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10AL51

Fifth Semester B.E. Degree Examination, June/July 2016
Management and Entrepreneurship

Time: 3 hrs.

Max. Marks: 100

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

PART – A

- 1 a. Define management, explain the levels of management. (10 Marks)
b. Define planning. Explain the types of plans with example. (10 Marks)
- 2 a. Explain in details any five functions of management. (10 Marks)
b. List and explain the characteristics of planning. (10 Marks)
- 3 a. Discuss the steps commonly followed by organizations in selection procedure. (10 Marks)
b. Discuss the different sources of recruitment. (10 Marks)
- 4 a. What are the purposes of communications in an organization? (10 Marks)
b. Discuss all the steps involved in a control process. (10 Marks)

PART – B

- 5 a. Define entrepreneur. Discuss four key elements in context to entrepreneurship. (06 Marks)
b. Explain entrepreneurs based on the type of business. (08 Marks)
c. Discuss three barriers in connection with entrepreneurship. (06 Marks)
- 6 a. Discuss steps in the location of small scale industry. (10 Marks)
b. Explain the important factors in the selection of a small scale industry site. (10 Marks)
- 7 a. Discuss in detail on sources of finance for small scale industry. (10 Marks)
b. Elaborate on objectives and functions of SIDBI. (10 Marks)
- 8 a. Define project, discuss at least four criteria to select a project. (10 Marks)
b. What are the needs of network techniques in project? Explain two types of network techniques in project implementation. (10 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, June/July 2016
Design of RCC Structural Elements

Time: 3 hrs.

Max. Marks: 100

- Note:** 1. Answer FIVE full questions, selecting at least TWO questions from each part.
 2. Use of IS 456-2000 and SP-16 is permitted.
 3. Assume missing data suitably.

PART – A

- 1 a. Briefly explain under reinforced, over reinforced and balanced sections with sketches. (06 Marks)
- b. Explain the following : (09 Marks)
- i) Partial safety factors for loads and materials
 - ii) Characteristic load
 - iii) Characteristic strength.
- c. Clearly distinguish between working stress method and limit state method of design of R.C sections. (05 Marks)
- 2 a. Define Doubly reinforced beam. List the situations which require the adoption of a Doubly reinforced beam. (06 Marks)
- b. A concrete beam has 350mm breadth and 700mm effective depth. Determine the total area of steel required if a beam is subjected to factored bending moment of 600kN m. Use M20 concrete and Fe 415 grade steel. Take $d^1 = 50\text{mm}$. Design stress strain curve data for Fe415 steel are given below (14 Marks)
- | Strain | Stress (N/mm ²) |
|---------|-----------------------------|
| 0.00276 | 351.8 |
| 0.00380 | 360.9 |
- 3 a. Discuss in brief short and long term deflections of R.C Beams. (06 Marks)
- b. A reinforced concrete beam of cross section 300mm×600mm overall is reinforced with 3 bars of 20mm diameter HYSD of Fe415 grade on tension side with an effective cover of 50mm. Compute short term deflection at midspan consisting of service load of 20kN/m and concentrated load of 25kN at the centre of span. The beam is simply supported over a span of 5m. Use M20 grade concrete and Fe415 steel. (14 Marks)
- 4 A Hall measuring 14m × 6m, beams are spaced at 3.5m c/c. The thickness of wall being 300mm. The thickness of slab is 150mm. Live load of slab is 5kN/m². The web (rib) width of beam is taken as 300mm. Design an intermediate T – beam. Use M15 concrete and Fe415 steel. Take $d = 500\text{mm}$, $d^1 = 50\text{mm}$. Sketch the reinforcement details. (20 Marks)

PART – B

- 5 Design a one way slab with a clear span of inner distance 3.5m × 8m simply supported over an 230mm thick supporting wall to support a live load of 4kN/m². Adopt M20 grade concrete and Fe 415 steel Take $\ell/d = 25$ and $d^1 = 20\text{mm}$. (20 Marks)

