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10AL51

Fifth Semester B.E. Degree Examination, June/July 2015
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. Explain different levels of Management. (05 Marks)
 b. Explain functional area of Management. (05 Marks)
 c. What is the profession and administration management? (10 Marks)
- 2 a. Give any four important reasons for the performance of planning functions. (05 Marks)
 b. Difference between strategic planning and tactical planning. (05 Marks)
 c. What is decision making? Explain different types of decisions. (10 Marks)
- 3 a. Define an organization and explain principles of organisation. (05 Marks)
 b. Write a brief note on the following : i) MBO ii) MBE. (05 Marks)
 c. Discuss any two types of organization structures with highlighting their merits and demerits. (10 Marks)
- 4 a. Briefly explain the purpose of communication. (05 Marks)
 b. Briefly explain the essentials of a sound control system. (05 Marks)
 c. Explain Maslow's and Heryburg theories of Human motivation. (10 Marks)

PART – B

- 5 a. Who is an Entrepreneur? Explain the characteristics of an Entrepreneur. (05 Marks)
 b. Explain the role of an Entrepreneur in economic development of any country. (05 Marks)
 c. Explain the barrier involved in entrepreneurship. (10 Marks)
- 6 a. What is Small Scale Industry? Briefly explain the need and rationale of SSI's. (05 Marks)
 b. Explain briefly the Government support for SSI during 5 year plan. (05 Marks)
 c. Explain the objectives and functions of WTO. (10 Marks)
- 7 a. Write functions of District industries centers / single window concept. (05 Marks)
 b. Write a short note on NSIC. (05 Marks)
 c. Explain the objectives and functions provided by TECSOK and KSSIDC. (10 Marks)
- 8 a. Briefly outline the contents of a project. (05 Marks)
 b. What is Financial and Social feasibility study? (05 Marks)
 c. What is Project Appraisal? Explain the steps followed in project appraisals. (10 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.

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Fifth Semester B.E. Degree Examination, June/July 2015
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 and SP-16 is permitted.
3. Assume missing data, if any, suitably.

PART – A

1.
 - a. What is meant by normal distribution in statistics and what is the relationship between mean value and characteristic value in such distribution assuming 5% confidence limit? (05 Marks)
 - b. Derive an expression for limiting values of x_u/d ratio from basic for different grades of steel used in RCC beam design. What is their importance? (05 Marks)
 - c. For a given data of a beam subjected to bending show that

$$\frac{x_u}{d} = 1.2 - \sqrt{(1.2)^2 - \left(\frac{6.68M_u}{f_{ck} b d^2} \right)}$$
 Data: b, d, M_u, f_{ck} and f_y . (05 Marks)
 - d. Explain the terms balanced, over-reinforced and under reinforced section in beam subjected to flexure with neat sketches. Which of these should be recommended in design? And why? (05 Marks)

2.
 - a. Determine the flexural steel reinforcement at mid span for a simply supported beam of effective span of 5.25m. The characteristic dead and live loads shall be 15kN/m and 20 kN/m respectively. The cross sectional dimensions are width is 300mm and effective depth is 675mm. Adopt M_{20} grade concrete and Fe415 grade steel. (10 Marks)
 - b. A RC beam of section 250mm \times 500mm overall dimension is reinforced with 5 bars of 25mm diameter on tension side and 5 bars of 12mm diameter on compression side with an effective cores of 50mm for both. Determine the ultimate moment of resistance of the section. Adopt M_{25} grade concrete and Fe415 grade steel. (10 Marks)

d'/d	0.15	0.10
Fe415, f_{sc}	342 N/mm ²	353 N/mm ²

3.
 - a. Determine the ultimate shear strength of the support section of a RC beam with following data: width, $b = 300$ mm, effective depth, $d = 600$ mm, $A_{st} = 4$ bars of 25mm ϕ , 8mm ϕ 2 legged vertical stirrups at 150mm c/c, 2 bars of 25mm ϕ are bentup at 45° near the support. Adopt M_{25} grade concrete and Fe415 grade steel. (10 Marks)
 - b. Determine the ultimate moment of resistance of flanged beam as shown in Fig.Q.3(b). Adopt M_{20} grade concrete and Fe415 grade steel. (10 Marks)

