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10AL51

Fifth Semester B.E. Degree Examination, June/July 2019
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 term 'Management'? Explain its functions. (05 Marks)
b. List various contributions made by F.W. Taylor in the field of scientific management. (05 Marks)
c. List and explain "Roles of Manger"? (10 Marks)
- 2 a. List importance and purpose of planning process. (05 Marks)
b. Distinguish between strategic planning and tactical planning. (05 Marks)
c. Explain various steps involved in planning. (10 Marks)
- 3 a. What is 'Span of Management'? Explain various factors governing it. (10 Marks)
b. List and explain various principles of organization. (10 Marks)
- 4 a. What is meant by 'co-ordination', and explain requirements for excellent co-ordination. (10 Marks)
b. Explain by listing 'essentials of effective control system'. (10 Marks)

PART – B

- 5 a. List and explain various characteristics of an Entrepreneur. (10 Marks)
b. What are the roles of an entrepreneur in Economic development? (10 Marks)
- 6 a. Explain various steps involved in starting a 'small scale industry'. (10 Marks)
b. Explain how Govt. of India supported SSI through its five year plan. (10 Marks)
- 7 a. Under what context DIC's were established and what are the assistances it extends to SSI's. (10 Marks)
b. How TECSOK assist to start up and existing units and what assignment it undertakes. (10 Marks)
- 8 a. What is project Report and its significance? (05 Marks)
b. List Technical Analysis in project feasibility study. (05 Marks)
c. On what factors a project report to start an SSI is prepared, briefly explain. (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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10CV52

Fifth Semester B.E. Degree Examination, June/July 2019

Design of RCC Structural Elements

Time: 3 hrs.

Max. Marks:100

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

PART – A

- 1 a. State and explain “Design Load”. (05 Marks)
b. What are the codal requirements for modulus of elasticity for reinforcing steel and concrete? (05 Marks)
c. What are the values of partial safety factors for loads (DL and IL) with respect to limit state of service ability? (05 Marks)
d. State the codal provisions for “Other Limit States”. (05 Marks)
- 2 a. A rectangular R.C. beam $300 \times 600\text{mm}$ is reinforced with 4 number of 20mm dia bars with a cover of 30mm. If M20 concrete and Fe415 steel are used. Calculate the moment of resistance of the beam. (09 Marks)
b. A T-beam of depth 500mm and width of rib 300mm has flange $900 \times 110\text{mm}$. Calculate the moment of resistance if 5 numbers 25mm dia Fe415 steel bars are used with an effective cover of 60mm, M20 concrete is used. (11 Marks)
- 3 a. State the “Slenderness limits for beams to Ensure lateral stability” as per codal requirements. (05 Marks)
b. What is the minimum grade of plain concrete, reinforced concrete and minimum cover to reinforcement when the exposure is “severe”. (05 Marks)
c. Explain the permissible values of deflection as per codal provisions when deflection is calculated. (05 Marks)
d. State the codal requirements for limit state of “cracking” in flexural members. (05 Marks)
- 4 Design the necessary reinforcement for a R.C. beam $300 \times 450\text{mm}$ to carry a udl of 25kN/m over a span of 4m. The beam is supported on a 400mm thick wall at the ends. Use M20 concrete and Fe415 steel. Assume effective cover to reinforcement as 40mm. (20 Marks)

PART – B

- 5 a. Explain the structural behaviour of one way and two way slabs? (04 Marks)
b. Design an R.C. slab for the following data:
Ly = 7500mm Lx = 3000mm
Simply supported on four sides
L.L = 4 kN/m² F.F. = 1kN/m²
M.20 concrete, Fe415 steel
Sketch the details of reinforcement (Plan). (16 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
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- 6 a. Explain the terms “short” and “slender” compression members. (04 Marks)
b. Design the necessary reinforcement for a R.C. column $400\text{mm} \times 600\text{mm}$ and of length 3000mm to carry an axial load of 1800kN . M20 concrete and Fe415 steel. Sketch the details. (16 Marks)
- 7 Design a R.C. footing for an R.C. column $300 \times 500\text{mm}$ to carry an axial load of 1200kN . Allowable bearing pressure on soil is 240 kN/m^2 . Use M20 concrete Fe415 steel. Sketch the details of reinforcement. (20 Marks)
- 8 Design an intermediate flight of a dog legged stair for a hall $2.40\text{m} \times 4.75\text{m}$. Floor to floor height is 3520mm . Take L.L as 4 kN/m^2 and finishes = 0.6 kN/m^2 . Assume landings span in the direction of stair. The slab is supported on 230mm thick masonry walls at ends. Sketch the details. (20 Marks)

Fifth Semester B.E. Degree Examination, June/July 2019
Structural Analysis – II

Time: 3 hrs.