- 6 a. Explain the design steps for axially loaded short columns. (06 Marks)
- b. Design a short R.C column of rectangular section subjected to ultimate load of 600kN and ultimate bending moment of 100 kN.m. The column bends at major axis (x-axis). The effective length of column is 4.5m. Assume width of column as 300mm. Use M₂₀ grade concrete and Fe415 steel. Design the lateral ties and sketch the details. Take D = 450mm and d¹ = 45mm. (14 Marks)
- 7 A square footing has to transfer a load of 1000kN from square column of size 400mm × 400mm. Assume M20 grade concrete and Fe415 HYSD steel Bars. Take SBC of soil = 200kN/m². Design the footing and sketch the reinforcement details. (20 Marks)
- 8 Design a dog legged stairs for an office building in a room measuring 2.8m × 5.8m clear. Vertical distance between the floors is 3.6m. Width of flight is to be 1.25m. Allowable live load is 3kN/m². Sketch the details of reinforcements. Use M20 concrete and Fe415 steel. Assume the stairs are supported on 230mm walls at the ends of outer edges of landing slabs. Take riser = 150mm and Tread = 300mm. (20 Marks)

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Fifth Semester B.E. Degree Examination, June/July 2016
Structural Analysis – II

Time: 3 hrs.

Max. Marks: 100

- Note: 1. Answer FIVE full questions, selecting at least TWO questions from each part.**
2. Missing data, if any, may be suitably assumed.

PART – A

- 1 a. Find the shear force at 'x' using influence line diagram, for the beam show in Fig. Q1(a) (08 Marks)

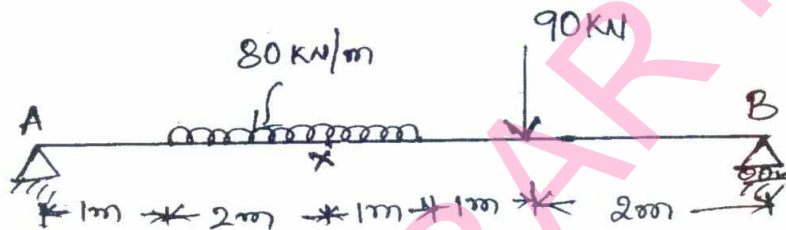


Fig. Q1(a)

- b. A train of Five wheel loads crosses a simple span of 30 meters. Calculate the maximum positive and negative shear at midspan and the absolute maximum bending moment anywhere in the span. (12 Marks)

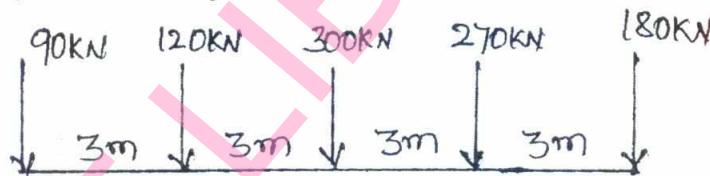


Fig. Q1 (b)

- 2 Analyse the frame shown in Fig Q2 by using slope deflection method. Draw BMD and SFD. (20 Marks)

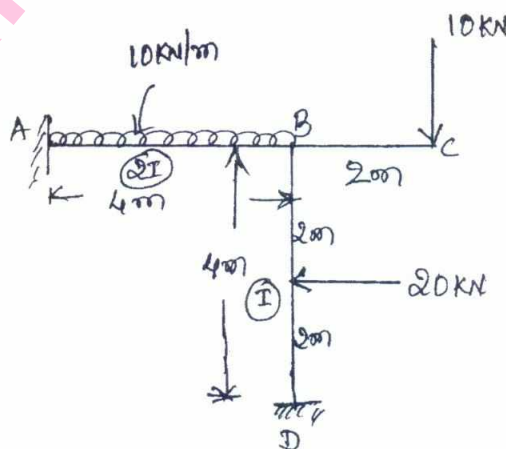


Fig. Q2

- 3 Analyse a continuous beam shown in Fig Q3. Using moment distribution method. Sketch SFD and BMD. (EI constant). (20 Marks)

