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

Time: 3 hrs.

Max. Marks: 80

- Note:** 1. Answer FIVE full questions, choosing ONE full question from each module.
2. Use of IS456-2000, SP-16 permitted.
3. Assume any missing data suitably.

Module-1

- 1 a. Briefly explain the principles of limit state. (06 Marks)
b. Briefly explain the modes of failure of beam sections with sketches. (06 Marks)
c. What are the causes of cracking in RC members? (04 Marks)

OR

- 2 A simply supported beam has a rectangular section and carries a uniformly distributed load of 20 kN/m over a clear span of 4.5 m. The cross section is 300mm × 550mm and is reinforced with 4 no's of 20 mm diameter bar.
Assume cover = 25 mm and bearing = 300 mm. Assuming, M20 grade concrete and Fe415 steel, compute short and long term deflection of the beam. (16 Marks)

Module-2

- 3 a. A Cantilever R.C. beam of span 2 m is rectangular in cross section 230 mm × 380 mm. It is reinforced with 3 – 16 mm diameter bars on tension side. Assume clear cover as 25 mm. M20 grade concrete and Fe415 steel is used. Determine the permissible concentrated load at the free end of Cantilever. (08 Marks)
b. A Doubly reinforced beam section 250 mm wide 500 mm deep to the centre of the tensile reinforcement. It is reinforced with 3 – 16 mm diameter bars as compression reinforcement at an effective cover of 50 mm and 4 bars of 20 mm diameter as tension reinforcement. Determine the moment of resistance of the section. M20 concrete and Fe500 steel is used. (08 Marks)

OR

- 4 a. Determine the minimum effective depth required and the corresponding area of tension reinforcement for a rectangle beam having a width of 200 mm to resist an ultimate moment of 200 kN-m. M20 grade concrete and Fe415 steel is used. (04 Marks)
b. A reinforced concrete beam has a support section with a width of 250 mm and effective depth of 500 mm. The support section is reinforced with 3 bars of 20 mm diameter on the tension side. 2 legged 8 mm diameter stirrups are provided at a spacing of 200 mm centre to centre. Calculate the shear strength of the support section for M20 grade concrete and Fe415 steel. (06 Marks)
c. A singly reinforced slab 120 mm thick is supported by T-beam spaced at 3 m C/C, the effective depth and width of web are 580 mm and 450 mm respectively. Eight HYSD bars of 20 mm diameter have been provided in tension in two layers, with 4 no's in each layer. The effective cover in lower tier is 50 mm. The effective span of simply supported beam is 3.6 m and grade of concrete is M20. Determine the depth of neutral axis and the moment of resistance of T-beams section. (06 Marks)

Module-3

- 5 a. Design the shear reinforcement for an RC beam $300\text{mm} \times 600\text{mm}$ effective carrying a uniformly distributed load of 30 kN/m run factored over a span of 6 m supported over 300 mm wide beams. Use M20 grade concrete and Fe415 grade steel. (08 Marks)
- b. Design the reinforcement for tension and compression reinforcement side and its percentage for a doubly reinforced rectangular beam simply supported at both ends. The size of the beam is $300\text{ mm} \times 600\text{mm}$ effective. Effective cover to compression reinforcement is 50 mm . The ultimate factored total load of 90 kN/m including self weight of beam is acting between the supports of effective span 6.0 m . Grade of concrete and steel are M20 and Fe415. (08 Marks)

OR

- 6 Design one of the intermediate T-beam for a hall measuring $7\text{m} \times 12\text{m}$ with beams spaced at 3 m C/C . Depth of slab is 120 mm . Live load on slab is 9.5 kN/m^2 including finishes. Use M20 grade concrete and HYSD bars. (16 Marks)

Module-4

- 7 a. Distinguish between one way and two way slab. (02 Marks)
- b. Design an interior panel of a two-way slab of size $5\text{m} \times 5\text{m}$. Live load = 3 kN/m^2 , floor finish = 1 kN/m^2 and bearing = 300 mm . Adopt M20 grade concrete and Fe415 grade steel. Sketch the reinforcement details in plan. (14 Marks)

OR

- 8 The clear dimension of a stair case hall is $2.4\text{ m} \times 4.75\text{ m}$. The floor to floor height is 3.52 m . A two flight dog legged stair is to be provided between the two floors with a rise of 160 mm . Design the stairs and also check for deflection. Sketch the reinforcement details of any one of the flight. (16 Marks)

Module-5

- 9 a. A RCC square column of side 300 mm is reinforced with 4 bars of 16 mm diameter. Determine the allowable service load on the column. M25 grade concrete and Fe500 steel is used. (04 Marks)
- b. A rectangular column of size $300\text{mm} \times 500\text{mm}$ is subjected to an axial load of 1200 kN and moment of 30 kN-m acting about an axis bisecting the depth of column. Effective cover = 50 mm . Calculate the necessary reinforcement adopting M20 grade concrete and Fe415 steel. Sketch the reinforcement details. (12 Marks)

OR

- 10 Design a rectangular footing of flat type for a column of size $300\text{ mm} \times 500\text{ mm}$ carrying an axial load of 1200 kN . SBC of soil is 200 kN/m^2 . Adopt M20 concrete and Fe500 steel. Sketch the reinforcement details. (16 Marks)

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15CV53

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

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. What is Stabilization of bore holes? Mention various methods and explain any one method. (06 Marks)
- b. With the help of neat sketch, explain Seismic Refraction method of soil exploration. Using this method, determine the velocity of waves in soil layers and thickness of the top stratum, for the following details :

Time (s) :	0.1	0.2	0.3	0.4	0.45	0.50	0.55
Distance (m) :	40	80	120	160	200	240	280

Geophones are placed at a spacing of 40m in a straight line and the time taken for the last wave to be received at each geo – phone is given. (10 Marks)

OR

- 2 a. List and explain types of soil samples. (06 Marks)
- b. Explain the determination of ground water level by Hvorslev's method. Using this method estimate the ground water table level for the following data :
Depth up to which water is boiled out = 15m ; Water rise on first day = 0.80m ;
Water rise on second day = 0.70m ; Water rise on third day = 0.60m. (10 Marks)

Module-2

- 3 a. Explain types of settlements with formulae. (06 Marks)
- b. Define Isobar. Using Boussenesq's equation construct isobar of intensity 0.25 Q (25% isobar), where Q is point load acting on the surface. (10 Marks)

OR

- 4 a. A circular area 6m diameter carries a uniformly distributed load of 10kN/m², determine the vertical stress at a depth of 2m, 4m and 8m. Plot the variation of vertical stress with depth. (06 Marks)
- b. A square footing 1.2m × 1.2m rests on a saturated clay layer 4 deep. $W_L = 30\%$, $\gamma_{sat} = 17.8\text{kN/m}^3$, $W = 28\%$ and $G = 2.68$. Determine the settlement if the footing carries a load of 300kN. (10 Marks)

Module-3

- 5 a. Explain Fellinius method of obtaining centre of critical slip surface in the case of stability analysis of C – ϕ soil. (06 Marks)
- b. A retaining wall of height 10m supports cohesionless soil with the following properties. $G = 2.65$, $c = 0.65$ and $\phi = 30^\circ$, Water table lies at 3m depth. Surface of back fill is horizontal and carries surcharge of intensity 14kN/m². Draw lateral active earth pressure distribution diagram. Determine total active earth pressure and its point of application. (10 Marks)

OR

- 6 a. Derive equations for the earth pressure coefficients K_a and K_p by considering back fill with horizontal surface. Use Rankine's theory. (06 Marks)
- b. An embankment is to be constructed with a soil having $C = 20\text{kN/m}^2$, $\phi = 10^\circ$ and $\gamma = 19\text{kN/m}^3$. The desired factor of safety with respect to cohesion as well as friction as 1.5. Determine i) Safe height of the desired slope if slope is 2H to 1V.
ii) Safe angle of slope if the desired height is 15m. For $\phi = 10^\circ$; Taylor's stability numbers are as follows : (10 Marks)

Stability No :	0.04	0.08
Slope angle (i) :	20	30

Module-4

- 7 a. With the help of sketches, explain effect of water table and eccentric loading on bearing capacity soil. (06 Marks)
- b. A square footing located at a depth of 1.3m below the ground has to carry a load of 800kN. Find the size of footing, if the desirable factor of safety is 3. The soil has the following properties. Void ratio = 0.55 ; degree of saturation = 50% , Specific gravity = 2.67 , Cohesion = 8KPa , Angle of shearing resistance = 30° , $N_c = 37.2$, $N_q = 22.5$ and $N_\gamma = 19.7$. (10 Marks)

OR

- 8 a. Explain Standard Penetration test with suitable corrections. (06 Marks)
- b. A rectangular footing has a size of 1.8m \times 3m has to transmit the load of a column at a depth of 1.5m. Calculate the safe load which the footing can carry at a factor of safety of 3 against shear failure. Use IS code method. The soil has following properties : $n = 40\%$; $G = 2.67$; $W = 15\%$; $C = 8\text{kN/m}^2$ and $\phi = 32.5^\circ$. (10 Marks)

Module-5

- 9 a. With the help of sketch, explain negative skin friction. (06 Marks)
- b. A 200mm diameter, 8m long piles are used as foundation for a column in a uniform deposit of medium clay having unconfined compressive strength of 100kN/m^2 . The spacing between the piles is 500mm. There are 9 piles in the ground arranged in a square pattern. Calculate the ultimate load capacity of the group. Assume adhesion factor = 0.9 and $N_c = 9$. (10 Marks)

OR

- 10 Write short notes on any four of the following :
- Efficiency of pile group.
 - Group capacity of piles.
 - Pile load test.
 - Settlement of piles.
 - Under reamed piles.
 - Single loaded pile capacity.