Max. Marks:100

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

PART – A

- 1 a. An udl of intensity 10 kN/m and of length 4 m is rolling over a simply supported beam of span 12 m (from right to left). Determine the maximum positive and negative shear force at section C. (08 Marks)
- b. Determine the absolute maximum moment for the given beam loaded with moving loads as shown in Fig. Q1 (b). (08 Marks)

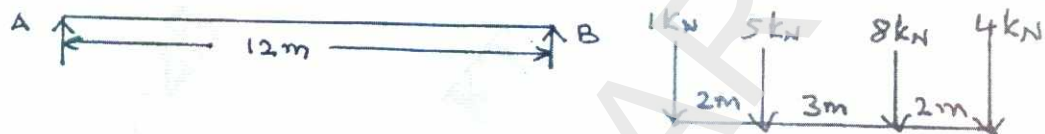


Fig. Q1 (b)

- c. What is an influence line? Explain its importance in structural analysis. (04 Marks)
- 2 Analyze the continuous beam shown in Fig. Q2 by using slope deflection method. Draw BMD and SFD. (20 Marks)

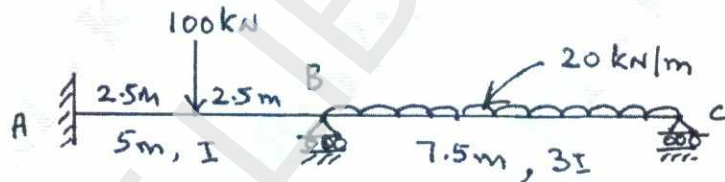


Fig. Q2

- 3 Analyze the portal frame by moment distribution method and draw BMD and SFD as shown in Fig. Q3. (20 Marks)

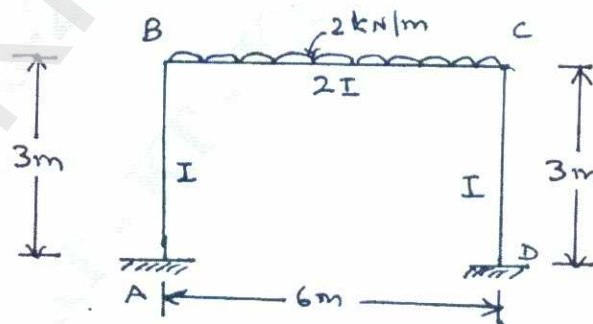


Fig. Q3

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.

- 4 Analyze the portal frame loaded as shown in Fig. Q4 by slope deflection method. Draw BMD. (20 Marks)

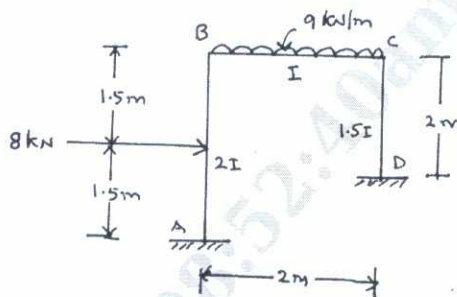


Fig. Q4

PART - B

- 5 Analyze the portal frame by Kani's method. Draw BMD. (20 Marks)

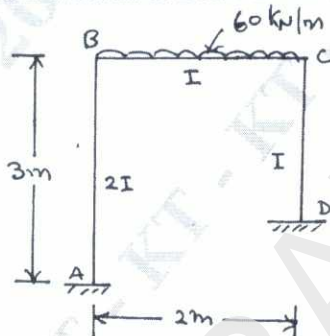


Fig. Q5

- 6 Using Flexibility matrix method (system approach) analyze the continuous beam as shown in Fig. Q6. Draw BMD and SFD, EI constant. (20 Marks)