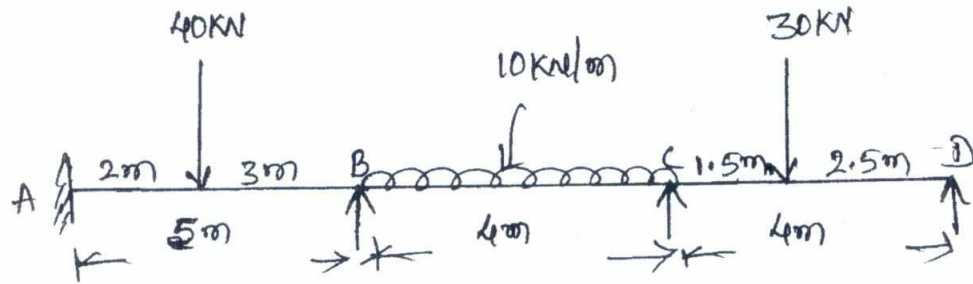


Fig. Q3

- 4 Analyse the frame shown in Fig Q4 by moment distribution method. Draw the bending moment diagram. (EI constant). (20 Marks)

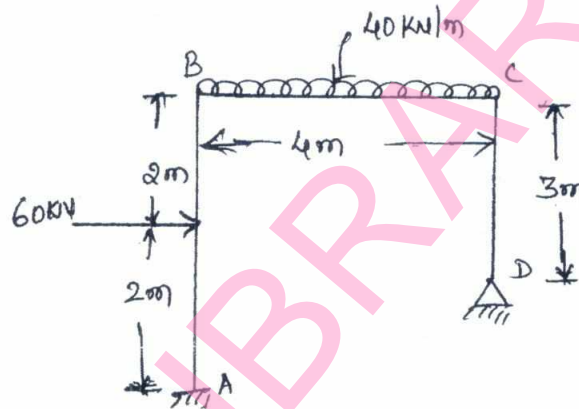


Fig. Q4

PART - B

- 5 Analyse the frame in Fig Q5 by Kani's method. Draw the bending moment diagram. (20 Marks)

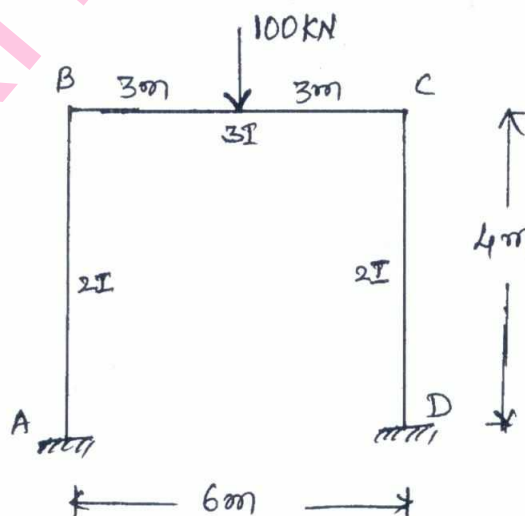


Fig. Q5

- 6 Analyse the frame shown in Fig. Q6 by using Flexibility matrix method. Use system approach. Draw BMD. (20 Marks)

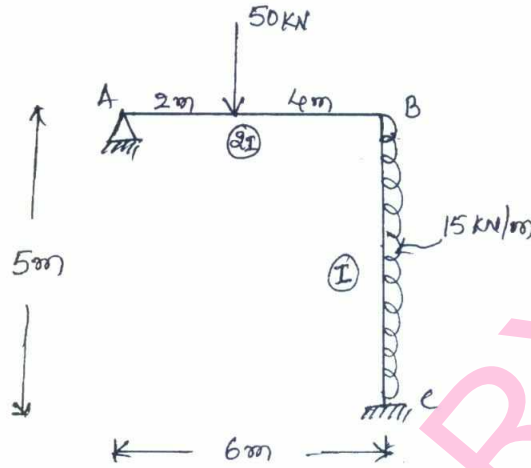


Fig. Q6

- 7 Analyse the continuous beam shown in Fig. Q7 by using stiffness matrix method. Use system approach Draw BMD. (20 Marks)

