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10AL51

Fifth Semester B.E. Degree Examination, Dec.2014/Jan.2015
Management & Entrepreneurship

Time: 3 hrs.

Max. Marks:100

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

PART – A

- 1 a. Give an example for each of the managerial functions and explain the same. (10 Marks)
b. Explain any five principles of management as formulated by Fayol. (10 Marks)
- 2 a. List and explain the steps in planning. (10 Marks)
b. List any five types of plans and explain each briefly. (10 Marks)
- 3 a. What is span of control and what factors affect it? Explain. (10 Marks)
b. Explain recruitment and selection. What is MBO and MBE? (10 Marks)
- 4 a. How does Maslow's hierarchy of needs help a manager to motivate his subordinates? Explain. (10 Marks)
b. List Hygiene and motivation factors as per Herzberg and explain their implications. (10 Marks)

PART – B

- 5 a. List the stages of entrepreneur process and explain any one of them. (10 Marks)
b. List the characteristics of an entrepreneur and explain any one of them. (10 Marks)
- 6 a. List the characteristics of small scale industry (SSI) and explain the need for SSI in the economy of a country. (10 Marks)
b. What are the steps involved in starting SSI? Explain one of them. (10 Marks)
- 7 a. List some state level agencies which support SSI and explain one of them as to how they assist the SSIs. (10 Marks)
b. What are the schemes of finance provided by SIDBI? Explain one of the schemes. (10 Marks)
- 8 Write notes on:
a. Market feasibility study
b. Financial feasibility study.
c. Technical feasibility study.
d. Economic feasibility study. (20 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.2014/Jan.2015

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 SP16 permitted.
3. Assume any missing data suitably.**

PART – A

- 1 a. Define : i) Characteristic strength.
ii) Design strength
iii) Characteristic load
iv) Design load (08 Marks)
- b. Explain : i) Limit state of collapse
ii) Limit state of serviceability. (04 Marks)
- c. Derive the expressions for stress block parameters for compressive force C_u , Tensile force τ_u and locate its depth $\bar{y} = 0.42x_u$ from top. (08 Marks)

- 2 a. An RCC beam 300 mm wide and 500 mm deep is reinforced with 4 bars of 16 mm diameter. It is freely supported on an effective span of 6 m. Determine the maximum permissible imposed service load. Assuming concrete grade M20 and Fe500 steel. (08 Marks)
- b. A doubly reinforced beam section is 250 mm wide and 450 mm deep to the centre of the tensile reinforcement. It is reinforced with 2#16 ϕ as compression reinforcement at an effective cover of 50 mm and 4#25 ϕ as tensile steel. Using M15 concrete and Fe250 steel. Calculate the ultimate moment of resistance of the beam section. (12 Marks)

- 3 a. What are the factors affecting the short term and long term deflections? (06 Marks)
- b. A singly reinforced rectangular beam 360 mm \times 580 mm in section, is simply supported on a effective span of 5.25 m. The steel reinforcement consists of 6#20 ϕ . The beam supports a udl of 25 kN/m (dead load) and 28 kN/m (live load). Assume M₂₀ concrete and Fe415 steel. Check the design for short and long term deflections. Take ultimate strain in concrete due to shrinkage as 0.0003 and coefficient of creep as unity. Effective cover may be taken as 40 mm. (14 Marks)

- 4 A hall measuring 14m \times 6m beams are spaced at 3.5 m C/C. The thickness of the wall being 300 mm. Thickness of the slab is 150 mm. Live load of slab is 5 kN/m². The web (rib) width of the beam shall be taken as 300 mm. Design an intermediate T-beam. Using M₁₅ concrete and Fe415 grade steel. Sketch the reinforcement details. (20 Marks)

PART – B

- 5 Design a slab for a room 5 m \times 10 m live load 4 kN/m². Use M₂₀ concrete and Fe415 steel. Also check for bond length deflection and shear. Assume corners are held down, bearing 300 mm. Sketch the reinforcement details. (20 Marks)

- 6 a. Design a RCC column (400 × 400) mm to carry an ultimate load of 1000 kN and eccentricity 160 mm. Use M₂₅ grade concrete and Fe415 grade steel. Sketch the reinforcement details. (10 Marks)
- b. A 3 m height column is effectively held in position at both ends and restrained against rotation at one end. Design the column to carry a factored axial load of 3000 kN. Use M₂₀ concrete and Fe 415 steel. Sketch the reinforcement details. (10 Marks)
- 7 Design a footing for a column carrying an axial load of 800 kN. The SBC of soil as 200 kN/m². Use M20 mix and Fe 415 steel. The column has 500 mm × 500 mm cross section. (20 Marks)
- 8 Design dog legged staircase for a stair hall (4.75 * 3.1) m. Take rise and tread of steps as 150 mm and 250 mm respectively. Width of stairs 1.5 m. Take live load 5 kN/m² and finishes 0.75 kN/m². Use M20 concrete and Fe 415 steel. Draw a neat sketch of reinforcement details. (20 Marks)

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Fifth Semester B.E. Degree Examination, Dec.2014/Jan.2015
Structural Analysis – II

Time: 3 hrs.