(16 Marks)

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15CV/CT551

Fifth Semester B.E. Degree Examination, Dec.2018/Jan.2019 Air Pollution and Control

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing one full question from each module.

Module-1

- 1 a. Define air pollution and briefly explain the various sources of air pollution. (06 Marks)
- b. Explain the subsidence inversion and radiation inversions in detail. (06 Marks)
- c. What are the effects of photo chemical smog? (04 Marks)

OR

- 2 a. Distinguish between primary and secondary air pollutants with examples. (08 Marks)
- b. Explain the effects of air pollutants on human health along with a neat sketch. (08 Marks)

Module-2

- 3 a. Explain the important meteorological parameters that influence air pollution. (08 Marks)
- b. Explain the various types of Plume behavior, with a neat sketch showing temperature gradient. (08 Marks)

OR

- 4 a. Explain wind rose with neat sketch in detail. (08 Marks)
- b. Calculate the effective stack height from the following data using:
 - (i) Inner diameter of stack = 0.6 m
 - (ii) Constructed stack height = 30 m
 - (iii) Wind velocity = 4 m/sec
 - (iv) Barometric pressure = 900 millibar
 - (v) Stack gas velocity = 8.2 m/sec
 - (vi) Stack gas temperature = 110°C
 - (vii) Atmospheric air temperature = 23°C(08 Marks)

Module-3

- 5 a. With a neat sketch, describe the methods of gaseous sampling by sampling train. (10 Marks)
- b. Write a brief note on indoor air pollution. (06 Marks)

OR

- 6 a. Explain the analysis of following air pollutants:
 - (i) SO_x (ii) NO_x (iii) CO (08 Marks)
- b. The following data were obtained in an ambient air quality monitoring in a residential area. Find the concentration of suspended particulate matter.
 - (i) Duration of sampling = 8 hrs.
 - (ii) Initial weight of filter paper = 1.6978 gms.
 - (iii) Final weight of filter paper = 1.7120 gms.
 - (iv) Atmospheric temperature = 28°.
 - (v) Atmospheric pressure = 690 mm of Hg.
 - (vi) Sampling rate (initial) = 1.4 m³/min.
 - (vii) Sampling rate (final) = 1.2 m³/min (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.

Module-4

- 7 a. With a neat sketch, explain the principle, construction and working of an ESP. (10 Marks)
b. Explain with a neat sketch, settling chamber. (06 Marks)

OR

- 8 a. List the different types of scrubbers and explain any one of them with a neat sketch. (10 Marks)
b. Calculate the size of the particle which can be collected in a cyclone having 50% collection from the following data:
(i) Inlet width = 30 cm
(ii) Inlet gas velocity = 3.2 m/sec.
(iii) Particle density = 1.6 gm/cc
(iv) Temperature of gas = 23°C
(v) Dynamic viscosity of gas = 0.181×10 poise at 23°C
(vi) Effective turns = 8. (06 Marks)

Module-5

- 9 a. Briefly discuss the different control measures adopted to check the air pollutants emitted by automobiles. (10 Marks)
b. What is noise pollution? What are sources of noise pollution? (06 Marks)

OR

- 10 a. What is green house effect? Explain briefly effect of green house on environment. (08 Marks)
b. Explain the Bhopal gas Tragedy in detail. (08 Marks)

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15CV553

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

Masonry Structures

Time: 3 hrs.

Max. Marks: 80

**Note: 1. Answer FIVE full questions, choosing one full question from each module.
2. Use of IS1905 – 1987 code is permitted.**

Module-1

- 1 a. Briefly explain the various defects and errors in masonry construction. (08 Marks)
 b. Explain in detail the properties of mortar. (08 Marks)

OR

- 2 a. Explain the qualities of good building stone and brick used in masonry. (08 Marks)
 b. Explain : (i) Effect of workmanship on masonry strength. (08 Marks)
 (ii) Initial rate of absorption.

Module-2

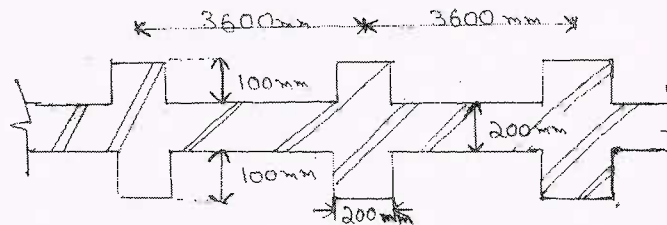
- 3 a. Explain the following types of masonry elements (i) Solid wall (ii) Faced wall (iii) Cavity wall (iv) Panel wall. (08 Marks)
 b. A solid wall of thickness 100 mm is constructed with brick units of 10 N/mm² and M1 type of mortar. Ceiling height of wall is 3 m. Load acts axially. End of the walls are fully restrained at top and bottom. Determine
 (i) Effective height (ii) Effective thickness (iii) Slenderness ratio
 (iv) Eccentricity (v) Stress modification factor (vi) Area reduction factor
 (vii) Shape modification factor (viii) Permissible compressive stress. (08 Marks)

OR

- 4 a. Explain the following :
 (i) Area reduction factor.
 (ii) Effective length.
 (iii) Slenderness ratio.
 (iv) Effective height. (08 Marks)
 b. Write a short note on load dispersion and arching action in masonry. (08 Marks)

Module-3

- 5 a. List the steps involved in the design of cavity walls (without eccentricity). (06 Marks)
 b. Design an interior wall of a single storeyed workshop of height 5.4 m supporting a RCC roof. The bottom of the wall rests over a foundation block. Assume roof load equal to 45 kN/m. Refer Fig. Q5 (b). (10 Marks)

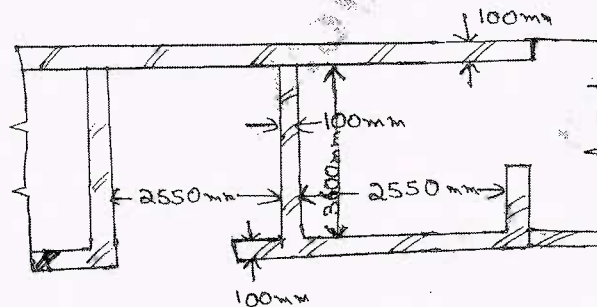


Solid wall with piers
Fig. Q5 (b)

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OR

- 6 Design an interior wall of a two storeyed building with RCC slabs of effective span 2.65 m. The wall is 3.6 m long and is stiffened at the ends by 100 mm thick intersecting walls. The ceiling height of each floor is 3 m. Refer Fig. Q6. (16 Marks)



Solid wall supported at the ends by cross walls

Fig. Q6

Module-4

- 7 a. Design an interior wall of a two storeyed wall carrying concrete slabs with a storey height of 3 m. The wall is stiffened by 100 mm thick intersecting walls at 3600 mm c/c. Also the wall has a door opening of size 900 × 2000 mm at a distance of 200 mm from one of the intersecting walls. Assume loading as follows:
- Roof loading = 15 kN/m
 - Floor loading = 12.5 kN/m
- b. With neat sketch, explain various stress distribution under eccentric loads. (10 Marks) (06 Marks)

OR

- 8 Design an interior cavity wall of a two storeyed building carrying eccentric load due to unequal short spans of roof / floor of 4 m and 3 m on either side of the wall. The height of each storey is 3 m. Assume intensity of loading as follows:
- From roof = 6 kN/m²
 - From floor = 4 kN/m²
- Assume overall thickness = 250 mm (cavity wall). Each leaf being 100 mm thick. (16 Marks)

Module-5

- 9 a. Design an solid wall under wind loading of a single storey warehouse of 3.5 m height. The loading on the wall consists of vertical load of 25 kN/m from the roof and wind pressure of 860 N/m². The wall is tied with metal anchor at the floor and roof levels. (12 Marks)
- b. Explain the various modes of failures of infilled frames. (04 Marks)
- 10 a. List the steps involved in the design of compound wall. (08 Marks)
- b. List the steps involved in the design of a shear wall under seismic loading. (08 Marks)

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15CV561

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

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. In detail explain the road user characteristics. (08 Marks)
b. Derive an expression for flow and concentration using Green-shield theory. (08 Marks)

OR

- 2 a. Explain the details of vehicle characteristics affecting road design. (08 Marks)
b. Explain urban traffic problems and measure to meet the problems. (08 Marks)

Module-2

- 3 a. Briefly explain the various causes of accidents. (08 Marks)
b. Define the term spot speed. Explain the presentation of spot speed data. (08 Marks)

OR

- 4 a. Explain the preventive measures to reduce accidents. (08 Marks)
b. Explain the importance and methods of traffic forecasting. (08 Marks)

Module-3

- 5 a. Enumerate the design factors and advantages of rotary intersection. (10 Marks)
b. Write short notes on: i) Road markings ii) Channelized intersections. (06 Marks)

OR

- 6 a. What are the advantages and disadvantages of traffic signal? (08 Marks)
b. Explain traffic signal design as per IRC method. (08 Marks)

Module-4

- 7 a. Explain various design factors of highway lighting. (10 Marks)
b. Explain the various detrimental effect of traffic noise. (06 Marks)

OR

- 8 a. List and explain different types of lighting layouts. (08 Marks)
b. Explain the measure to control the traffic noise. (08 Marks)