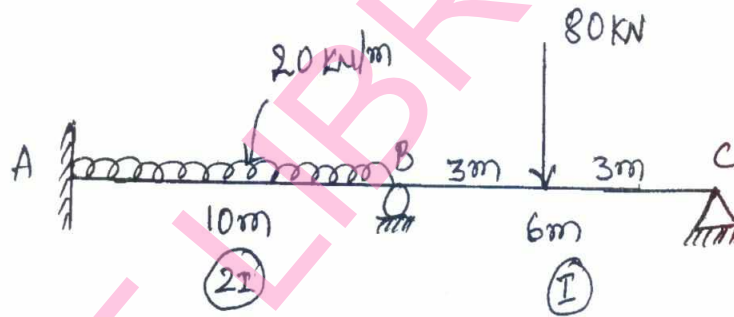


Fig. Q7

- 8 a. Explain degrees of freedom, free vibration, natural frequency and damping. (08 Marks)
 b. Determine natural frequency and period of the system as shown in Fig. Q8(b). Take $I = 6.5 \times 10^7 \text{ mm}^4$ and $E = 2 \times 10^5 \text{ N/mm}^2$. (12 Marks)

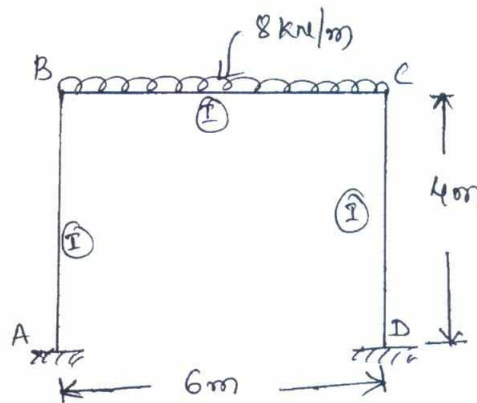


Fig. Q8(b)

Fifth Semester B.E. Degree Examination, June/July 2016
Geotechnical Engineering - I

Time: 3 hrs.

Max. Marks: 100

Note: 1. Answer any FIVE full questions, selecting atleast TWO questions from each part.
2. Assume missing data if any, suitably.

PART – A

- 1 a. Critically define the terms void ratio, porosity and water content with phase diagram. (04 Marks)
- b. Derive the relation $\gamma_d = \frac{G \cdot \gamma_w}{1 + e}$ with usual notations. (06 Marks)
- c. In an earthen embankment under construction, the bulk unit weight is 16.5 kN/m^3 at water content 11%. If the water content has to be increased to 50%, compute the quantity of water to be added per cubic meter of soil. Assume no change in void ratio. Also determine 'e' at this water content taking $G = 2.65$. (10 Marks)
- 2 a. Define relative density of sand and list its importance in geotechnical engineering. (04 Marks)
- b. Describe consistency of soil. List and define consistency limits. (06 Marks)
- c. The following results are obtained by conducting liquid limit test on clayey soil in the laboratory : (10 Marks)

No. of blows (N) :	34	23	18	12
Water content (W%) :	44.6	49.4	51.4	55.6

Plot flow curve. Determine Liquid limit, Toughness index. Assume plastic limit = 20%.

- 3 a. Explain with the help of typical particle size distribution curve, well graded, poorly graded and gap graded soil. (04 Marks)
- b. With the neat sketch, explain structure of clay minerals. (06 Marks)
- c. Following results are obtained from the laboratory tests conducted on two soil samples : (10 Marks)

Soil sample	A	B
Liquid limit :	85%	45%
Plastic limit :	50%	12%

Show the positions of these soils on plasticity chart and classify as per I.S. system.