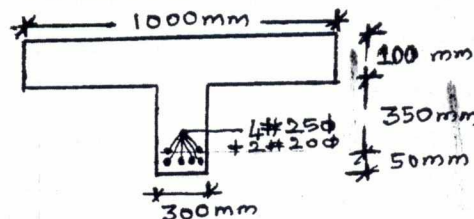


Fig.Q.3(b)

- 4 A simply supported RC beam supports a service live load of 8 kN/m over a clear span of 3m. Support width is 200mm. Adopt M_{20} grade concrete and Fe415 grade steel. Design the beam for flexure and shear. Check the beam depth for control of deflection using empirical method. Sketch the reinforcement details. (20 Marks)

PART – B

- 5 Design a two way slab of $5\text{m} \times 7\text{m}$ (clear dimensions) with all four edges discontinuous and corners held down. The slab has a support width of 300mm on all the four edges. The live load on the slab is 3kN/m^2 . Adopt M_{25} grade concrete and Fe415 steel grade. Sketch the reinforcement details. (20 Marks)
- 6 a. Design a circular pin ended column of 400mm diameter with helical reinforcement, with unsupported length of 4m. The column is to carry a factored axial load of 1500kN. Adopt M_{20} grade concrete and Fe415 grade steel. Sketch the reinforcement details. (10 Marks)
- b. ARC column of size $300\text{mm} \times 400\text{mm}$ has an unsupported length of 3m and effective length 3.6m. Determine the longitudinal steel and transverse steel if the column is subjected to a factored load of $P_u = 1000\text{ kN}$ and $M_u = 210\text{ kN-m}$. Adopt M_{25} grade concrete and Fe415 grade steel. Assume $d' = 60\text{mm}$. Sketch the reinforcement details. (10 Marks)
- 7 Design an isolated rectangular footing of uniform depth for the column size of $230\text{mm} \times 300\text{mm}$ supporting an axial service load of 850kN-m. The safe bearing capacity of soil is 150kN/m^2 . Adopt M_{20} grade concrete and Fe415 grade steel. Sketch the reinforcement details. (20 Marks)
- 8 Design a dog legged staircase for a building in which the vertical distance between floors is 3.5m. The stair hall measures $2.1\text{m} \times 5.0\text{m}$. Take live load of 2 kN/m^2 . The flights are supported on 230mm walls at the ends of outer edges of landing slab, so that it spans in the direction of going. Adopt M_{20} grade concrete and Fe415 grade steel. Sketch the reinforcement details. (20 Marks)

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Fifth Semester B.E. Degree Examination, June/July 2015

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. Draw the influence line diagram for Bending moment at any given section of a simply supported beam. (04 Marks)
 - b. Show that for maximum bending moment at any section of a simply supported girder traversed by a moving uniformly distributed load shorter than the girder span, the section should divide the uniformly distributed load in the same ratio as it divides the girder span. (06 Marks)
 - c. A uniformly distributed load of 5kN/m and 5m long sides across a beam of 15m long simply supported at it's both ends. Determine Max Bending moment and shear force at a section 6m from left hand support. (10 Marks)
- 2 Analyse the continuous beam shown in Fig Q No.2 by slope deflection method. Draw B.M.D. (20 Marks)

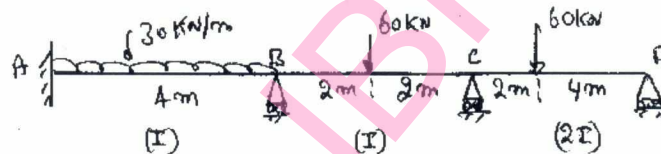


Fig Q No.2

(20 Marks)

- 3 Analyse the frame shown in Fig. Q No. 3 by moment distribution methods. Draw B.M.D (20 Marks)