Max. Marks:100

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

PART – A

- 1 a. Four point loads of 120 kN, 160 kN, 160 kN and 80 kN spaced 2 m between consecutive loads move on a girder of 25 m span from left to right with the 120 kN load leading. Calculate the maximum bending moment at a point 10 m from left support. Also, calculate the position and value of the absolute bending moment. (10 Marks)
- b. Draw the ILD for shear force and bending moment for a section at 6 m from left support of a simply supported beam 15 m long. Hence calculate the maximum bending moment and shear force at the section due to a uniformly distributed rolling load of length 5 m and intensity 40 kN/m run. (10 Marks)
- 2 Analyse the frame shown in Fig. Q2 by slope deflection method. Draw SFD, BMD and elastic curve. Take EI constant. (20 Marks)

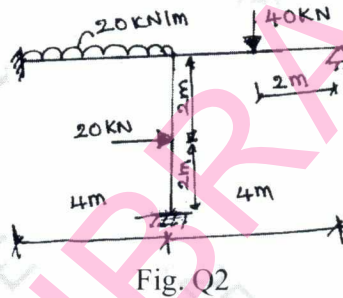


Fig. Q2

- 3 Analyse the continuous beam ABCD 20 m long simply supported at its ends and loaded as shown in Fig. Q3. If support B sinks by 10 mm, analyse the beam by moment distribution method. Sketch the SFD and BMD. Take $E = 2.1 \times 10^5 \text{ N/mm}^2$ and $I = 85 \times 10^5 \text{ mm}^4$. (20 Marks)

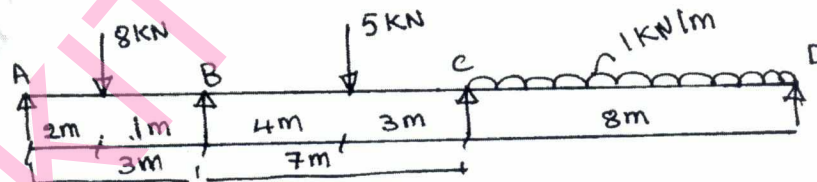


Fig. Q3

- 4 Analyse the frame shown in Fig. Q4 by moment distribution method. (20 Marks)

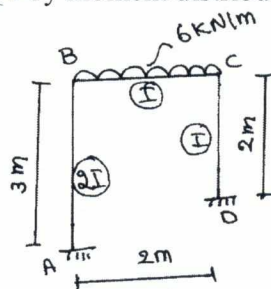


Fig. Q4

PART – B

- 5 Analyse the beam loaded as shown in Fig. Q5 using Kani's method. Draw BMD. (20 Marks)

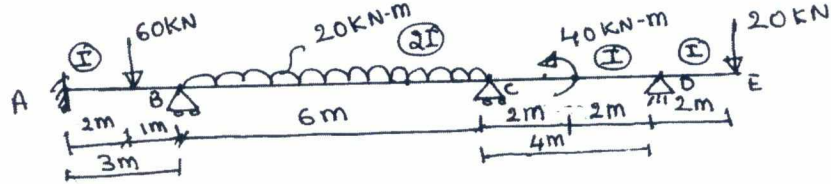


Fig. Q5

- 6 Analyse the portal frame ABCD shown in Fig. Q 6 by flexibility method. EI is constant throughout. (20 Marks)

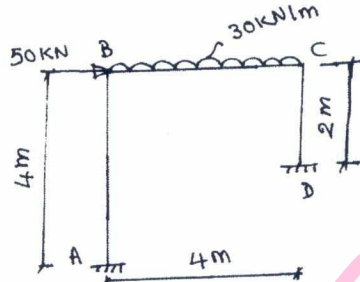


Fig. Q6

- 7 Analyse the frame shown in Fig. Q7 by stiffness matrix method. Draw BMD and elastic curve. (20 Marks)