- 4 a. Derive the relation between co-efficient of permeability and percolation with usual notations. (07 Marks)
- b. Explain Quick – sand phenomena and list its importance during construction. (05 Marks)
- c. A falling head permeater accommodates a soil sample of 6cm length and 500 cm^2 in area. The permeability of sample is expected to be $1 \times 10^{-4} \text{ cm/sec}$. Head of water in the standpipe falls from 30cm to 10cm in 40 minutes. Determine the size of the stand pipe which should be used. (08 Marks)

PART – B

- 5 a. Explain sensitivity and thixotropy of clayey soil. (04 Marks)
- b. List the factors affecting shear strength of soil. (04 Marks)

- c. A direct shear test results are obtained as follows :

Normal stress (kN/m^2) :	100	200	300
Shear stress (kN/m^2) :	130	185	240

Determine shear parameters graphically. Also draw Mohr's circle corresponding to second test result and report major and minor principal stresses. **(12 Marks)**

- 6 a. List the factors affecting compaction of soil and explain any 2 in detail. **(05 Marks)**
 b. List and explain various types of field compaction equipments. **(05 Marks)**
 c. The results of standard compaction test conducted in the laboratory are tabulated as follows:

Water content % :	5.00	10.00	14.00	20.00	25.00
Bulk density kN/m^3 :	17.70	19.80	21.00	21.80	21.60

Find MDD and OMC with usual notations by plotting compaction curve. Also draw ZAVD – line assuming $G = 2.65$. **(10 Marks)**

- 7 a. State the assumptions of one – dimensional Terzaghi's theory of consolidation. Also write standard / general differential one – dimensional consolidation equation with usual notation. **(08 Marks)**
 b. Explain with neat sketch, determination of co-efficient of consolidation by square – root of time fitting method. **(06 Marks)**
 c. A layer of soft clay is 6m thick and lies under newly constructed building. The weight of sand overlying the clayey layer produces a pressure of 260 kN/m^2 and this new construction increases the pressure by 100 kN/m^2 . If the compression index is 0.5, compute settlement of soil layer given water content 40% and $G = 2.65$. **(06 Marks)**
- 8 a. Critically discuss limitations of direct shear test. **(04 Marks)**
 b. Explain Vane shear test with neat sketch along with relations. **(06 Marks)**
 c. A vane apparatus 10cm long and 8cm in diameter was passed into the soft clay, at the bottom of borehole test. A torque of 45N-m was applied at which failure took place. Subsequently, vane instrument rotated rapidly, so as to get remolded soil sample. This remolded soil was sheared at a torque of 18 N-m. Then calculate sensitivity of clayey soil. **(10 Marks)**

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Fifth Semester B.E. Degree Examination, June/July 2016
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. Assume any missing data suitably.**

PART – A

- 1
 - a. With neat sketch, explain the various types of precipitation. (08 Marks)
 - b. What is a Rain gauge? Explain with neat sketch, working principle of Symon's non – recording gauge and its demerits. (08 Marks)
 - c. Raingauge station "X" did not function for a part of a month during which a storm occurred. The storm produced rainfalls of 84, 70 and 96mm at three surrounding stations A, B and C respectively. The normal annual rainfalls at the stations "X", A, B and C are respectively 770, 882, 736 and 944 mm. Estimate the missing storm rainfall at station "X". (04 Marks)

- 2
 - a. Define Evaporation. With a neat sketch, explain measurement of evaporation using I.S. class "A" pan. (08 Marks)
 - b. What is Infiltration? Explain the measurement of infiltration using double ring Infiltrometer (with a neat sketch). (08 Marks)
 - c. The rates of rainfall for the successive 30min period of a 3-hour storm are 1.6, 3.6, 5.0, 2.8, 2.2, 1.0 cm/hr. The corresponding surface runoff is estimated to be 3.6cm. Establish the ϕ – Index. Also determine the W – Index. (04 Marks)