Module-5

- 9 a. Discuss the details of traffic system management. (08 Marks)
b. List and explain the various phases of traffic regulation. (08 Marks)

OR

- 10 Write short notes on:
a. TDM b. ITS
c. Traffic congestion d. Road pricing system. (16 Marks)

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Important Note: 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
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15CV563

Fifth Semester B.E. Degree Examination, Dec.2018/Jan.2019 Remote Sensing and GIS

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Define Remote Sensing. Explain the process of remote sensing with neat sketch. (08 Marks)
b. Describe the Electromagnetic spectrum with a neat sketch. (08 Marks)

OR

- 2 a. Explain the energy interactions with earth surface features (soil, water and vegetation) with a neat sketch. (06 Marks)
b. Define Visual Interpretation. Enumerate different types of elements considered during visual interpretation process. (10 Marks)

Module-2

- 3 a. Explain different types of IRS series satellites used in remote sensing. (08 Marks)
b. Explain different types of sensors used in remote sensing. (08 Marks)

OR

- 4 a. Explain different types of sensor resolutions in remote sensing. (08 Marks)
b. Illustrate Radiometric and Geometric corrections in digital image processing. (08 Marks)

Module-3

- 5 a. Define GIS. Describe the key components of GIS software. (08 Marks)
b. Describe different types of Data types used in GIS data models. (08 Marks)

OR

- 6 a. Explain different types of coordinate systems used in GIS. (08 Marks)
b. Describe different types of map projections used in GIS. (08 Marks)

Module-4

- 7 a. Explain topological model of vector data overlay concept. (08 Marks)
b. Explain the creation of shape file in vector data model. (08 Marks)

OR

- 8 a. Describe Raster data GIS models with sketch. (08 Marks)
b. Explain advantages and disadvantages of Raster data. (08 Marks)

Module-5

- 9 a. Explain the role of Remote sensing in monitor of land use changes. (08 Marks)
b. Explain the application of Remote Sensing and GIS in water resources management. (08 Marks)

OR

- 10 a. Explain the applications of RS and GIS for natural resources management system. (08 Marks)
b. Describe the application of RS and GIS in the field of Urban planning. (08 Marks)

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15CV61

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

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Define management. Explain the contributions of Taylor to Scientific Management. (08 Marks)
b. Briefly explain the various levels and skills required at different levels. (08 Marks)

OR

- 2 a. Briefly explain the important steps in planning. (08 Marks)
b. Write difference between strategic planning and tactical planning. (08 Marks)

Module-2

- 3 a. What is organization? Explain the purpose and nature of an organization. (08 Marks)
b. What is appropriate span of control? Explain the factors affect the span of management. (08 Marks)

OR

- 4 a. What is Department? Mention the types and explain the departmentation by geographic area. (08 Marks)
b. Explain the steps in the selection procedure of an organization. (08 Marks)

Module-3

- 5 a. Explain the comparison of Maslow's and Hertberg theories of Human motivation. (08 Marks)
b. What are the different steps involved in controlled process. (08 Marks)

OR

- 6 a. Briefly explain the Maslow's hierarchy needs. (08 Marks)
b. Explain some of the methods of establishing control. (08 Marks)

Module-4

- 7 a. Define the term 'Entrepreneur'. Explain the functions of an Entrepreneur. (08 Marks)
b. Explain the steps involved in Entrepreneurial process. (08 Marks)

OR

- 8 a. Define 'Small Scale Industry' and state the characteristics of a SSI. (08 Marks)
b. Explain the WTO, state its functions. (08 Marks)

Module-5

- 9 a. Explain the role of TECSOK in promotion of small enterprises in Karnataka. (08 Marks)
b. Explain the important activities in establishing small enterprises, with the help of KSSIDC. (08 Marks)

OR

- 10 a. Explain the role of KSFC in promotion of small enterprise. (08 Marks)
b. Write short notes on :
(i) SISI (ii) SIDBI (iii) Project Identification (iv) Barrier in Entrepreneur (08 Marks)

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15CV63

Sixth Semester B.E. Degree Examination, Dec.2018/Jan.2019 Highway Engineering

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing one full question from each module.

Module-1

- 1 a. Explain various characteristics of Road Transport. (05 Marks)
 b. Explain briefly the salient features of third twenty year road development plan. (05 Marks)
 c. 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 of 1.0 and 10.0 per 1000 tonnes of agricultural and industrial products served.

Proposal	Road length in km	Number of villages served pollution range			Productivity in 1000 tonnes	
		<2000	2001-5000	>5000	Agriculture	Industrial
A	200	80	40	10	90	12
B	250	75	45	12	105	22
C	300	85	50	18	110	26

(06 Marks)

OR

- 2 a. Explain the role of transportation in social and economic development of the country. (05 Marks)
 b. Explain briefly the following :
 (i) Jayakar Committee (ii) Indian Road Congress (IRC) (iii) Central Road Fund (CRF) (05 Marks)
 c. The area of a certain district in India is 13,400 sq.km and there are 12 towns as per 1981 census. Determine the lengths of different categories of roads to be provided in third twenty year road development plan. (06 Marks)

Module-2

- 3 a. What are the basic requirements of an ideal highway alignment? List and explain briefly. (05 Marks)
 b. Briefly explain the role of pavement surface characteristics in highway geometric design. (05 Marks)
 c. Calculate the safe stopping sight distance for design speed of 50 kmph. For (i) Two way traffic on two lane road (ii) Two way traffic on a single lane road. Assume $f = 0.37$ and reaction time, $t = 2.5$ sec. (06 Marks)

OR

- 4 a. Briefly explain how MAP study is helpful in the alignment of new highway. (05 Marks)
 b. Give the details of drawings to be prepared in highway project and discuss briefly. (05 Marks)
 c. The radius of a horizontal circular curve is 100 m. The design speed is 50 kmph and the design co-efficient of lateral friction is 0.15.
 (i) Calculate the super elevation required if full lateral friction is assumed to develop
 (ii) Calculate the co-efficient of friction needed if no super elevation is provided.
 (iii) Calculate the equilibrium super-elevation if the pressure on inner and outer wheels should be equal. (06 Marks)

1 of 2

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Module-3

- 5 a. List and explain the desirable properties of subgrade soil. (05 Marks)
 b. List and explain the various design factors to be considered for pavements. (05 Marks)
 c. A load penetration values of CBR tests conducted on a specimen of a soil sample are given below. Determine the CBR value of soil, if 100 divisions of load represents 190 kg and in the calibration chart of proving ring. (06 Marks)

Penetration of plunger, in mm	0.0	0.5	1.0	1.5	2.0	2.5	3.0	4.0	5.0	7.5	10.0	12.5
Load dial readings (Divisions)	0	8	15	23	29	34	37	43	48	57	63	67

OR

- 6 a. Explain the desirable properties of aggregates to be used in pavement construction. (05 Marks)
 b. Explain the significance of ESWL in pavement design. (05 Marks)
 c. Calculate the stresses at interior, edge and corner regions of a cement concrete pavement using Westergaard's stress equation. Use the following data; wheel load, $P = 5100$ kg, Modulus of elasticity, $E = 3 \times 10^5$ kg/cm², Pavement thickness, $h = 18$ cm, Poisson's ratio of concrete, $\mu = 0.15$, Modulus of subgrade reaction, $k = 6$ kg/cm³, Radius of contact area, $a = 15$ cm. (06 Marks)

Module-4

- 7 a. Briefly explain the different types of pavement construction. (08 Marks)
 b. Explain the construction steps for cement concrete pavement slab. (08 Marks)

OR

- 8 a. Explain the construction steps for water bound macadam roads. (08 Marks)
 b. Write a short note on the following :
 (i) Bituminous macadam (ii) Bituminous concrete (iii) Prime coat (iv) Seal coat (08 Marks)

Module-5

- 9 a. What are the requirements of highway drainage system? (05 Marks)
 b. Explain the various road user benefits of highway improvements. (05 Marks)
 c. The maximum quantity of water expected in one of the open longitudinal drain on clayey soil is 0.9 m³/sec. Design the cross-section of trapezoidal drain, assuming the bottom width of the trapezoidal section to be 1 m and cross slope to be 1 vertical to 1.5 horizontal. The allowable velocity of flow in the drain is 1.2 m/sec. (06 Marks)

OR

- 10 a. Briefly explain the types of cross drainage structures. (05 Marks)
 b. Describe the various methods of economic analysis of a highway. (05 Marks)
 c. Compare the annual costs of two types of pavement structures (i) WBM with thin bituminous surface at total cost of Rs.2.2 lakhs per km, life of 5 years, interest at 10%, salvage value of Rs.0.9 lakhs after 5 years; Annual average maintenance cost of Rs. 0.35 lakhs per km and (ii) Bituminous macadam base and bituminous concrete surface, total cost of Rs. 4.2 lakhs per km, life of 15 years, interest at 8%, salvage value of Rs. 2 lakhs at the end of 15 years ; Annual average maintenance cost Rs.0.25 lakhs per km. (06 Marks)

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Sixth Semester B.E. Degree Examination, Dec.2018/Jan.2019 Alternative Building Materials

Time: 3 hrs.

Max. Marks: 80

- Note: 1. Answer any FIVE full questions, choosing one full question from each module.
2. Missing data can be assumed suitably.