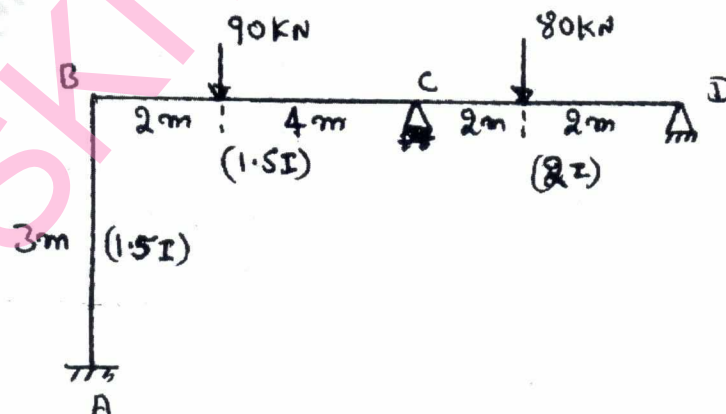


Fig. Q No. 3

(20 Marks)

- 4 Analyse the frame show below by moment distribution methods. Draw B.M.D.
(Refer Fig. Q No.4).

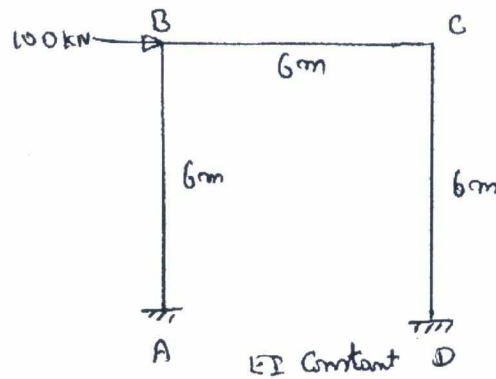


Fig. Q No.4.

(20 Marks)

PART – B

- 5 Analyse the frame shown in Fig. Q No.5 by taking advantage of symmetry. Draw B.M.D.

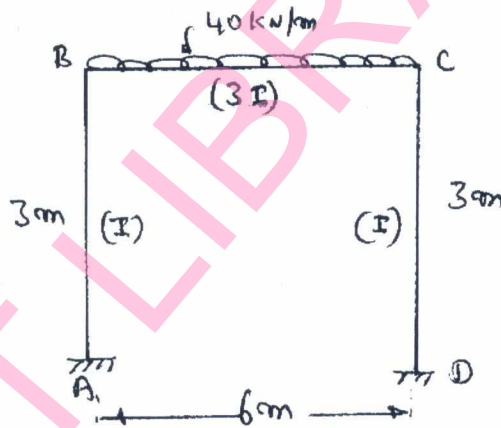


Fig. Q No.5

(20 Marks)

- 6 Analyse the frame shown in Fig. Q No.6 by using Flexibility matrix method. Use system approach.

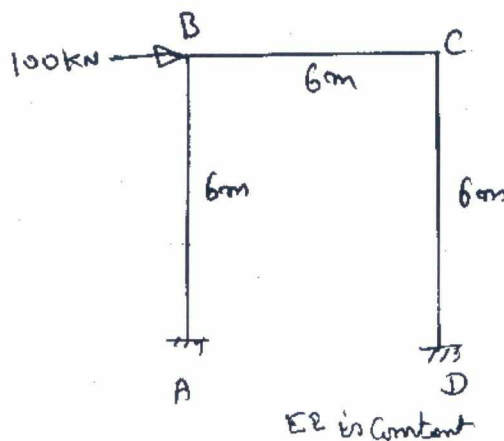


Fig. Q 6

(20 Marks)

- 7 Find the displacement components along the system coordinates for the frame shown in Fig Q No. 7 using stiffness method (use system approach)