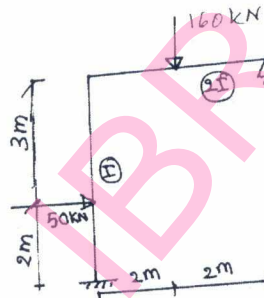


Fig. Q7

- 8 a. Explain the following: (12 Marks)
- Vibration and oscillation.
 - Free vibration and forced vibration.
 - Damping and types of damping.
 - Degree of freedom and single degree of freedom system.
- b. Calculate the natural angular frequency in sideway for the frame in Fig. Q8 (b) and also the natural period of vibration. If the initial displacement is 25 mm and the initial velocity is 25 mm/s, what is the amplitude and displacement at $t = 1$ sec. (08 Marks)

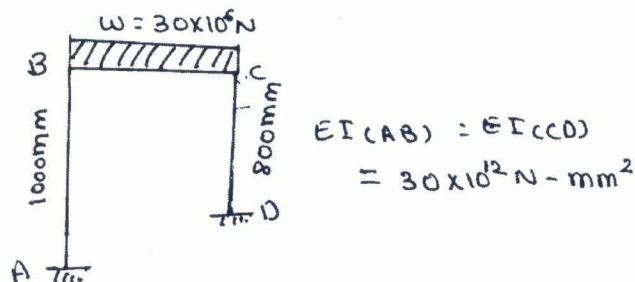


Fig. Q8 (b)

Fifth Semester B.E. Degree Examination, Dec.2014/Jan.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 relevant data wherever required.

PART - A

- 1 a. With the help of three phase diagram, define the terms Bulk density, Dry density, void ratio and Water content. (08 Marks)
 b. With usual notation prove that $S_e = WG$. (06 Marks)
 c. A soil sample weighing 19 kN/m^3 has a water content of 30%. The specific gravity of soil particles is 2.68. Determine void ratio, porosity and degree of saturation. (06 Marks)
- 2 a. What is consistency of soil? List and define consistency limits. (06 Marks)
 b. Briefly explain the correction to be applied to a hydrometer reading. (06 Marks)
 c. Following results were obtained from liquid limit test on a clay sample, whose plastic limit is 20%. (08 Marks)

Number of blows	12	18	22	34
Water content in %	56	52	50	45

Plot the curve and obtain : i) Liquid limit ii) Plasticity index iii) Flow index.

- 3 a. Explain soil classification according to IS classification system. (08 Marks)
 b. Explain any two field tests to identify silts from clays. (04 Marks)
 c. With neat figures, explain the structure of three clay minerals. (08 Marks)
- 4 a. List various factors affecting permeability of soils. (06 Marks)
 b. Explain quick sand and capillary phenomena. (06 Marks)
 c. In a falling head permeability test on a silty clay sample, the following results were obtained
 Length of sample = 12cm ; Diameter of sample = 8cm ; Diameter of stand pipe = 0.4cm
 Initial head of water in stand pipe = 120cm ; Final head of water in stand pipe = 40cm
 Time of fall in head = 6 minutes. Find the coefficient of permeability of the soil. (08 Marks)

PART - B

- 5 a. Explain Mohr – Coulomb theory. (06 Marks)
 b. Explain Sensitivity and Thixotropy of clay. (06 Marks)
 c. The results of shear box test are as follows :

Normal stress (kN/m^2)	50	100	200	300
Shear stress (kN/m^2)	36	80	154	235

Determine shear parameters. Would the failure occur on the plane within the soil mass when the shear stress is 122 kN/m^2 and normal stress is 246 kN/m^2 ? (08 Marks)

- 6 a. Write the differences between standard and modified proctor compaction test. (06 Marks)
 b. Briefly explain factors affecting compaction. (06 Marks)

- c. The following data were obtained from standard proctor compaction test :

Water content (%)	9	11	13	15	16	17	18
Bulk unit weight (kN/m^3)	18	19	19.9	20.8	21	20.5	20.1

- i) Plot the compaction curve and determine MDD and OMC.
 ii) Draw zero – G.r void line.
 iii) Also determine saturation at MDD. Take $G = 2.6$. **(08 Marks)**
- 7 a. Explain Mass-spring analogy. **(06 Marks)**
 b. With neat sketch, explain how pre-consolidation pressure is determined by Casagrande's method. **(06 Marks)**
 c. A soil sample 20mm thick takes 20 minutes to reach 20% consolidation. Find the time taken for a clay layer 6m thick to reach 40% consolidation. Assume double drainage in both cases. **(08 Marks)**
- 8 a. What are the advantages and limitations of vane shear test? How do you conduct the test in laboratory? **(08 Marks)**
 b. Explain square root of time fitting method for determination of coefficient of consolidation. **(06 Marks)**
 c. With neat sketch, explain vane shear test. **(06 Marks)**