Module-1

- 1 a. Explain different categories of energy consumption in a building. (06 Marks)
b. What are the environmental issues related to the building materials. (06 Marks)
c. Write a note on green building ratings. (04 Marks)

OR

- 2 a. Explain role of transportation in building constructions. (06 Marks)
b. Explain rain water harvesting in building. (05 Marks)
c. Discuss building in different climatic regions. (05 Marks)

Module-2

- 3 a. Discuss the properties and requirements of mortars. (08 Marks)
b. Explain manufacture of stabilized mud blocks. (08 Marks)

OR

- 4 a. A brick masonry prism is made up of 5 bricks joined by mortar of thickness 2cm. The brick is 7.5cm in thickness. The prism is subjected to a uniform vertical stress of 4MPa. The brick has a modulus of 500MPa and the mortar has a modulus of 8000MPa. Determine the horizontal lateral stress in brick and mortar. Assume the Poisson's ratio of brick and mortar is 0.1. (05 Marks)
b. List out the factors influencing compressive strength of masonry. Explain any two. (07 Marks)
c. Write down the characteristics of a good brick. (04 Marks)

Module-3

- 5 a. Explain the processing of lime. (04 Marks)
b. Explain the techniques to blend lime pozzolana by dry and wet process. (04 Marks)
c. List out matrix materials and reinforcing materials in fiber reinforced cement composites and explain behaviour of FRC in compression. (08 Marks)

OR

- 6 a. Explain typical agro wastes and other biomass resources in construction. (08 Marks)
b. List out the applications of FRC in construction. (04 Marks)
c. How do you produce Rice husk Ash in rice husk burner. (04 Marks)

Module-4

- 7 a. Write a note on: i) Hollow concrete block walls ii) Cavity wall iii) Rammed earth. (09 Marks)
b. Explain various types of filler slabs along with materials. (07 Marks)

OR

- 8 a. Explain the construction of masonry domes and masonry vaults. (08 Marks)
b. Explain different materials to be used in production of ferro cement products. (08 Marks)

Module-5

- 9 a. Explain various machines for manufacture of concrete. (06 Marks)
b. Write a note on mivan shuttering. (04 Marks)
c. Explain the methods of production of precast elements. (06 Marks)

OR

- 10 a. Explain cost saving techniques in construction. (08 Marks)
b. Write a note on global warming and construction industries. (08 Marks)

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15CV/CT51

Fifth Semester B.E. Degree Examination, June/July 2019 Design of RC Structural Elements

Time: 3 hrs.

Max. Marks: 80

- Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. Use of IS456-2000 and SP-16 is permitted.
3. Assume any missing data suitably.*

Module-1

- 1 a. Explain the principles of limit state design. (06 Marks)
b. Enlist the reasons for adopting partial safety factors for loads and material strength. (05 Marks)
c. Derive from the fundamentals the expression for the area of stress block $0.36 f_{ck} x_u$. (05 Marks)

OR

- 2 a. Explain short term deflection and long term deflection. (06 Marks)
b. A simply supported RCC beam of size 300mm × 600mm carries a Udl live load of 25 kN/m and superimposed load [Dead load] 12 kN/m over an effective span of 5m. It is reinforced with 4 - # 16mm diameter bars. The effective cover is 50mm. Calculate the short term deflection and long term deflection of beam, if i) Ultimate shrinkage coefficient = 0.0003, ii) Creep co-efficient = 1.6, concrete grade M20, and steel Fe415 are used. (10 Marks)

Module-2

- 3 a. A singly reinforced concrete beam of 250mm × 450mm deep upto the centre of reinforcement is reinforced with 3-#16 at an effective cover of 50mm, effective span 6m. M20 concrete and Fe415 steel. Determine the central point load that can be supported in addition to the self weight. (10 Marks)
b. Determine the moment of resistance of a T-beam for the following data:
Breadth of the flange = 740mm,
Effective depth = 400mm,
Breadth of web = 240mm,
Area of steel = 5 - 20 and
Depth of flange = 110mm,
Adopt M20 grade concrete and Fe415 steel. (06 Marks)

OR

- 4 a. A doubly reinforced beam section is 250mm wide and 450mm deep upto the centre of the tensile reinforcement. It is reinforced with 2- ϕ 16 as compression reinforcement at an effective cover of 50mm and 4- ϕ 25 as tensile steel, using M20 concrete and Fe250 steel. calculate the ultimate moment of resistance of the beam section. (09 Marks)
b. A Tee beam has the following data:
i) C/C spacing of beams = 3.20m,
ii) Simply supported efficiency span of (simply) beam \Rightarrow 8m
iii) Depth of slab = 150mm
iv) Size of web of beam = 300mm × 500mm.
Calculate the balanced moment of resistance. (07 Marks)

1 of 2

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.

Module-3

- 5 Design a reinforced concrete beam of rectangular cross-section using the following data: Effective span = 5m, width of beam = 250mm, overall depth = 500mm, service load including dead load and live load = 40kN/m, tension cover = 50mm. Adopt M20 grade concrete and Fe-415 grade steel. Sketch the reinforcement details. (16 Marks)

OR

- 6 a. List the circumstance under which doubly reinforced beam are recommended. (04 Marks)
b. A rectangular beam 230mm × 550mm deep is subjected to a sagging BM of 40 kNm, shear force of 30kN and twisting moment of 11.5 kNm at a given section. Design the reinforcement if M20 grade concrete and Fe415 steel are used. Sketch the details. (12 Marks)

Module-4

- 7 Design a R.C.C. slab for an office floor 4.5m × 5.5m with all four edges discontinuous and corners held down. The live load on the slab is 3kN/m². Assume floor finish as 0.6 kN/m² and ceiling finish as 0.4 kN/m². Use M20 concrete and Fe415 steel. Sketch the reinforcement details. (16 Marks)

OR

- 8 Design a Dog legged Stair for an office building in a room measuring 2.8m × 5.8m clear vertical distance between the floors is 3.6m. The width of flight is to be 1.25m. Assume live load of 3kN/m². Use M-20 concrete and Fe-415 grade steel. Assume that the stairs are supported on 230mm at the outer edges of landing stairs. Sketch the reinforcement details. (16 Marks)

Module-5

- 9 a. Design the reinforcement for a square column of size 450mm × 450mm to support a service load of 1500kN. Use M20 concrete and Fe-415 steel. (08 Marks)
b. A column size of 300mm × 400mm has an effective length of 3.6m and is subjected to $P_u = 1100\text{kN}$ and $M_u = 150\text{kNm}$, about the major axis. Assuming the bars on two sides, design the column using M25 concrete and Fe415 steel. (08 Marks)

OR

- 10 Design an isolated footing of uniform thickness of a RC column, bearing a vertical load of 600kN and having a base of size 500mm × 500mm. The safe bearing capacity of the soil may be taken as 120kN/m². Use M-20 grade concrete and Fe-415 grade steel. Sketch the reinforcement details. (16 Marks)

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15CV52

Fifth Semester B.E. Degree Examination, June/July 2019 Analysis of Indeterminate Structures

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Analyse the continuous beam shown in Fig.Q1(a) by slope deflection method. Draw bending moment diagram. EI is constant. (06 Marks)

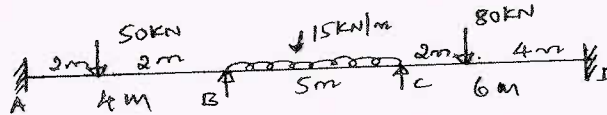


Fig.Q1(a)

- b. Analyse the portal frame shown in Fig.Q1(b) by slope deflection method. Draw bending moment diagram. (10 Marks)

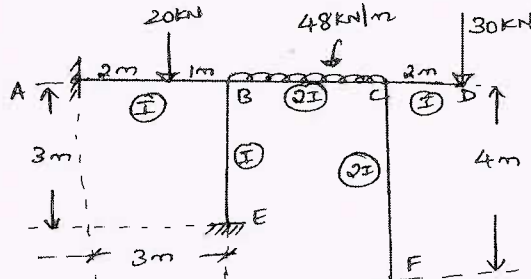


Fig.Q1(b)

OR

- 2 a. Analyse the continuous beam shown in Fig.Q2(a) by slope deflection method. Support 'B' sinks by 3 mm. Take $EI = 3000 \text{ kN-m}^2$. Draw bending moment diagram. (06 Marks)

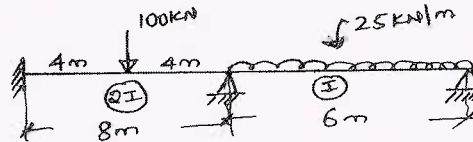


Fig.Q2(a)

- b. Analyse the portal frame shown in the Fig.Q2(b) by slope deflection method. Draw bending moment diagram. (10 Marks)

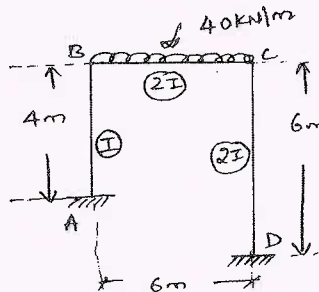


Fig.Q2(b)

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.