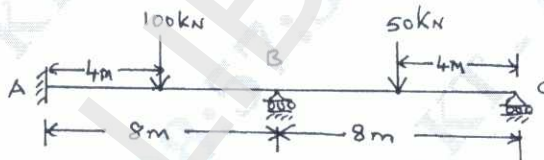


Fig. Q6

- 7 Analyze the portal frame as shown in Fig. Q7 by stiffness matrix method and draw BMD. (20 Marks)

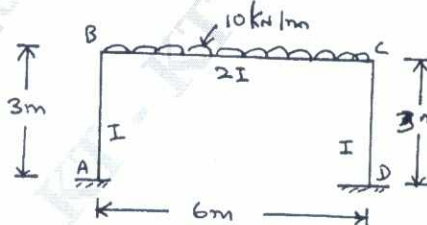


Fig. Q7

- 8 a. Explain degree of freedom, free vibration, natural frequency, periodic motion, forced vibration, damping, single degree of freedom. (14 Marks)
 b. In a vibrating system of 100 kg is supported by 1,00,000 N/m spring constant. Find the natural frequency, critical, damping co-efficient and period of oscillation. (06 Marks)

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10CV54

Fifth Semester B.E. Degree Examination, June/July 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. Define Void Ratio, Porosity, Percent air voids, Percent air content and Degree of saturation. (05 Marks)
 - b. Prove the following relationship from the Phase diagram

$$r_b = \left(\frac{G_s + S.e}{1 + e} \right) r_w$$
 (05 Marks)
 - c. A moist soil sample weighs 3.52N. After drying in an oven, its weight is reduced to 2.9N. The specific gravity of solids and the mass specific gravity are respectively 2.65 and 1.85. Determine the water content, Void ratio, Porosity and the degree of saturation. Take $r_w = 10 \text{ kN/m}^3$. (10 Marks)
- 2
 - a. Write a note on Sieve analysis. (06 Marks)
 - b. How do you calculate Liquid limit by using A Casagrande's device? (06 Marks)
 - c. A soil has dry density of 18.16 kN/m^3 in the natural condition. The same soil is having dry densities in the loose and dense states are 14.14 kN/m^3 and 19.07 kN/m^3 respectively. Find the relative density. Take $G = 2.67$, $r_w = 10 \text{ kN/m}^3$. (08 Marks)
- 3
 - a. Write a detailed note on IS classification. (10 Marks)
 - b. Differentiate between the Kaolinite, Illite and Montmorillonite clay minerals with neat sketches. (10 Marks)
- 4
 - a. Determination of Permeability from Laboratory by any one of the methods. (08 Marks)
 - b. Define Coefficient of Permeability, Discharge velocity, Seepage velocity and Coefficient of Percolation. (06 Marks)
 - c. Determine the average coefficient of permeability in the horizontal and vertical directions for a deposit consisting of 3 layers of thickness 5m, 1m and 2.5m and having the coefficients of permeability of $3 \times 10^{-2} \text{ mm/sec}$, $3 \times 10^{-5} \text{ mm/sec}$ and $4 \times 10^{-2} \text{ mm/sec}$ respectively. (06 Marks)

PART - B

- 5
 - a. How do you calculate the shear strength parameters from Mohr – coulomb theory? (06 Marks)
 - b. Discuss about the factors affecting shear strength of sands and clays. (08 Marks)
 - c. A services of direct shear tests was conducted on a soil, each test was carried out till the sample failed. The following results were obtained.

Sample No	Normal stress (kN/m^2)	Shear stress (kN/m^2)
1	15	18
2	30	25
3	45	32

Determine the Cohesion intercept and the angle of shearing resistance.

(06 Marks)

- 6 a. Write a note on Standard Proctors compaction test. (06 Marks)
 b. How do you calculate the water content in the field by using Proctor's needle method? (06 Marks)
 c. The following results were obtained from a standard compaction test as a sample of soil.
- | | | | | | | |
|-----------------------|------|------|------|------|------|------|
| Water content (%) | 0.12 | 0.14 | 0.16 | 0.18 | 0.20 | 0.22 |
| Mass of wet soil (kg) | 1.68 | 1.85 | 1.91 | 1.87 | 1.87 | 1.85 |
- The volume of the mould used was 950 ml. Plot the compaction curve and calculate the $r_{d \max}$ and OMC. Also calculate the void ratio and the degree of saturation at OMC. (08 Marks)
- 7 a. Write the assumptions of Terzaghi's 1 – D Consolidation theory. (08 Marks)
 b. Determine the Pre – consolidation pressure by A – Casagrande's graphical method. (06 Marks)
 c. In a consolidation test, when the load was changed from 50 to 100 KPa, the void ratio changed from 0.7 to 0.65. Determine the coefficient of volume decrease M_V and the compression index C_C . (06 Marks)
- 8 a. What are the advantages and disadvantages of Direct shear test? (06 Marks)
 b. List out the tests in the laboratory based on the drainage conditions. (04 Marks)
 c. Determination of coefficient of consolidation by Square root of time fitting method. (10 Marks)