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Fifth Semester B.E. Degree Examination, Dec.2014/Jan.2015
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 missing data, if any.**

PART – A

- 1 a. Explain in brief the different types of precipitation. (08 Marks)
b. How do you estimate the average depth of precipitation by Thiessen polygon method? (05 Marks)
c. The average annual rainfall in cm at 4 existing rain gauge stations are 105, 79, 70 and 66cm respectively. If the average depth of rainfall over the basin is to be estimated within 10% error. Determine the additional number of rain gauge required. (07 Marks)
- 2 a. Define evaporation. What are the factors affecting evaporation? (06 Marks)
b. List the methods of estimation of evapotranspiration. Discuss Blancy Criddle method. (06 Marks)
c. For small catchment the infiltration rate at the beginning of a storm was observed 90mm/hr and decreased exponentially to a constant rate of 8mm/hr after 2½ hour. The total infiltration during 2½ hr was 50mm. Develop Horton's equation and determine the infiltration rate at 30 min. (08 Marks)
- 3 a. With the aid of neat sketch show the various components of an observed flood hydrograph. (08 Marks)
b. What are the uses and application of unit hydrograph? (04 Marks)
c. Following are the ordinates of a 3-hr unit hydrograph. Derive the ordinate of a 6hr unit hydrograph:
- | | | | | | | | | | |
|------------------------------------|---|-----|-----|-----|------|-----|-----|-----|-----|
| Time in hr | 0 | 3 | 6 | 9 | 12 | 15 | 18 | 21 | 24 |
| Ordinates of 3 hr unit hydro graph | 0 | 1.5 | 4.5 | 8.6 | 12.0 | 9.4 | 4.6 | 2.3 | 0.8 |
- (08 Marks)
- 4 a. Define: i) Flood — ii) Design flood. (04 Marks)
b. Discuss in brief the following method of flood control :
i) Reservoir control ii) Construction of levels iii) Channel improvement. (09 Marks)
c. Define Flood routing and which are formulas used for storage versus elevation determination and outflow versus elevation determination. (07 Marks)

PART – B

- 5 a. Define Irrigation and what are the benefits and ill effects of irrigation. (06 Marks)
b. Discuss in brief the following types of irrigation: i) Flow irrigation; ii) Direct irrigation; iii) Storage irrigation; iv) Inundation irrigation. (08 Marks)
c. Write a note on:
i) Sewage irrigation
ii) Well irrigation
iii) Supplemental irrigation. (06 Marks)

- 6 a. Describe with help of sketch various soil moisture zone. (06 Marks)
 b. Define: i) Saturation capacity; ii) Field capacity; iii) Permanent wilting; iv) Temporary wilting. (08 Marks)
 c. Discuss in brief: i) Alluvial soil; ii) Black soil; iii) Red soil. (06 Marks)
- 7 a. Define Duty and delta and establish a relation between them. (06 Marks)
 b. What are the various methods of improving duty of irrigation water? (06 Marks)
 c. The base period, duty at the field of different crops and area under each crop in the command area are given below. Find the required reservoir capacity to cater to the needs of the crop. (08 Marks)

Crop	Base Period (days)	Duty @ field ha/cumec	Area under the crop (Ha)
Wheat	120	1800	4800
Sugarcane	360	800	5600
Cotton	200	1400	2400
Rice	120	900	3200

- 8 a. How irrigation Canals are classified? (06 Marks)
 b. Discuss the drawback of Kennedy's theory. (04 Marks)
 c. A channel section is to be designed for the following data:
 Discharge $Q = 5$ cumes
 Silt factor $f = 1.0$
 Side slope = $1/2$ (H) : 1 (V)
 Also determine the bed slope of the channel by Lacey method of channel design. (10 Marks)

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Fifth Semester B.E. Degree Examination, Dec.2014/Jan.2015
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 (if any).