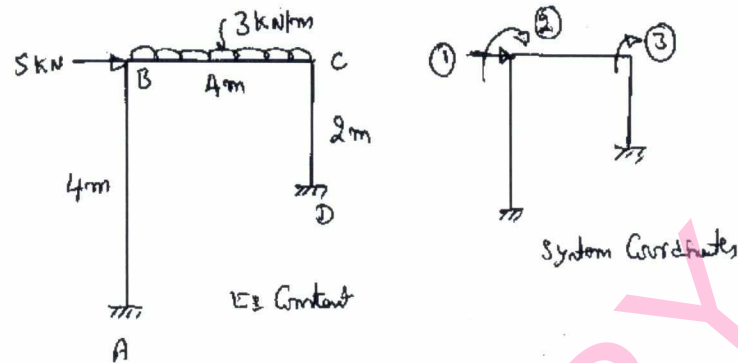


Fig Q No. 7

(20 Marks)

- 8 a. Define the following terms
 i) Free Vibration ii) Forced Vibration iii) Periodic motion. iv) Natural frequency
 v) Damping (10 Marks)
- b. Determine the natural frequency and Time period of the system as shown in Fig Q No. 8 (b). Take $E = 2.1 \times 10^5 \text{ N/mm}^2$ and $I = 13 \times 10^6 \text{ mm}^4$.

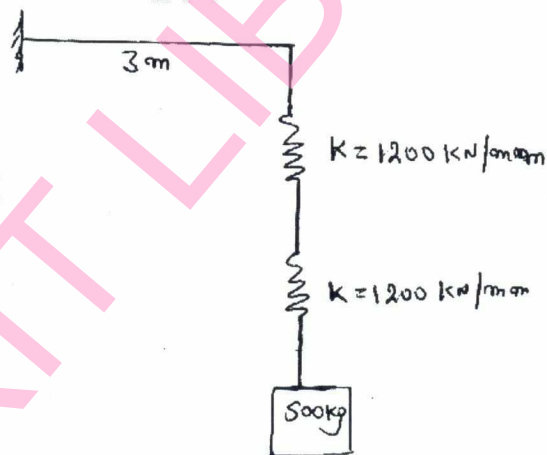


Fig Q No. 8 (b)

(10 Marks)

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10CV54

Fifth Semester B.E. Degree Examination, June/July 2015
Geotechnical Engineering - I

Time: 3 hrs.

Max. Marks: 100

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

PART - A

- 1 a. Derive an expression for the dry density of the soil in the form

$$\gamma_d = \frac{(1-n_a)G\gamma_w}{1+GW}$$
 with usual notations. (06 Marks)
- b. Define the following with the help of three phase diagram. Indicate the units :
 i) Water content ii) Void ratio iii) Saturated unit weight iv) Degree of saturation. (08 Marks)
- c. An embankment is to be constructed with a void ratio of 0.85 and the quantity of embankment being 5000m³. Three borrow pits are available for the construction of the embankment and the corresponding void ratio and the cost of transportation for 1.0m³ of soil is given below. Determine the most economical borrow pit. (06 Marks)

Borrow Pit	Void ratio e %	Cost / m ³ Rupees
A	0.95	30
B	1.90	16
C	1.65	25

- 2 a. What is Consistency of soil? List and briefly explain consistency limits. (06 Marks)
- b. Explain the following with the help of particle size distribution curve :
 i) Well graded soil ii) Poorly graded soil iii) Gap graded soil. (06 Marks)
- c. In a liquid limit test on the clayey soil the following results are obtained :

No. of flows	34	22	19	12
Water contents %	44.6	49.4	51.4	55.6

Plot the flow curve and obtain i) Liquid limit ii) Plasticity Index if the plastic limit is 22% iii) Flow Index iv) Toughness Index. (08 Marks)

- 3 a. Explain any two clay minerals with the help of neat sketches. (08 Marks)
- b. Classify the soil on the basis of the following data as per IS 1498 - 1970. (12 Marks)

Soil	Liquid limit %	Plastic limit %	Percent passing through 75 μ	Percent gravel	Percent sand	C _u	C _c
A	40	45	100	0	0	-	-
B	40	20	70	10	20	-	-
C	40	20	20	20	60	7	2
D	-	Non plastic	10	10	80	5	10