Module-2

- 3 a. Analyse the continuous beam using moment distribution method. Draw bending moment and shear force diagram. Refer Fig.Q3(a). (06 Marks)

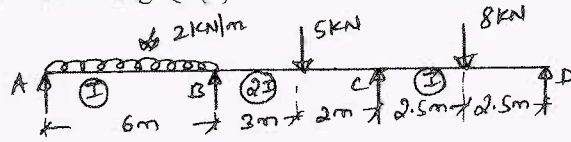


Fig.Q3(a)

- b. Analyse the portal frame shown in Fig.Q3(b) using moment distribution method. Draw bending moment diagram. Take $EIS = 20 \text{ kN-m}^3$. (10 Marks)

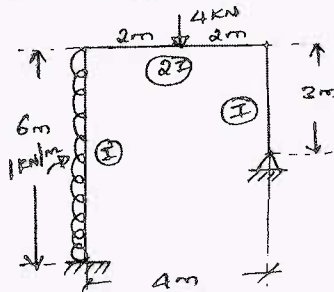


Fig.Q3(b)

OR

- 4 a. A horizontal beam is loaded as shown in Fig.Q4(a). It support 'A' sinks by 10 mm and B by 30 mm and C by 20 mm. Determine the end moments in the beam. Given $I = 2.4 \times 10^6 \text{ mm}^4$ and $E = 2 \times 10^5 \text{ N/mm}^2$. (08 Marks)

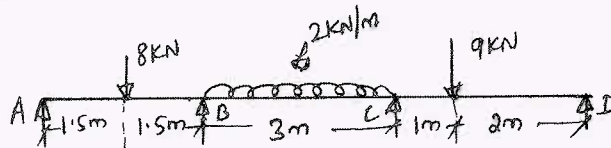


Fig.Q4(a)

- b. Analyse the portal frame shown in Fig.Q4(b) using moment distribution method. Draw bending moment. (08 Marks)

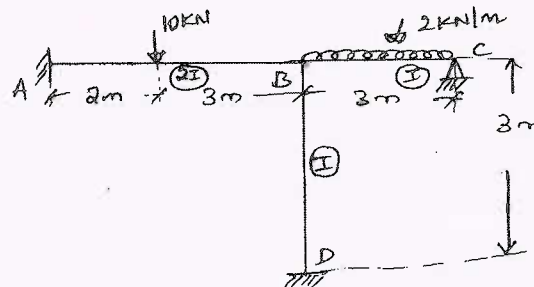


Fig.Q4(b)

Module-3

- 5 a. Analyse the continuous beam shown in Fig.Q5(a) using Kani's method. Draw bending moment diagram. (08 Marks)

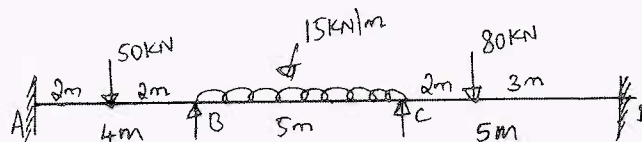
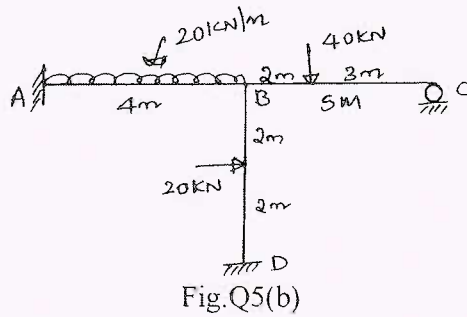


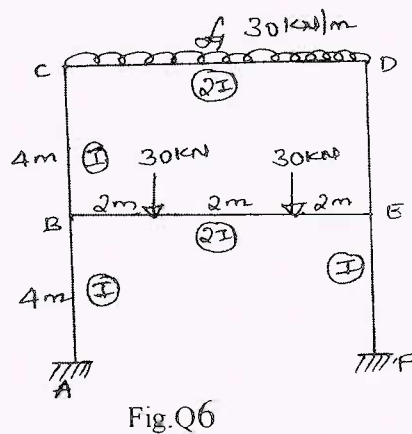
Fig.Q5(a)
2 of 4

- b. Analyse the frame shown in Fig.Q5(b) using Kani's method. Draw bending moment diagram. (08 Marks)



OR

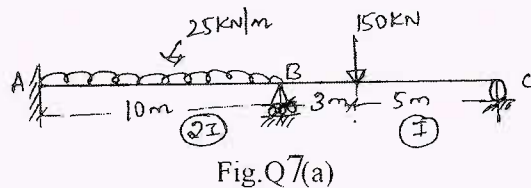
- 6 Analyse the frame shown in Fig.Q6 by Kani's method. Draw bending moment diagram.



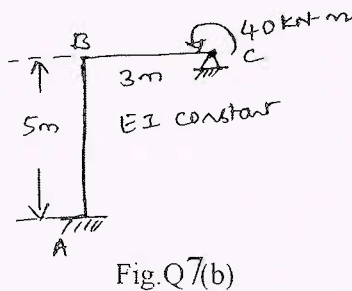
(16 Marks)

Module-4

- 7 a. Analyse the beam shown in Fig.Q7(a) by flexibility method and draw bending moment diagram. (08 Marks)



- b. Analyse the frame shown in Fig.Q7(b) by flexibility method and draw bending moment diagram. (08 Marks)



OR

- 8 Analyse the pin-jointed frame shown in Fig.Q8 by flexibility method. The cross-sectional areas A and E for all members is the same. (16 Marks)

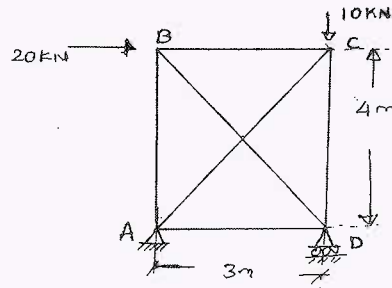


Fig.Q8

Module-5

- 9 a. Analyse the continuous beam shown in Fig.Q9(a) by stiffness method. Draw bending moment diagram. (08 Marks)

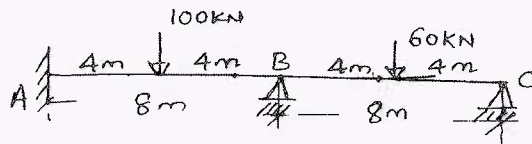


Fig.Q9(a)

- b. Analyse the portal frame shown in Fig.Q9(b) by stiffness method. Draw bending moment diagram. (08 Marks)

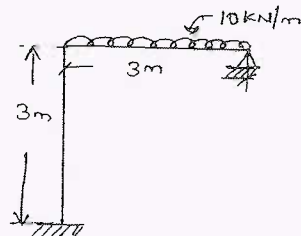


Fig.Q9(b)

OR

- 10 Using stiffness method determine the displacements at the joint 'B' of a pin-jointed frame shown in Fig.Q10. Also calculate the forces in the members AB and BC due to given loading. The values of area of cross-section are indicated. Take $E = 2 \times 10^5 \text{ N/mm}^2$. (16 Marks)

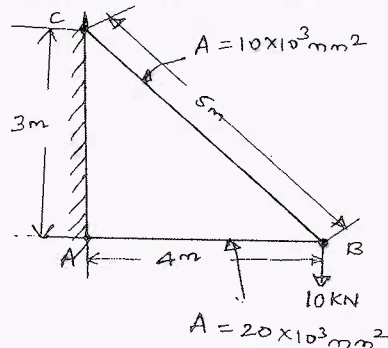


Fig.Q10

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15CV53

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

Time: 3 hrs.

Max. Marks: 80

**Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. Use of IS : 6403 is permitted.**

Module-1

- 1 a. Enumerate the objectives of subsurface exploration. (04 Marks)
b. Explain with reference to soil surplus : Area ratio , Inside clearance , Outside clearance and Recovery ratio. (04 Marks)
c. Estimate the position of ground water table from the following data :
Depth upto which water is boiled out is 32m. Water raise in the first day : 2.4m ,
Second day : 2.0m and Third day : 1.6m. (08 Marks)

OR

- 2 a. Distinguish between undisturbed , disturbed and representative soil samples. What are the tests conducted on these samples in the laboratory? (05 Marks)
b. Explain 'Seismic refraction method' of soil exploration, with a neat sketch on its mechanism. (06 Marks)
c. What is a Bore hole log? List the information recorded in it. (05 Marks)

Module-2

- 3 a. What do you understand by 'Pressure bulb'? Illustrate with a sketch. (05 Marks)
b. A circular area 6m is diameter , carries a uniformly distributed load of 10kN/m^2 . Plot the variation of vertical stress at depths 2m , 4m and 8m. (06 Marks)
c. Explain the principle of 'New - marks chart'. (05 Marks)

OR

- 4 a. What are different types of settlements of footings? Explain. (04 Marks)
b. Estimate the immediate settlement of a footing of size $2\text{m} \times 3\text{m}$ resting at a depth of 1.5m in sandy soil whose compression modulus is 10N/mm^2 . Footing is expected to transmit a unit pressure of 200kN/m^2 . Poisson's ratio of soil is 0.3 and influence factor for footing is 1.06. (04 Marks)
c. A saturated clay 8m thick underlies a proposed new building. The existing overburden pressure at the centre of clay layer is 300kN/m^2 and load due to new building increases the pressure by 200kN/m^2 . The liquid limit of soil is 75% with field water content = 50% and $G_s = 2.7$. Estimate consolidation settlement. (08 Marks)

Module-3

- 5 a. Explain step by step procedure of Culmann's graphical construction for determination of Active pressure. (04 Marks)
b. A 4.5m high retaining wall retains a cohesive soil with $C = 10\text{kN/m}^2$, $\phi = 20^\circ$ and $\gamma = 16\text{kN/m}^3$. Calculate the depth of tension cracks and critical depth. (04 Marks)
c. A retaining wall 6.6m high retains a cohesionless soil whose properties are $\phi = 25^\circ$, $G = 2.6$ and $e = 0.6$. The water table is at a depth of 2.1m below GL. Draw the earth pressure diagram and calculate magnitude and position of active earth pressure above the base of the wall. (08 Marks)

1 of 2

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.