- 3
 - a. Define Unit Hydrograph. Explain the assumptions made in deriving the unit hydrograph. (08 Marks)
 - b. Write brief note on Base Flow Separation. (04 Marks)
 - c. The Ordinates of a 3 hour unit hydrograph are given below :

Time in hr	0	3	6	9	12	15	18	21	24	27	30
Ordinates m ³ /sec	0	10	25	20	16	12	9	7	5	3	0

Find the ordinates of a 6 hour unit hydrograph for the basin, analytically. What is the peak value of discharge in this unit hydrograph? (08 Marks)

- 4
 - a. What do you mean by the term flood? Mention the factors affecting flood. Explain any two of them. (08 Marks)
 - b. Mention any two empirical formulae used to estimate the flood (briefly explain). (08 Marks)
 - c. Differentiate between Channel routing and Reservoir routing. (04 Marks)

PART – B

- 5
 - a. Define the term Irrigation. What are the necessity of irrigation? (06 Marks)
 - b. With neat sketches, explain Bandhara Irrigation. List its advantages and disadvantages. (08 Marks)
 - c. List benefits and ill effects of irrigation. (06 Marks)

- 6 a. List and explain in brief Common Indian Soils generally encountered. (08 Marks)
 b. With neat sketch, explain soil moisture presence in different zones. (06 Marks)
 c. The following data pertains to healthy growth of a crop :
 i) Field capacity of soil = 30% ii) Permanent wilting point %age = 11%
 iii) Density of soil = 1300 kg/m³ iv) Effective depth of root zone = 700mm
 v) Daily consumptive use of water = 12mm.
 For healthy growth moisture content must not fall below 25% of water holding capacity between the field capacity and the permanent wilting point. Determine the water Interval in days. (06 Marks)
- 7 a. Define “Duty” and “Delta” and also write their relationship. What are the factors on which duty depends? (08 Marks)
 b. Explain any four methods of assessment of Irrigation water. (04 Marks)
 c. The base Period, Intensity of Irrigation and duty of water for various crops under a canal system are given in the Table below. Determine the reservoir capacity if the culturable commanded area is 40,000 hectares, canal losses are 20% and reservoir losses are 10%. (08 Marks)

Crop	Base period (days)	Duty of water at the field (hectares/cumec)	Intensity of Irrigation (percentage)
Wheat	120	1800	20
Sugarcane	360	1700	20
Cotton	180	1400	10
Rice	120	800	15
Vegetables	120	700	15

- 8 a. Define Canals. Explain briefly classification based on discharge and relative importance in a given network of canals. (08 Marks)
 b. Explain various considerations for alignment of a canal. (08 Marks)
 c. Write short notes on :
 i) Critical velocity ratio ii) Regime channel. (04 Marks)

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Fifth Semester B.E. Degree Examination, June/July 2016
Transportation Engineering – I

Time: 3 hrs.

Max. Marks: 100

- Note: 1. Answer FIVE full questions, selecting at least TWO questions from each part.**
2. Use of tables and charts extracted from IRC 37-2001 & IRC 58-2002 is permitted.

PART – A

- 1 a. Explain the role of transportation in the development of the country. (06 Marks)
 b. What are the significant recommendations of Jayakar committee? How are they implemented? (06 Marks)
 c. Explain the objectives of, (i) CRRI (ii) IRC (iii) HRB (iv) CRF. (08 Marks)
- 2 a. Explain (i) Saturation system (ii) Road patterns (06 Marks)
 b. 3 new roads P, Q, R are to be completed in a district during a five year plan period. Using the data given below work out the order of priority for phasing the plan program by the principle of maximum utility per unit length. Adopt utility unit of 0.5, 1.0, 2.0 for population ranges & 1.0 for 1000t of agricultural products or 100t of industrial products respectively. (06 Marks)

Road	Length Km	No. of villages served population			Productivity 1000 times	
		< 2000	2000-5000	> 5000	Agricultural	Industrial
P	15	10	8	3	15	1.2
Q	12	16	3	1	11	0.0
R	18	20	10	2	20	0.8