- 4 a. Explain briefly constant head permeameter test. Derive an expression to obtain coefficient of permeability under constant head condition. (08 Marks)
- b. List and explain factors affecting the permeability of soil. (06 Marks)

- c. In a falling head permeability test the length and area of cross section of soil specimen are 0.17m and $21.8 \times 10^{-4} \text{m}^2$ respectively. Calculate the time required for the head to drop from 0.25m to 0.10m. The cross sectional area of stand pipe is $2 \times 10^{-4} \text{m}^2$. The sample has three layers having permeabilities $3 \times 10^{-5} \text{m/s}$ for first layer of 0.06m, $4 \times 10^{-5} \text{m/s}$ for second 0.06m and $6 \times 10^{-5} \text{m/s}$ for third 0.05m height. Assume the flow is taking place perpendicular to the bedding plane (06 Marks)

PART - B

- 5 a. What are the advantages and limitations of direct shear test? (06 Marks)
 b. Explain the types of shear test based on different drainage conditions. (06 Marks)
 c. A consolidated undrained test was carried out on a clay sample and the results are as follows

Cell pressure, kN/m^2	100	200	400	600
Deviator stress at failure, kN/m^2	300	410	610	850
Pore water pressure at failure kN/m^2	-45	-15	+50	+110

Find total and effective shear parameters of soil. (08 Marks)

- 6 a. List the differences between standard and modified proctor compaction test. (05 Marks)
 b. Briefly explain the use of proctor needle in field compaction control. (06 Marks)
 c. On a compaction test following results are obtained

Water content %	7.7	11.5	14.6	17.5	19.5	21.2
Weight of wet soil, N	16.67	18.54	19.92	19.52	19.23	18.83

Volume of compaction mould is $9.5 \times 10^{-4} \text{m}^3$. Determine maximum dry density and OMC. Also plot zero air void line assuming the specific gravity of solids 2.65. (09 Marks)

- 7 a. Explain Mass Spring Analog of theory of consolidation of soils. (07 Marks)
 b. What is Preconsolidation Pressure? How it is determined by Casagrande's method. (07 Marks)
 c. List and briefly explain the assumptions of one dimensional Terzaghis theory of consolidation. (06 Marks)
- 8 a. Differentiate Compaction and Consolidation. (04 Marks)
 b. Define Thixotropy and Sensitivity. (06 Marks)
 c. The time to reach 40% consolidation of a two way drained saturated clay sample of 10mm thick in the laboratory is 40s. Determine the time required for 60% consolidation of the same soil 12m thick on an impervious layer subjected to same loading conditions as the laboratory sample. (10 Marks)

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10CV55

Fifth Semester B.E. Degree Examination, June/July 2015
Hydrology & Irrigation Engineering

Time: 3 hrs.

Max. Marks:100

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

PART – A

1.
 - a. Define hydrology and explain briefly the practical applications of Hydrology. (08 Marks)
 - b. Explain how the Double mass curve method is used to test the consistency of rainfall record. (06 Marks)
 - c. The average annual rainfall of 8 rain gauge stations in a basin are 1000, 950, 900, 850, 800, 700, 600, 400mm. If the permissible error is 6%, determine the optimum number of raingauges required in the basin. (06 Marks)
2.
 - a. Define Evaporation (E) and Evapo – transpiration (ET) and list out the factors affecting the evaporation. (06 Marks)
 - b. Mention the different methods of measurement of rate of infiltration and describe anyone of them. (08 Marks)
 - c. For a storm of 2 hr duration the rainfall rates are given below :

Time period (minutes)	20	20	20	20	20	20
Rainfall rate (cm/hr)	2.5	2.5	10.0	7.5	5.1	1.25

If ϕ – index is 3cm/hr, estimate the surface runoff. Also determine W – index. (06 Marks)