- 6 a. Give the classification of Indian soils. (07 Marks)
 b. Explain the distribution of soil moisture. (07 Marks)
 c. After how many days will you supply water to soil in order to ensure sufficient irrigation of the given crop, if the field capacity of the soil is 30%, permanent wilting point = 14%, density of soil = 0.0125 N/cm^3 , effective depth of root zone = 70cm, daily consumptive use of water for the crop = 10.5mm. (06 Marks)
- 7 a. Give in brief crop seasons in India and Karnataka. (06 Marks)
 b. Define Duty, Delta and Base Period. Give the relationship between them. (05 Marks)
 c. The base period, intensity of irrigation and duty of various crops under a canal system are given in the table below. Find the total volume of the water to be stored if the canal losses are 20% and evaporation losses are 12%. (09 Marks)

Crop	Base period (days)	Duty at field (hectare/ cumec)	Area under crop (hectares)
Wheat	120	1800	4800
Sugarcane	360	800	5600
Cotton	200	1400	2400
Rice	120	900	3200
Vegetables	120	700	1400

- 8 a. Give the classification of canals. (10 Marks)
 b. Design an irrigation canal according to Lacey's silt theory for the following data :
 Full supply discharge = 15 cumec.
 Silt factor = 1.0
 Side slope of channel = 0.5H : 1V (10 Marks)

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10CV56

Fifth Semester B.E. Degree Examination, June/July 2019
Transportation 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 suitably.

PART – A

1.
 - a. "Roads are the red carpets on which Prosperity and Civilization Spread". Comment and discuss. (06 Marks)
 - b. What are the objectives and activities of the Indian Roads Congress (IRC)? (06 Marks)
 - c. What are the important policies mentioned in Vision : 2021 document? (08 Marks)

2.
 - a. What are the different types of classification of roads in India? (06 Marks)
 - b. List and explain briefly Fact Finding Surveys (Planning Surveys). (06 Marks)
 - c. Determine the length of different categories of roads in a state in India using the 3rd 20 year road development plan formula and the following data :
Total area of state = 80000 Sq.km ; Total number of towns = 86 ;
Overall road density = 82 km per 100 sq. km area. (08 Marks)

3.
 - a. What are the conditions which necessitate taking up a realignment project of a highway? (06 Marks)
 - b. In a district , where the rainfall is heavy, two types of road pavement are to be constructed :
i) Two lane state highway with bituminous concrete surface ii) Major district road of WBM pavement, 3.8mt wide. What should be the height of the crown with respect to the edges in these two cases? Assuming straight line camber. (06 Marks)
 - c. Calculate the safe overtaking sight distance for a highway having design speed of 96 kmph. The acceleration of overtaking vehicle A = 2.5 kmph/sec. Assume all other data suitably. (08 Marks)

4.
 - a. A national highway having ruling design speed $V = 80$ kmph has a horizontal curve of radius 500 mts. Design the length of transition curve assuming following data :
Normal pavement width , $W = 7.0$ mts
Allowable rate of introduction of super elevation = 1 in 150. Pavement to be rotated about the inner edge to effect better drainage in heavy rainfall area. (12 Marks)
 - b. 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 Headlight sight distance requirement for a design speed of 80 kmph. Assume allowable rate of change of centrifugal acceleration $C = 0.6\text{m/sec}^3$. (08 Marks)

PART – B

5.
 - a. What are the desirable properties of road aggregates and list the tests which are generally carried out for judging the desirable properties and suitability of stone aggregates. (06 Marks)
 - b. Discuss the desirable properties of a soil as a highway material. (06 Marks)