OR

- 6 a. What are the causes of slope failure? List and enumerate the types of failures in finite slopes. (03 Marks)
- b. List and enumerate the types of failures in finite slopes. (03 Marks)
- c. An embankment 6m high has a slope of 1V : 2H. The soil properties are $C = 5\text{kN/m}^2$, $\phi = 30^\circ$ and $\gamma = 19\text{kN/m}^3$. A trial slip circle of radius 8.8m and passing thro' the toe has its centre at the same level as the top of embankment. Find the factor of safety by the 'method of slices'. (10 Marks)

Module-4

- 7 a. Define Ultimate bearing capacity, Safe bearing capacity and Allowable bearing pressure. (03 Marks)
- b. List the assumption made in Terzaghi's b.c theory. (03 Marks)
- c. Determine the safe bearing capacity of a square footing of side 1.8m, located at a depth of 1.5m below GL in a soil having $\gamma = 16.2\text{kN/m}^3$, $C = 15\text{kN/m}^2$ and $\phi = 35^\circ$. Take $N_c = 57.8$, $N_q = 41.1$ and $N_r = 42.4$ with FS = 3. Assume water tank at great depth, what will be the SBC if WT rises to the base of footing. (10 Marks)

OR

- 8 a. Explain the three modes of shear failure below the footing, with neat sketches. (04 Marks)
- b. Discuss the effect of size and shape on the bearing capacity of footing on :
i) Sand ii) Clay. (04 Marks)
- c. Proportion a square footing to carry a load of 900kN from a column $400 \times 400\text{mm}$ in section and located at a depth of 1.5m below GL. The soil has $C = 0$, $\phi = 36^\circ$, $\gamma = 17.5\text{kN/m}^3$ above water table and $\gamma_{\text{sat}} = 20\text{kN/cm}^3$ below water table(WT). The WT is at the base of the footing. Permissible settlement is 25mm, Corrected N - Value = 30. Use a FS = 2. [Use of IS : 6403 is permitted]. No structural design required. (08 Marks)

Module-5

- 9 a. Classify the pile foundations according to material and function, with neat figures. (04 Marks)
- b. Explain in detail, the principle associated with determination of pile load capacity using static formula. (04 Marks)
- c. A 12m long, 30mm dia. pile is driven in uniform deposit of sand with $\phi = 40^\circ$. The W.T is at great depth. The average dry unit weight of sand is 18kN/m^3 . Using $N_q = 137$, calculate the safe load capacity of single pile with a FS = 2.5 and angle of wall friction (δ) = 30° . (08 Marks)

OR

- 10 a. What is meant by efficiency of pile groups? Discuss Feld's rule for its determination. (04 Marks)
- b. What is Negative friction? Under what situation negative skin friction occurs. (04 Marks)
- c. Calculate the safe load carrying capacity of a 16 pile group arranged in a square pattern with each pile is of 400mm diameter, 9m length and with a spacing of 1.2m c/c. The soil is 14m deep clay with unconfined strength of 100kN/m^2 , $r = 16\text{kN/m}^3$ and $r^1 = 9\text{kN/m}^3$ with adhesion factor (α) = 0.7. W.T is 1m below GL. Use a FS = 2.5. (08 Marks)

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15CV/CT551

Fifth Semester B.E. Degree Examination, June/July 2019 Air Pollution and Control

Time: 3 hrs.

Max. Marks: 80

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. Assume missing data suitably.

Module-1

- 1 a. Write definition of Air Pollution. Explain the various sources of Air Pollution. (08 Marks)
b. Discuss the effects of following pollutants on human and vegetation :
i) Carbon monoxide ii) Oxides of Nitrogen iii) Sulphur dioxide iv) Hydrocarbons. (08 Marks)

OR

- 2 a. Discuss in brief units and measurements of Air Pollutants. (08 Marks)
b. What is Inversion? Explain different types of Inversion, with neat sketch. (08 Marks)

Module-2

- 3 a. What is Maximum mixing depth? How is it determined? (08 Marks)
b. Explain with neat sketch, the various types of Plume behaviour under different stability condition. (08 Marks)

OR

- 4 a. Write definition for Plume rise. Give different formulas used to calculate the Plume rise. (08 Marks)
b. Estimate the effective height of stack with the following data :
i) Physical stack height = 200m ii) Inside diameter of stack of exit = 1m
iii) Wind velocity = 3.5 m/sec iv) Air temperature = 15°C
v) Pressure = 1000 milli bars vi) Stack gas velocity = 9m/sec
vii) Stack gas temperature = 150°C. (08 Marks)

Module-3

- 5 a. Identify the basic considerations of air sampling. (08 Marks)
b. Explain the procedure for monitoring SPM in ambient air (High volume air sampler) (08 Marks)

OR

- 6 a. Illustrate with neat sketch, sampling train for particulate matter collection in stack. (08 Marks)
b. Explain in brief Monitoring and analysis of SO_x and NO_x in brief. (08 Marks)

Module-4

- 7 a. Identify the factors affecting selection of particulate control devices. (08 Marks)
b. Examine the operational problems encountered in fabric filter. Mention factors affecting the Efficiency of fabric filter. (08 Marks)

OR

- 8 a. Explain with neat sketch construction, working of ESP. (08 Marks)
b. Explain the advantages and disadvantages of cyclone separator. (08 Marks)

1 of 2

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.

Module-5

- 9 a. Assess the adverse effects of vehicle exhausts. (08 Marks)
b. Justify what is noise pollution. What are the sources of noise pollution? (08 Marks)

OR

- 10 a. Rate the effect of: i) Acid Rain ii) Global warming. (08 Marks)
b. Explain in brief the case history of Bhopal gas Tragedy. (08 Marks)

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15CV561

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

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Explain the interdependency of "land use and transport" with a diagram. (10 Marks)
b. Discuss briefly the PIEV theory. (06 Marks)

OR

- 2 a. Describe the fundamentals of traffic flow. (06 Marks)
b. A passenger car weighing 3 tonnes is required to accelerate at a rate of 3m/sec^2 in the first gear from 9 speed of 10 kmph to 25kmph. The gradient is +1% and road has a black topped surface. The frontal projection area of the car is 2m^2 . The car tyres have radius of 0.33m. The rear axle gear ratio is 3.82 : 1 and the first gear ratio is 2.78 : 1. Calculate the speed of the engine. The radius and deformation factor for tyres is 0.36 and 0.95 respectively. Assume transmission efficiency as 0.88 and $f = 0.02$, $c_a = 0.39$. (10 Marks)

Module-2

- 3 a. Explain the different types of classified volume survey presentation. (06 Marks)
b. Two vehicles A and B approaching at right angles, A from west and b from south, collide with each other. After collision, vehicle 'A' skids in a direction 50° N of west and vehicle 'B' 60° E of north. The initial skid distances of vehicles 'A' and 'B' are 38m and 20m respectively before collision. The skid distance after collision are 15m and 36m respectively. If the weights of vehicles 'A' and 'B' are 4.0 and 6.0T. Calculate the original speeds of vehicle. Assume $f = 0.55$. (10 Marks)

OR

- 4 a. Explain concept of Level Of Service (LOS) and its applications. (06 Marks)
b. The table Q4(b) below gives the consolidated data of spot speed studies on a section of a road. Determine : i) the upper and lower values or speed limits for installing speed regulations ii) modal speed for the range.

Table Q4(b) : Speed Studies

Speed range kmph	Number of speed observations	Speed range kmph	Number of speed observations
0 - 10	0	50 - 60	216
10 - 20	11	60 - 70	68
20 - 30	30	70 - 80	24
30 - 40	105	80 - 90	0
40 - 50	233		

(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 e.g. 42+8 = 50, will be treated as malpractice.

Module-3

- 5 a. At a right angled intersection of two roads, road 1 has four lanes and road 2 has two lanes with a width of 12m and 6.6m respectively. The volume of traffic approaching the intersection during design hour are 900 and 743 PCU/hr on the two approaches of road 2. design the signal timings as per IRC. (12 Marks)
- b. Explain the significant roles of traffic control personnel. (04 Marks)

OR

- 6 a. Explain the three types of traffic signs with 3 examples for each with diagrams. (10 Marks)
- b. Explain the design factors to be considered for design of rotary intersection. (06 Marks)

Module-4

- 7 a. Describe the causes of road accidents and also suggest preventive measures to control accidents. (08 Marks)
- b. Describe the various environmental hazards due to traffic in urban areas. (08 Marks)

OR

- 8 a. Explain the arrangement of street lighting in urban areas and show the lighting arrangement sketch for signalized and rotary intersections. (08 Marks)
- b. Explain the importance and promotion of non motorized transport. (08 Marks)

Module-5

- 9 a. Explain the various methods of traffic segregation. (08 Marks)
- b. Explain the concept of area traffic management system control (ATC) with an example. (08 Marks)

OR

- 10 a. Explain applications of Intelligent Transport System (ITS). (08 Marks)
- b. Explain parking pricing and congestion pricing methods to control traffic management. (08 Marks)

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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 300×600 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 900×110 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 300×450 mm to carry a udl of 25kN/m over a span of 4mt. 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:
 $L_y = 7500$ mm $L_x = 3000$ mm
Simply supported on four sides
L.L = 4 kN/m^2 F.F. = 1 kN/m^2
M.20 concrete, Fe415 steel
Sketch the details of reinforcement (Plan). (16 Marks)