3.
 - a. What is Unit hydrograph? State the assumptions and limitations of Unit Hydrograph Theory. (Any 3 each). (08 Marks)
 - b. Explain how base flow is separated from a simple storage hydrograph, with a neat sketch (any two methods). (06 Marks)
 - c. The ordinate of 4 hr unit hydrograph are given below. Determine the ordinates of 12 hr unit hydrograph. (06 Marks)

Time (hr)	0	4	8	12	16	20	24	28	32	36	40	44	48
Ordinates of unit hydrograph (4hr)cumecs	0	15	110	220	150	115	90	70	60	50	30	20	0

4.
 - a. Define the terms Flood and Flood routing. (04 Marks)
 - b. What is the importance of Design flood? List out the factors affecting flood. (08 Marks)
 - c. An Urban catchment has an area of 1km². The slope of the catchment is 0.005 and the maximum length of travel of water is 500m. The maximum depth of rainfall with a 20 years return period is as given below :

Duration (tc) (minutes)	10	15	20
Depth of rainfall (cm)	4.0	5.0	6.0

Estimate the required peak flow rates by using runoff co-efficient as 0.40. (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. Define the term Irrigation and Explain the necessity of Irrigation in India. (06 Marks)
 b. Explain the Flow Irrigation System with the aid of necessary sketches. (08 Marks)
 c. Write a note on Environmental impacts of Irrigation. (06 Marks)
- 6 a. Explain the essential soil conditions for good plant growth. (06 Marks)
 b. Give a brief classification of Indian soils. (06 Marks)
 c. After how many days you will supply water to soil in order to ensure sufficient irrigation of the given crop, if field capacity of the soil is 35%, permanent wilting point is 18%, density of soil is 1.50gm/cc, effective depth of root zone is 70cm and daily consumptive use of water for the given crop is 17mm. Assume that readily available moisture is 75% of the available moisture. (08 Marks)
- 7 a. Define Duty and Delta and give the relationship between them. (04 Marks)
 b. Explain the terms : i) Base period ii) Crop period iii) Crop season iv) Irrigation requirement. (08 Marks)
 c. Two canal system A and B have the cultural command area of 30000 ha and 15000 ha and discharge $20\text{m}^3/\text{S}$ and $10\text{m}^3/\text{S}$ respectively. The intensity of Rabi crop and Base period for canal A are 85% and 120days. For canal B intensity of Rabi crop and the Base period are 50% and 120days. Which system is more efficient? (08 Marks)
- 8 a. Describe briefly the various considerations made in the alignment of an Irrigation canal. (06 Marks)
 b. Explain briefly the classification of canals based on alignment. (06 Marks)
 c. Design an Irrigation channel by Kennedy's theory to carry a discharge of 5 cumecs. Take $m = 1.0$, $N = 0.0225$ and $\frac{B}{D} = 3.24$. (08 Marks)

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10CV56

Fifth Semester B.E. Degree Examination, June/July 2015
Transportation 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 are the social effects of transportation? (06 Marks)
 - b. What are the advantages and disadvantages of airways? (06 Marks)
 - c. What are the objectives of IRC and Central Roads Research Institute? (08 Marks)
- 2
 - a. With sketches indicate different road patterns. (06 Marks)
 - b. Indicate the details to be collected in : i) Traffic surveys ii) Engineering surveys, while planning a highway. (06 Marks)
 - c. The area of district is 8400km². There are 9 towns with population greater than 5000. Calculate the length of NH, SH, MDR, ODR + VR as par 3rd 20 year road plan. (08 Marks)
- 3
 - a. Briefly explain how map study is helpful in the alignment of new highway. (06 Marks)
 - b. The width of pavement is 7.5m and parabolic camber of 1 in 40 is to be provided. Design the parabolic profile of the pavement surface. (06 Marks)
 - c. A vehicle is moving at 55kmph on a single lane pavement of width 4mts on level surface. The reaction time is 2.3secs and coefficient of longitudinal friction is 0.39. Determine the intermediate sight distance. (08 Marks)
- 4
 - a. Design the length of transition curve for a speed of 65 kmph on a 2 – lane highway with a width of 7.0 mts. The radius of the curve is 220 mts. The super elevation is provided by raising the outer edge with respect to inner edge. The rate of raising the outer edge is 1 in 150 in open country. The wheel base is 6.1 mts. (12 Marks)
 - b. An up gradient of 1 in 18 meets another up – gradient of 1 in 48. Design the length of the vertical curve to be provided for a SSD of 70 mts. Mention the type of curve provided. (08 Marks)