- c. What is the necessity of realignment? List the steps in the realignment. (08 Marks)
- 3 a. Explain the various elements of road margin. (06 Marks)
 b. The design speed of a road is 65 kmph, the coefficient of friction is 0.36 and reaction time of driver is 2.5 sec. Calculate the values of, (i) HSD, (ii) ISD required for the road. (06 Marks)
 c. Calculate the super elevation to be provided for a horizontal curve with a radius of 400 m for a design speed of 100 kmph in plain terrain comment on the results. What is the coefficient of lateral friction mobilized if super elevation is restricted to 0.07? (08 Marks)
- 4 a. Explain the necessity of providing transition curve and also define transition curve. (06 Marks)
 b. The speeds of overtaking and overtaken vehicles on a 2 way traffic road are 90 kmph and 60 kmph respectively. The acceleration of overtaking vehicle is 0.95 m/sec^2 .
 (i) Calculate safe overtaking sight distance.
 (ii) Mention the minimum length of overtaking zone.
 (iii) Draw a neat sketch of the overtaking zone. Show the position of sign posts. (06 Marks)
 c. A valley curve is formed by a descending grade of 1 in 25 meeting an ascending grade of 1 in 30. Design the length of valley curve to fulfill both comfort condition and head light sight distance requirements for a design speed of 80 kmph. Assume allowable rate of change of centrifugal acceleration $C = 0.6 \text{ m/sec}^2$. (08 Marks)

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.

PART – B

- 5 a. List and explain the desirable properties of subgrade soil. (06 Marks)
 b. List the desirable properties of bitumen and tests to be conducted to bitumen. (06 Marks)
 c. Explain with a neat sketch how the plate load test is conducted to determine the modulus of subgrade reaction of soil. (08 Marks)
- 6 a. Explain the significance of ESWL in pave design. (04 Marks)
 b. Design the flexible pavement for construction of new highway with the following data:
 Number of commercial vehicles as per last count = 1000 CV.
 Period of construction = 3 yrs.
 Annual traffic growth rate = 8%
 Design CBR of subgrade soil = 10%
 Category of road NH, 2 lane single carriage way.
 Design life 15 yrs. (08 Marks)
 c. Design the pavement slab thickness by IRC method using the following data:
 Modulus of Subgrade reaction = 8 kg/cm^3
 Design wheel load (P) = 5100 kg
 Present traffic intensity = 1000 cvd
 Radius of contact area = 15 cm
 Highway is South Tamil Nadu $t = 17.6$ (08 Marks)
- 7 a. Differentiate between seal coat and prime coat. (04 Marks)
 b. Explain the construction steps for cement concrete pavement slab. (08 Marks)
 c. The maximum quantity of water expected in one of the open longitudinal drains on clayey soil is $0.9 \text{ m}^3/\text{sec}$. Design the cross section and longitudinal slope of trapezoidal drain assuming the bottom width of trapezoidal section to be 1.0 m and cross slope to be 1.0 vertical to 1.5 horizontal. The allowable velocity of flow in the drain is 1.2 m/sec and Manning's roughness coefficient is 0.02. (08 Marks)
- 8 a. Write a note on types of failures in flexible pavement. (06 Marks)
 b. Write a note on benefit cost ratio method BOOT concept. (06 Marks)
 c. Compare the annual costs of 2 types of pave structures,
 (i) WBM with thin Bituminous surface at total cost of ₹ 2.2 lakhs per km, life of 5 years, interest at 10%, salvage value of ₹ 0.9 lakhs after 5 years, annual average maintenance cost of 0.35 lakhs per km and
 (ii) Bituminous Macadam base and bituminous concrete surface total cost of ₹ 4.2 lakhs, life of 15 years, interest at 8%, Salvage value of 2.0 lakhs at the end of 15 years, annual average maintenance cost of ₹ 0.25 lakhs per km. (08 Marks)

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