- 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)

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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)

1 of 2

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
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- 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)

CBCS SCHEME

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15CV61

Sixth Semester B.E. Degree Examination, June/July 2019 Construction Management and Entrepreneurship

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. What are the characteristics of Management and explain any two characteristics of Management? (08 Marks)
b. Explain the advantages and disadvantages of Planning. (08 Marks)

OR

- 2 a. Explain the purpose of planning process. (08 Marks)
b. Explain the Critical Path Method (CPM). (08 Marks)

Module-2

- 3 a. What are the factors affecting the productivity? (08 Marks)
b. Explain the function of Materials Management. (08 Marks)

OR

- 4 a. What are the advantages of utilizing the construction equipments? (08 Marks)
b. List out the various classification of the construction equipment and explain any one type of construction equipment. (08 Marks)

Module-3

- 5 a. Define Inspection and explain the types of inspection. (08 Marks)
b. Explain Integrity and trust worthiness. (08 Marks)

OR

- 6 a. Define Quality and what are the dimensions of quality. (08 Marks)
b. Differentiate between Moral the Ethics. (08 Marks)

Module-4

- 7 a. Explain the principles of Engineering Economy. (08 Marks)
b. Differentiate between Micro and Macro Economics. (08 Marks)

OR

- 8 a. Determine the effective interest rate for a nominal annual rate of 8% that is compounded.
i) Daily ii) Monthly iii) Quarterly iv) Semi Annually. (08 Marks)
b. A person estimates an expenditure of Rs 10 lakh for her daughters medical college from now. He plans to deposit an equal amount at the end of every year for next 10 years at a rate of interest 8% compounded annually. Find the equivalent amount that must be deposited at the end of every year for next 8 years. (08 Marks)

Module-5

- 9 a. What are the function of Entrepreneurship? (08 Marks)
b. List out the various objectives and functional activities of Karnataka State Finance Corporation. (08 Marks)

OR

- 10 a. What are the Barriers to Entrepreneurship? (08 Marks)
b. Explain the characteristics or importance of market plan. (08 Marks)

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CBCS SCHEME

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15CV62

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

Design of Steel Structural Elements

Time: 3 hrs.

Max. Marks: 80

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.

2. Use of IS : 800 – 2007 and steel tables are permitted.

Module-1

- What are the advantages and disadvantages of using steel structure? (05 marks)
 - Explain briefly limit state method of design of structure. Mention the limit states. (05 marks)
 - What are rolled used steel sections? Mention different types of RS sections used in constructions. (06 Marks)

OR

- Explain the terms : i) plastic hinge ii) collapse mechanism. (03 marks)
 - Find the shape factor and plastic moment capacity for a built up beam section shown in fig.Q2(b). (05 Marks)

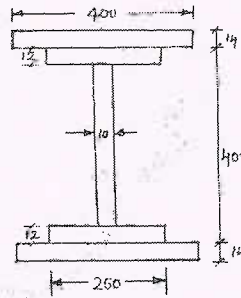


Fig.Q2(b)

- Determine the plastic moment capacity (M_p) for the beam loaded as shown in Fig. Q2(c). Use load factor = 1.50.

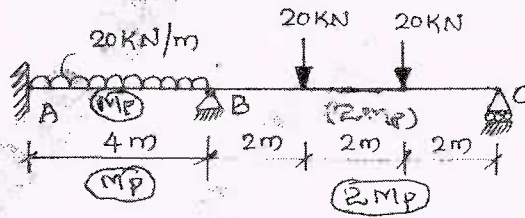


Fig.Q2(c)

(08 Marks)

Module-2

- Explain various modes of failure of bolted connections. (06 Marks)
 - Mention any four advantages and disadvantages of HSFG Bolts. (04 Marks)
 - An ISA 100mm × 100mm × 10mm carries a load of 100kN. It is to be joined with a 12mm thick gusset plate. Design the joint using HSFG bolts of 16mm diameter and grade 8.8, when i) no slip is permitted ii) slip is permitted. Steel is of grade Fe410. (06 Marks)

OR

- What are common defects in welding? Explain briefly with neat sketches. (06 Marks)
 - A tie member of roof truss consists of 2 ISA 100 × 75 × 8mm and are connected to both the sides of 10mm gusset plate, by longer legs. Factored axial force in the member is 500kN. Design the welded joint by providing weld i) along two parallel sides of angle ii) along all 3 sides of connected angle. Assume shop weld. (10 Marks)

1 of 2

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Module-3

- 5 a. Explain the possible modes of failure of axially loaded columns. (03 Marks)
- b. A double angle discontinuous strut ISA 150 × 75 × 10mm, long leg back to back is connected to either side of 10mm gusset plate by 2 bolts in a row. The length of strut between point of intersection is 3.5m and are tack bolted all along the length. Determine the safe load that the strut can carry. (05 Marks)
- c. A built up column consists of ISMB 250@ 366N/m with two side plates 250mm × 10mm as shown in Fig.Q5(c). Compute the maximum compressive load that the column can carry, if the length of the column is 6.25m ends of columns are restrained in position at both the ends, and one end is restrained against rotation. (08 Marks)

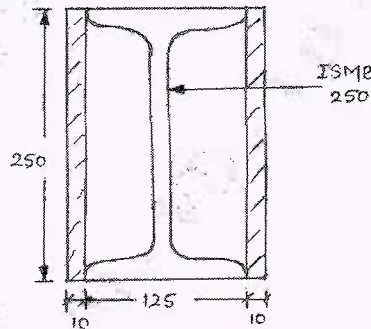


Fig.Q5(c)

OR

- 6 Design a built up column comprising of two channel section placed back to back to carry a load of 1000 kN over a length of 10m. The ends of compression member are restrained in position but not in direction/rotation. Design single lacing system also with 20mm diameter bolts for connections. (16 Marks)

Module-4

- 7 a. What are lug angles? Briefly explain advantages and disadvantages of using lug angles in bolted connections. (06 Marks)
- b. Design an unequal single angle section to carry a load of 140 kN in tension. Use M20, 4.6grade bolts. The length of the member is 3m. (10 Marks)

OR

- 8 a. Distinguish between slab base and gusseted base. (03 Marks)
- b. Design a gusseted base for a built up column ISHB 350@ 674 N/m with 400mm × 20mm flange plates carrying an axial load of 2000 kN. Assume M₂₀ grade concrete and M₂₄ bolts of grade 4.6. SBC = 200 kN/M². (13 Marks)

Module-5

- 9 a. Briefly explain the factors affecting lateral stability of beams. (04 Marks)
- b. Design one of the internal beams of span 6m (clear), spaced in the hall at 3.5m c/c, supports 130mm thick RCC slab. Take imposed load of 5kN/m² and finishes 1.5 kN/m². Bearing of wall 300mm. The beam is laterally restrained. Check for shear, moment capacity and deflection. (12 Marks)

OR

- 10 a. Write a note on Laterally unsupported beam. (04 Marks)
- b. Briefly explain different types of seated connections. (05 Marks)
- c. Explain the necessities of providing column splices. With neat sketches write about any two types of column splices. (07 Marks)

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15CV63

Sixth Semester B.E. Degree Examination, June/July 2019 Highway Engineering

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Mention different modes of transportation. Explain the characteristics of road transport in comparison with other systems. (08 Marks)
- b. Determine the length of different categories of roads in a state in India by the year 2021 as per 3rd year road plan formulae. The area of state is 3,08,000 km². Number of Towns as per 1981 census was 276. Overall road density aimed at 82km per 100km². (08 Marks)

OR

- 2 a. What are the types of roads and its classification? Briefly outline classification of urban roads. (08 Marks)
- b. Three new roads A, B and C are to be completed in a district during a five year plan period. Workout the order of priority for phasing the plan programme by maximum utility principle, from the data given below. Adopt utility unit of 1.0 for serving a village with population range 2000-5000, for catering for 1000T of agricultural products or per 100T of industrial products. Assume any other required data suitably.

Road	Length km	Number of village served population			Productivity 1000T	
		<2000	2000 – 5000	>5000	Agricultural	Industrial
A	15	10	8	3	15	1.2
B	12	16	3	1	11	0.0
C	18	20	10	2	20	0.8

(08 Marks)

Module-2

- 3 a. Clarify the features of ideal alignment and enumerate factors affecting alignment. (08 Marks)
- b. Write a brief outline on engineering surveys. (08 Marks)

OR

- 4 a. With neat sketches illustrate different cross section elements. (08 Marks)
- b. The speed of overtaking and overtaken vehicles are 70 and 40 kmph respectively on a two way traffic road. If the acceleration of overtaking vehicle is 0.99 m/sec².
- Calculate safe overtaking sight distance.
 - Mention the minimum length of overtaking zone
 - Draw a neat sketch of the overtaking zone and show the positions of the sign posts.

(08 Marks)

Module-3

- 5 a. With neat sketches illustrate conduction of plate load test to determine modulus of subgrade reaction. (08 Marks)
- b. Distinguish between :
- Tar and Bitumen
 - Cutback and Emulsion.