PART – B

- 5 a. The CBR test results are as follows :

Load in kgs	0	2	4	9	20	34	49	74	92	118	125
Penetration in mm	0	0.5	1	1.5	2	2.5	3	4	5	7.5	10

Apply correction and determine the CBR value of the soil.

(08 Marks)

- b. The results of soil test is as follows :

Sieve size 0.074mm	% age passing is 45%
Liquid Limit	38 %
Plastic Limit	27 %

Determine the Group Index and classify the soil as per HRB system. Discuss its suitability as subgrade material.

(08 Marks)

- c. Define cut back bitumen. What is SC, MC and RC cutback bitumen?

(04 Marks)

- 6 a. Design the bituminous pavement with the following data :
 4 – lane divided carriageway.
 Traffic in each direction = 5600 CVD ; Design life = 9 yrs ; CBR = 5% ;
 Traffic growth rate = 8% ; Vehicle damage factor = 4.5 ; Distribution factor = 0.75.
 Indicate pavement composition. Also, after 4 years determine the thickness of DBM and BC to be laid. **(10 Marks)**
- b. Determine warping stress at interior, edge and corner region for the following data.
 Slab thickness = 25 cm ; Slab size = 3.6 × 11m ; Modulus of subgrade reaction = 6.9kg/cm³ ; Temperature differential = 0.6⁰C per cm ; Radius of area of contact, a = 15cm ; e = 10 × 10⁻⁶/⁰C ; E = 3 × 10⁵ kg/cm² ; μ = 0.15. **(10 Marks)**

- 7 a. Mention the specification of materials and construction procedure for Wet Mix Macadam. **(08 Marks)**
- b. What are the requirements of highway drainage system? **(04 Marks)**
- c. The sieve analysis of subgrade soil is as follows :

Sieve size mm	4	2	1	600μm	300μm	150μm	75μm
% age passing	100	88	70	52	25	10	5

Size of perforation in drain pipe = 2.5mm. Design the filter material for
 i) Permeability condition ii) Prevent piping condition. **(08 Marks)**

- 8 a. Mention factors affecting vehicle operation cost dependent on time. **(04 Marks)**
- b. Analyse the economics by Benefit – Cost Ratio method for proposal A, B and C. **(06 Marks)**

	A	B	C
Highway cost	1, 76, 527	3, 81, 900	3, 75, 100
Road user cost	32, 57, 857	28, 73, 025	27, 52, 345

- c. Calculate the Annual cost of a stretch of highway

Particulars	Cost in lakhs	Life in years	Rate of S. int %
Right of way	140	100	7
Earth work	90	40	8
Bridges	85	70	8
Pavement	160	12	9

Maintenance cost is Rs 12 lakhs per year. **(10 Marks)**

Table 1 : Pavement design catalogue for traffic range 10 -150 msa

Cumulative Traffic msa	Total Pavement thickness mm	CBR 5%		
		Pavement composition		Granular base and sub base mm
		BC mm	DBM mm	
10	660	40	70	Base = 250 Sub base = 300
20	690	40	100	
30	710	40	120	
50	730	40	140	
100	750	50	150	
150	770	50	170	

Table 2 : Values of coefficient C

$\frac{L_x}{l}$ or $\frac{L_y}{l}$	1	2	3	4	5	6	7	8	9	10	11	12 & > 12
C _x or C _y	0	0.04	0.175	0.44	0.72	0.92	1.03	1.075	1.08	1.075	1.05	1.03