- c. The index properties of subgrade soil are given below :
 Passing 0.074mm sieve = 55% ; Liquid limit = 50% ; Plastic limit = 41%.
 Classify the soil by revised HRB system with group Index value. [Refer Fig.Q5(c)]

(08 Marks)

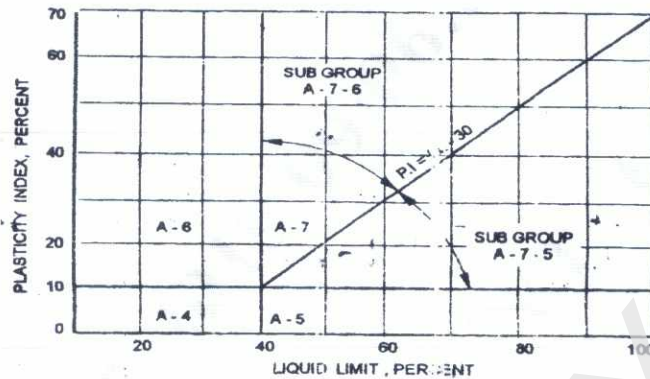


Fig. 6.3 Chart for classifying fine grained soil by HRB system

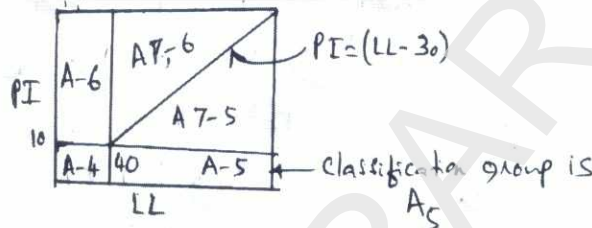


Fig.Q5(c)

- 6 a. Design the flexible pavement for a construction of new highway as per IRC – 37 – 2001. With the following data :
 Number of commercial vehicles as per last count = 1000 CVPD.
 Period of construction = 3 years ; Annual traffic growth rate = 8% ;
 Design CBR of subgrade soil = 10% ; Vehicle damage factor = 3.5 ;
 Lane distribution factor = 0.75 ; Design life in years = 15 for NH.

(10 Marks)

IRC:37-2001

PAVEMENT DESIGN CATALOGUE
PLATE 2 - RECOMMENDED DESIGNS FOR TRAFFIC RANGE 10-150 msa

Cumulative Traffic (msa)	Total Pavement Thickness (mm)	CBR 10%		
		PAVEMENT COMPOSITION		
		Bituminous Surfacing		Granular Base & Sub-base (mm)
BC (mm)	DBM (mm)			
10	540	40	50	Base = 250 Sub-base = 200
20	565	40	75	
30	580	40	90	
50	600	40	110	
100	630	50	130	
150	650	50	150	

- b. Using the data given below, calculate the wheel load stresses at i) Interior ii) Edge iii) Corner region of a cement concrete pavement using Westergaard's stress equations.
 Wheel load = 5100 kgs.
 Modulus of elasticity of cement concrete, $E = 3.0 \times 10^5 \text{ kg/cm}^2$.
 Pavement thickness, $h = 18\text{cms}$; Poisson's ratio of concrete $\mu = 0.15$.
 Modulus of subgrade reaction, $K = 6.0 \text{ kg/cm}^3$; Radius of contact area $a = 15\text{cms}$.

(10 Marks)

- 7 a. Write down the construction steps for Wet mix Macadam base course. (06 Marks)
b. Explain briefly step by step construction procedure of Bituminous Concrete (BC) pavements and also mention the specifications for the materials used. (08 Marks)
c. Explain briefly the significance of highway drainage. (06 Marks)
- 8 a. Briefly explain the various highway user benefits. (06 Marks)
b. Briefly describe the different methods of economic analysis of a highway. (06 Marks)
c. Compare the annual cost of two types of pavement structures.
I) WBM with thin bituminous surface at cost of Rs 2.21 lakhs per KM ; life of 5 years, interest at 10% and salvage value of Rs 0.90 lakhs after 5 years. Annual average maintenance cost of Rs 0.35 lakhs per km.
II) Bituminous Macadam base and bituminous concrete surface, Total cost of Rs 4.2 lakhs, Life of 15 years, interest rate at 8% ; Salvage value of 2.0 lakhs at the end of 15 years. Annual average maintenance cost of Rs 0.25 lakhs per km. (08 Marks)