PART – A

1.
 - a. Explain the role of transportation in social and economic development of the country. **(06 Marks)**
 - b. Explain various characteristics of road transport. **(06 Marks)**
 - c. Write a note on the following:
 - i) Jayakar Committee Recommendations.
 - ii) Central Road Fund.
 - iii) Indian Road Congress. **(08 Marks)**
2.
 - a. Briefly explain about 'Planning Survey' for a highway project. **(08 Marks)**
 - b. There are three alternate proposals of road plans for a district in Karnataka state. Suggest the order of priority for planning road based on the maximum utility approach. Assume utility units of 0.5, 1.0, 2.0 for the three population ranges and utility units of 1.0 and 5.0 per 1000 tonnes of agricultural and industrial products served. **(06 Marks)**

Proposal	Road length (km)	Number of towns and villages served with population range			Productivity served, in 1000 tonnes	
		< 2000	2001 – 5000	5001 – 10000	Agricultural	Industrial
A	500	100	150	40	150	20
B	700	270	350	82	300	35
C	900	290	430	96	430	45

- c. Write short notes on: i) PMGSY scheme; ii) KSHIP and its projects. **(06 Marks)**
3.
 - a. What are the main objectives of the preliminary survey and the steps followed in the preliminary survey by conventional method? (Name the steps). **(06 Marks)**
 - b. Write a note on carriageway with reference to IRC recommendations. Also draw a neat sketch of lateral clearances/placement of vehicles on a two lane pavement. **(06 Marks)**
 - c. The speeds of overtaking and overtaken vehicles are 70kmph and 40kmph respectively on a two way traffic road. The average acceleration during overtaking may be assumed as 0.99m/sec^2 .
 - i) Calculate safe overtaking sight distance.
 - ii) Calculate minimum and desirable length of overtaking zone.
 - iii) Draw a neat sketch of overtaking zone and show the position of sign posts. **(08 Marks)**
4.
 - a. With the help of a neat sketch, explain the attainment of super elevation in the field. **(06 Marks)**
 - b. Calculate the length of transition curve using the following data:
 Design speed = 65 kmph, radius of circular curve = 220m, pavement width including extra widening = 7.5m, allowable rate of introduction of super elevation (pavement rotated about the centre line) is 1 in 150. **(08 Marks)**
 - c. Explain the following terms with respect to highway vertical alignment: i) Ruling gradient; ii) Length of parabolic summit curve when $L > SSD$, with equations. **(06 Marks)**

PART – B

- 5 a. Briefly explain how the CBR value of the given soil is found in the laboratory. (06 Marks)
- b. What are the desirable properties of road aggregate? Mention the IRC/MORTH requirements/specifications values for different tests conducted on road aggregate. (08 Marks)
- c. Distinguish between bitumen and tar. Also mention the different tests conducted on bitumen. (06 Marks)
- 6 a. Draw a typical flexible pavement layer indicating the different component layer. Also mention the functions of each component layer. (08 Marks)
- b. Design the flexible pavement as per IRC 37-2001, using the following data:
 Number of commercial vehicle as per last count = 1000 commercial vehicles, construction period = 3 years, annual growth rate = 8%, design CBR of soil = 10%, category of road = national highway, two lane single carriageway, design life = 10 years, VDF = 2.5, LDF = 75%. Calculate the overall thickness and the thickness of individual pavement layer using the following pavement design catalogue for a traffic range 10-150 Msa and CBR 10%. (06 Marks)

Cumulative traffic (Msa)	Total pavement thickness (mm)	Pavement composition		
		Bituminous surfacing		Granular base and sub base (mm)
		BC(mm)	DBM(mm)	
10	540	40	50	Base = 250
20	565	40	75	Sub base = 200
30	580	40	90	
50	600	40	110	
100	630	50	130	
150	650	50	150	

Explain with the help of equations.

- i) Modulus of subgrade reaction. (06 Marks)
- ii) Radius of relative stiffness. (08 Marks)
- iii) Equivalent radius of resisting section with respect to rigid pavement. (04 Marks)
- 7 a. Explain in detail the requirements, specifications of materials and the construction steps/method for a water mix macadam (WMM) layer. (08 Marks)
- b. Explain in detail the requirements, specifications of materials and the construction steps/method for Bituminous Concrete (BC) layer. (08 Marks)
- c. Mention the tests, gradation and requirements as per IRC for a coarse/fine aggregate used in Pavement Quality Concrete (PQC). (04 Marks)
- 8 a. Explain in detail 'Highway user benefits'. (06 Marks)
- b. Briefly describe the different methods of economic analysis of a highway. (08 Marks)
- c. Explain the following with respect to highway financing:
 i) BOT ii) BOOT iii) Components of VOC. (06 Marks)

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