air content iii) water content iv) bulk unit weight of soil v) unit weight of soil solids vi) percentage air voids vii) degree of saturation viii) void ratio. (06 Marks)
- b. with usual notations, derive the relation :

$$\gamma' = \frac{(G - 1)\gamma_w}{1 + e}$$
 (06 Marks)
- c. Soil has been compacted in an embankment at a bulk density of 21.5 kN/m³ and water content of 12%. The value of specific gravity of soil solid is 2.65. The water table is well below the foundation level. Estimate the dry density, void ratio, degree of saturation air content and percentage air voids of compacted soil. (08 Marks)

- 2 a. What is consistency of soil? List and define the various atterberg consistency limits. (06 Marks)
- b. What are the corrections to be made in hydrometer reading? Give the combined equation for corrected hydrometer reading. (04 Marks)
- c. Draw the particle size distribution curve and determine uniformity coefficient and coefficient of curvature of the soil for the data given below :
 Also state whether the sand given is well graded or poorly graded as per I.S recommendations :

Sieve size 'mm'	4.75	2.36	1.18	0.60	0.30	0.15	0.075	Pan
Mass of soil retained 'grams'	13	72	66	517	231	92	8	1

(10 Marks)

- 3 a. Explain with the help of the particle size distribution curve, well graded, uniformly graded and gap graded soil. (04 Marks)
- b. With neat sketch, explain the structure and salient details of clay minerals. (08 Marks)
- c. The following data refers to a sample of soil :
 Percentage passing 4.75mm IS sieve = 52
 Percentage passing 0.75mm IS sieve = 7
 Uniformity coefficient = 6.8
 Coefficient of curvature = 3.0
 Liquid limit of fine grained soil = 38%
 Plastic limit of fine grained soil = 12%
 Classify the soil. (08 Marks)

- 4 a. List and briefly explain the factors affecting the permeability of soils. (06 Marks)
- b. Explain quick sand phenomenon. (06 Marks)
- c. A sand sample of 35cm² cross-sectional area and 20cm long was tested in a constant head permeameter. Under a head of 60cm the discharge was 120ml in 6 minutes. The dry unit weight of the sand used for the test was 1120 grams and G = 2.68. Determine,
 i) Coefficient of permeability in cm/sec
 ii) The discharge velocity
 iii) The seepage velocity. (08 Marks)

PART – B

- 5 a. Explain briefly the Mohr-Coulomb theory applied to soils. (05 Marks)
 b. Explain sensitivity and thixotropy of clay. (05 Marks)
 c. A direct shear test was conducted on a remoulded soil sample of sand gave the following observations at the time of failure. Normal load, $\sigma = 288\text{N}$. Shear load = 173 N. The cross-sectional area of the sample = 36cm^2 . Determine,
 i) The angle of internal friction
 ii) The magnitude and direction of the principal stresses in the zone of failure, by using graphical method. (10 Marks)
- 6 a. List the differences between standard and modified proctors compaction test. (04 Marks)
 b. Explain the factors affecting the compaction of soils. (04 Marks)
 c. The following are the results of compaction test :

Mass of mould + wet soil (grams)	2925	3095	3150	3125	3070
Water content %	10	12	14.3	16.1	18.2

Volume of the mould = 1000ml

Mass of the mould = 1000grams

Specific gravity of solids = 2.70

- i) Plot the compaction curve and find the optimum moisture content and maximum dry density
 ii) Plot the zero air void line
 iii) Determine the degree of saturation at the maximum dry density. (12 Marks)
- 7 a. What are the assumptions made in Terzaghi's one dimensional consolidation theory? (08 Marks)
 b. Explain the determination of pre-consolidation pressure by casagrande method. (06 Marks)
 c. An undisturbed sample of a clay stratum 2m thick, was tested in the laboratory and the average value of coefficient of consolidation was found to be $2 \times 10^{-4}\text{cm}^2/\text{sec}$. If a structure is built on the clay stratum, how long will it take to attain half the ultimate settlement under the load of the structure? Assume double drainage. (06 Marks)
- 8 a. What are the curve fitting methods used in consolidation test? Explain logarithmic time curve fitting method with neat sketch. (08 Marks)
 b. What are the advantages of triaxial shear test over direct shear test? (04 Marks)
 c. A vane 10cm long and 8cm in diameter was pressed into soft clay at the bottom of a borehole. Torque was applied and gradually increased to 45 N-m when failure took place. Subsequently, the vane rotated rapidly so as to completely remould the soil and a torque of 18 N-m is required to shear this soil. Calculate cohesion of clay in natural and remoulded state. Also find sensitivity and mention the type and structure of clay based on this sensitivity. (08 Marks)

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10CV55

Fifth Semester B.E. Degree Examination, Dec.2018/Jan.2019
Hydrology and Irrigation Engineering

Time: 3 hrs.