(08 Marks)

OR

- 6 a. Enumerate different types of pavements with their component parts and functions of each component. (08 Marks)
- b. Calculate ESWL of a dual wheel assembly carrying 2004 kg each for pavement thickness of 15, 20 and 25 cms. Centre to centre tyre spacing = 27cm and distance between the walls of the tyres = 11cm. Use graphical method. (08 Marks)

Module-4

- 7 a. Briefly outline the design procedure of soil aggregate mixes by Rothfuch's method. (08 Marks)
- b. Explain the procedure of marshall mix design of Bituminous mixes. (08 Marks)

OR

- 8 a. Enumerate in detail the requirements, specifications of materials and the construction steps for a wet mix macadam (WMM) layer. (08 Marks)
- b. Explain in detail the requirements, specifications of materials and the construction steps for pavement quality concrete. (08 Marks)

Module-5

- 9 a. Explain with sketches how the subsurface drainage system is provided to lower the water table. (08 Marks)
- b. 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 the trapezoidal section to be 1.0m 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 $n = 0.02$. (08 Marks)

OR

- 10 a. Briefly describe the different methods of economic analysis of a highway. (08 Marks)
- b. Calculate the annual cost of a stretch of a highway from the following particulars:

Item	Total cost (Rs. in lakh)	Estimated life (years)	Rate of interest (%)
Land	12	100	6
Earthwork	9.0	40	8
Bridges and culverts	7.5	60	8
Pavement	14	15	10

(08 Marks)

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15CV64

Sixth Semester B.E. Degree Examination, June/July 2019 Water Supply and Treatment Engineering

Time: 3 hrs.

Max. Marks: 80

- Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. Assume suitable data wherever necessary.*

Module-1

- 1 a. Explain the importance and need for protected water supply. (06 Marks)
b. Enumerate the fire demand in water supply. (03 Marks)
c. The population of a city in three consecutive years i.e. 1991, 2001 and 2011 in 80,000, 2,50,000 and 4,80,000 respectively. Determine: (i) The saturation population (ii) The equation of logistic curve (iii) The expected population in 2021. (07 Marks)

OR

- 2 a. What is meant by per capita demand? (02 Marks)
b. Explain geometrical and incremental increase method of population forecasting. (07 Marks)
c. The following population data are available for a town. Estimate the probable population in the year 2031 by geometrical and incremental increase methods:

Year	1971	1981	1991	2001
Population	80,000	1,20,000	1,68,000	2,28,000

(07 Marks)

Module-2

- 3 a. Explain the objectives of water treatment. (06 Marks)
b. List the physical water quality characteristics. (03 Marks)
c. Discuss the complete sequence of water treatment plant with a flow diagram. (07 Marks)

OR

- 4 a. What are the objectives of water quality management? (05 Marks)
b. Discuss the effect of excess concentration of hardness, nitrogen and fluoride in drinking water. (06 Marks)
c. Explain the importance of bacteriological tests in determining the quality of drinking water. (05 Marks)

Module-3

- 5 a. Define surface flow rate and detention period for a sedimentation tank. (04 Marks)
b. Describe briefly the various constituents of coagulation sedimentation tank. (06 Marks)
c. A rectangular settling tank without mechanical equipment is to treat 1.8 MLD of raw water. The sedimentation period is to be 4h, the velocity of flow is 8 cm/min, and the depth of the water and sediment is 4.2 m. If an allowance of 1.2 m for sediment is made, what should be (i) the length of the basin (ii) the width of the basin? (06 Marks)

OR

- 6 a. Explain with a neat sketch the working and back washing of rapid gravity sand filter. (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.

- b. Find the area and number of units required for rapid sand filtration to serve a population of 2,00,000. Take average rate of demand = 160 lpcd and maximum demand as 1.8 times.
 Rate of filtration = $5 \text{ m}^3/\text{h}/\text{m}^2$
 Size of each filter = $10 \text{ m} \times 5 \text{ m}$ (06 Marks)

Module-4

- 7 a. List the requirement of good disinfectant. (03 Marks)
 b. Explain the theory of chlorination of water with chemical equations. (08 Marks)
 c. Enumerate the treatment of swimming pool water. (05 Marks)

OR

- 8 a. What is softening of water? Discuss the lime soda process of water softening with chemical equations. (10 Marks)
 b. Explain the reverse osmosis process of softening of water. (06 Marks)

Module-5

- 9 a. Discuss the factors governing the selection of source of water for water supply scheme. (04 Marks)
 b. Explain with a neat sketch a wet intake tower structure. (06 Marks)
 c. For water supply of a town, water is pumped from a river 3 km away into a reservoir. The maximum difference of levels of water in river and the reservoir is 20 m. The population of the town is 50000 and per capita demand is 120 c/d. If pumps are to operate for a total of 8 hr and the efficiency of pumps is 80%, determine the horse power of the pumps. Assume average daily demand as 1.5 times the average, $f' = 0.03$ and $v = 2\text{m}/\text{sec}$. (06 Marks)

OR

- 10 a. Discuss the various methods of distribution of water and give the advantages and disadvantages of any two systems. (08 Marks)
 b. What is service reservoir? Explain with a neat diagram. (08 Marks)

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15CV651

Sixth Semester B.E. Degree Examination, June/July 2019 Solid Waste Management

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Explain the different sources and types of solid wastes. (06 Marks)
b. Estimate the density of a solid waste sample, on as discarded basis. Take 1000kg sample. (10 Marks)

Component	% by mass	Density (kg/m ³)
Food waste	20	300
Paper	40	100
Plastics	5	90
Garden trimmings	15	150
Wood	5	250
Tin cans	5	100
Cardboard	10	80

OR

- 2 a. With a neat sketch, explain hauled container system and stationary container system. (10 Marks)
b. With a neat sketch, explain the different types of Transfer stations. (06 Marks)

Module-2

- 3 a. Explain the process of incineration with the aid of neat sketch. (08 Marks)
b. Explain the following :
i) Mechanical volume reduction ii) Component separation. (08 Marks)

OR

- 4 a. Describe the effect of 3T's in incineration process of solid waste. (08 Marks)
b. Write a note on Air pollution and its control. (08 Marks)

Module-3

- 5 a. What are the important factors for the design consideration in Anaerobic composting? (06 Marks)
b. Write a note on Vermi composting. (04 Marks)
c. Determine the amounts of oxygen required to oxidize 1 tonne of waste and also to stabilize Ammonia in having the chemical equation C₅₀ H₁₀₀ O₄₀ N. (06 Marks)

OR

- 6 a. Determine the landfill area required for municipality with a population of 50,000 given that Solid waste generation = 350gm/person/day ; Compacted density of landfill = 504 kg/m³ ; Average depth of compacted solid waste = 3m. (04 Marks)
b. What is Leachate? What are its effects on ground water? (04 Marks)
c. List and explain briefly the various factors that must be considered in evaluating a potential landfill site. (08 Marks)

1 of 2

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
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Module-4

- 7 a. Explain the Bio – medical waste disposal methods. (08 Marks)
b. List the various sources of e – waste, hazardous and construction waste. (08 Marks)

OR

- 8 a. Explain the categories of hazardous waste and its method of disposal. (08 Marks)
b. Discuss about collection , treatment and disposal of construction waste. (08 Marks)

Module-5

- 9 a. Describe about the various types of incinerations. (08 Marks)
b. Write short notes on :
i) Energy recovery operation ii) Significance of Reuse in solid waste. (08 Marks)

OR

- 10 a. Define Pyrolysis. Briefly explain the process of pyrolysis. (08 Marks)
b. Explain the design criteria for incineration. (08 Marks)

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Sixth Semester B.E. Degree Examination, June/July 2019 Water Resource Management

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Write a detailed note on availability of 'Global Water Resources' and distribution of 'Global Fresh Water'. (08 Marks)
b. Explain 'Major', 'Medium' and 'Minor' water basins in India and list a minimum of six major water basins identified in our country. (08 Marks)

OR

- 2 a. Explain water balance equation and its importance. (08 Marks)
b. Explain the process of 'Hydrologic Cycle' along with representative diagram. (08 Marks)

Module-2

- 3 a. Explain in detail the necessity of water resources planning and management. (08 Marks)
b. Write a detailed note on post planning and management issues to be addressed in case of a river valley development project. (08 Marks)

OR

- 4 a. What are the planning and management aspects in case of water resource development project? (06 Marks)
b. Explain in detail the following:
i) Top-down approach of water resource planning and management.
ii) Demand based bottom-up approach of water resource management. (10 Marks)

Module-3

- 5 a. Analyze the four basic principles of "Integrated Water Resources management" recommended as per Dublin's International conference on 'Water and Environment' (1992). (10 Marks)
b. Comment on the 'Role of Government' in providing 'Enabling Environment' for achieving integrated water resource management in our country. (06 Marks)

OR

- 6 a. Bring out the advantages/disadvantages of private sector involvement in the field of water resources management. (08 Marks)
b. Explain the process of 'integrated water resources management' involving integration of natural water system and human system. (08 Marks)

Module-4

- 7 a. Elaborate the salient features included in the 'National Water Policy (2002)' and discuss the water sector reforms needed to be adopted in India. (10 Marks)
b. Discuss the role of 'Water user associations' and its effectiveness for effective water governance and management of water resources. (06 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.

OR

- 8 a. Write a detailed note on existing legal framework for water and constitutional provisions for water usage by the citizens of India. (08 Marks)
- b. Elaborate the role of local institutions and its importance for good water governance. (08 Marks)

Module-5

- 9 a. Define the term 'Rain Water Harvesting'. Elaborate Rural technological systems being adopted for water conservation. (08 Marks)
- b. Explain the design principles for small water harvesting structures for a micro catchment. (08 Marks)

OR

- 10 a. What is ground water recharge? With neat sketches explain
i) Basin method and ii) Pit method of Ground Water recharge. (10 Marks)
- b. Explain the importance of water harvesting and conservation along with basic principles involved in the process. (06 Marks)

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