Max. Marks:100

- Note: 1. Answer any FIVE full questions, selecting atleast TWO questions from each part.**
2. Draw neat sketches, wherever necessary.
3. Assume missing data, if any.

PART – A

- 1 a. Define Precipitation. What is Cyclonic precipitation? Distinguish between cold front and warm front. Explain how you would estimate missing precipitation data in detail. (10 Marks)
 b. There are four rain gauge stations existing in the catchment of a river. The average annual rainfall values at these stations are 800, 620, 400 and 540mm respectively.
 i) Determine the optimum number of raingauges in the catchment, if it is desired to limit the error in the mean value of rainfall in the catchment to 10%.
 ii) How many more gauges will then be required to be installed? (10 Marks)
- 2 a. Draw a neat sketch of an automatic recording rain gauge and describe its working. What precautions are to be taken in the installation of the gauge and recording of the rainfall measurements? (10 Marks)
 b. Explain the double mass curve method of testing the consistency of rainfall record. (05 Marks)
 c. The analysis of a storm yielded the following information regarding Isohyets. Calculate the average depth of rainfall and volume of rain water for given catchment. (05 Marks)

Isohyet Interval in mm	70-80	80-90	90-100	100-110	110-120	120-130
Area in km ²	10	85	113	98	136	67

- 3 a. Mention the basic assumptions in the theory of unit hydrograph. Explain step by step method of construction of unit hydrograph from a storm of unit duration. Mention the sources of error in unit hydrograph construction. (10 Marks)
 b. A reservoir with a surface area of 300 hectares has the following average meteorological data during a given week.
 Water temperature = 30⁰C ; Relative humidity = 50% ; Wind velocity @ 1m above ground = 12 km/h ; Mean barometer reading = 750 mm of Hg. Estimate the average daily evaporation from the lake reservoir and the volume of water evaporated from the lake during this week. Make use of Meyer's formula and Rohwer's formula to compare the results. Assume $e_s = 31.82$ mm of Hg, $K_m = 0.36$. (10 Marks)
- 4 a. Describe step by step procedure adopted for flood routing computations required for reservoirs by 'Trial and Error method'. (10 Marks)
 b. Describe a double ring infiltrometer for measuring infiltration rate. What is the significance of the outer ring? (05 Marks)
 c. The average rainfall over a basin of area 107 hectare during a storm was as follows :

Time (hr)	0	1	2	3	4	5	6	7
Rainfall (mm)	0	9	15	24	32	29	19	0

If the volume of run – off from this storm was measured as $50 \times 10^3 \text{ m}^3$. Determine the ϕ Index. (05 Marks)

PART – B

- 5 a. Discuss briefly on “ill – effects of irrigation” on environment. (05 Marks)
b. With a flow diagram, discuss briefly about different systems of irrigation. (10 Marks)
c. Compare the advantages and disadvantages of well irrigation. (05 Marks)
- 6 a. Discuss briefly about soil classification. (10 Marks)
b. Describe the factors which affect the duty of water. (10 Marks)
- 7 a. What is meant by “Irrigation efficiencies”? Obtain expressions for various Irrigation efficiencies. (10 Marks)
b. A water course has a cultivable commanded area of 1200 ha. The intensity of irrigation for crop A is 40% and for B is 35% , both the crops being Rabi crops. Crop A has a Kor period of 20 days and crop B has Kor period of 15 days. Calculate the discharge of the water course, if the Kor depth for crop A is 10 cm and for B it is 16 cm. (10 Marks)
- 8 a. Explain various types of canals, according to various classification systems. (10 Marks)
b. Design an irrigation channel in alluvial soil according to Lacey’s Silt theory, given the following data :
Full supply discharge = $15\text{m}^3/\text{sec}$.
Lacey’s silt factor = 1.0.
Channel side slopes = $\frac{1}{2} : 1$. (10 Marks)

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Fifth Semester B.E. Degree Examination, Dec.2018/Jan.2019

Transportation Engineering – I

Time: 3 hrs.

Max. Marks:100

Note: Answer any FIVE full questions, selecting at least TWO questions from each part.

PART – A

1.
 - a. Explain various characteristics of road transport. (06 Marks)
 - b. Explain briefly the contribution of the following in road development in India:
 - i) Indian road congress
 - ii) Central road fund
 (08 Marks)
 - c. The area of a state is 3,08,000 sq.km. The number of towns as per 1981 census was 276. The number of villages was 41,833. Calculate the length of various categories of roads as per 3rd 20 year road development plan. (06 Marks)

2.
 - a. Define “Master plan” and “Saturation system”. Explain the following with neat sketches:
 - i) Rectangular or block pattern
 - ii) Star and grid pattern
 (08 Marks)
 - b. List the salient features of PMGSY. (04 Marks)
 - c. There are three alternate proposals for a back ward district shown below, suggest the order of priority for phasing based on the utility units of 0.5, 1, 2, 4 and 8 for the five population ranges and 1 and 5 per 1000t of agricultural and industrial products.

Road Link	Length km	No. of Villages Served with Population range			Productivity served in 1000 tonnes	
		<500	501-1000	1001-2000	Agricultural	Industrial
A	500	100	150	40	250	20
B	600	200	250	68	320	25
C	700	270	350	82	500	35

(08 Marks)

3.
 - a. What is an ideal alignment? Explain with neat sketches how you will align through (i) Hill pass (ii) A bridge site (iii) Marshy land. (08 Marks)
 - b. Describe the terms: Carriage way and right of way. Give typical cross section of NH/SH in rural section, in embankment and in cutting, with dimensions. (06 Marks)
 - c. What is SSD? Calculate the minimum SSD required to avoid a head on collision, when two cars are approaching from opposite directions on 2.5% gradient stretch, with speeds of 90 kmph and 70 kmph. Assume reaction time as 2.5 sec and coefficient of friction as 0.35. (06 Marks)

4.
 - a. Explain the factors influencing the geometric elements. (06 Marks)
 - b. List the object providing extra widening of pavement at horizontal curves and super elevation. (06 Marks)
 - c. Design a valley curve at the junction of downward gradient of 1 in 30 and a level stretch from head light sight distance considerations. SSD is 180 m. Treating the curve as a square parabola, calculate the RLS at an interval of 25 m to set out the curve. RL of starting point at level stretch is 10.00 m. (08 Marks)

PART – B

- 5 a. List the desirable properties of bitumen. What are the various tests carries out on bitumen? (07 Marks)
- b. Describe how the quality of toughness and hardness of aggregates is evaluated in the lab. (06 Marks)
- c. The following test data pertains to a soil subgrade specimen.

Penetration (mm)	0	0.5	1.0	1.50	2.0	2.5	3.0	4.0	5.0	7.5	10.00	12.50
Load (kg)	0	5	16.2	28.1	40	48.5	56.5	67.5	75.2	89.0	99.5	106.5

Plot the data and determine the CBR value. (07 Marks)

- 6 a. Distinguish between flexible pavement and rigid pavement. (06 Marks)
- b. Explain the meaning of ESWL. How is it determined for a dual wheel assembly and what are its applications? (06 Marks)
- c. Design the flexible pavement for the construction of a new highway (NH/two lane/single carriage way) with the following data, as per IRC 37-2001.
 - i) Number of commercial vehicles as per last count 1000 CVPD.
 - ii) Period of construction = 3 yrs, annual growth rate = 08%. Design CBR of sub of sub-grade soil 6%.

Pavement Design Catalogue
Recommended design for Traffic Range 10-150 msa
CBR 6%

Cumulative Traffic (msa)	Total Pavement Thickness (mm)	Pavement Composition		
		Bituminous Surfacing		Granular Base and Sub Base (mm)
		BC (mm)	DBM (mm)	
10	615	40	65	Base = 250
20	640	40	90	
30	655	40	105	Sub-base = 260
50	675	40	125	
100	700	50	140	
150	720	50	160	

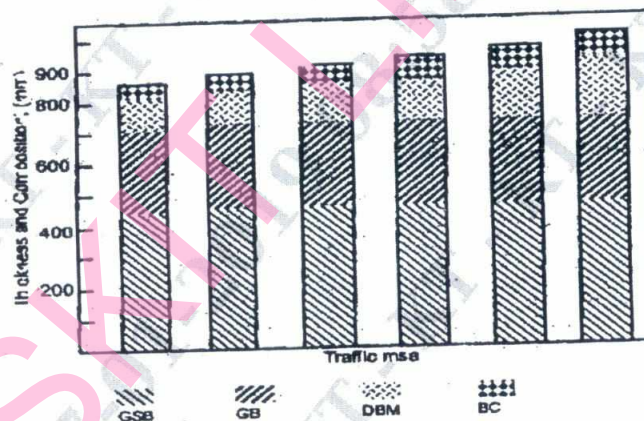


Fig.Q6(c)

(08 Marks)

- 7 a. Explain the construction steps for cement concrete roads. (06 Marks)
- b. Indicate the different methods of subsurface drainage, with neat sketches. (08 Marks)
- c. What do you understand by wet mix macadam? What are materials used and its requirements? (06 Marks)
- 8 a. Write short notes on: (i) Annual cost method (ii) Benefit cost ratio method (06 Marks)
- b. Explain the concept of BOT and BOOT, in financing high way project. (06 Marks)
- c. Explain the following with neat sketches:(i) Alligator cracking (ii) Mud pumping. (08 Marks)

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