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10CV82

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

Design and Drawing of Steel Structures

Time: 4 hrs. Max. Marks:100

Note: 1. ***Answer any ONE full question, each from PART-A and PART-B.***

2. ***Use of IS-800, SP(6)-1 and steel tables is permitted.***

PART – A

1 a. An ISMB 350 is connected to the flange of column ISHB 400 using 20 mm diameter black bolts of Grade 5.6. Two angles ISA 110 × 110 × 8 mm were used for framed connection. The length of angle is 260 mm. Four bolts were used to connect the angles with the column. Also another set of four bolts were used to connect angles with the web of the beam. Draw to a suitable scale.

i) Front view and

ii) Side view with all details. **(15 Marks)**

b. A stiffened seated connection has the following details. An ISMB500@869 N/m is connected to the web of column ISHB300@630 N/m using welds. The clip angle ISA 100 × 100 × 6 mm of length 120 mm was used. The size of weld was 5 mm. The seat plate of size 200 × 90 × 18 mm stiffening plate of thickness 12 mm and length 180 mm was used. The width of stiffener plate was equal to the width of seat plate and reduced to 50 mm at the bottom. Use 12 mm fillet weld. Draw to a suitable scale.

i) Front view and

ii) Side view **(15 Marks)**

2 a. A column section ISHB250@547N/m is supported over another column section ISHB300 @724 N/m. The bearing plate thickness 50 mm. Use splice plate of thickness 6 mm. Use 8 numbers of 20 mm bolt on one side of the joint for each flange. Draw to a suitable scale.

i) Front view and

ii) Side view **(15 Marks)**

b. A gusseted base for ISHB400@822 N/m with flange plate of 300 × 12 mm one on each flange to be detailed with the data.

i) Base plate 720 × 720 × 16 mm

ii) Gusset plate 16 mm thick and 360 mm depth

iii) Gusset angles 2ISA 150 × 115 × 15 mm

Gusset plate and the flange plate connected by 10 bolts on one side of columns. Provide 12 bolts for connecting gusset plate to gusset angle. Diameter of bolts 20 mm. Draw to a suitable scale.

i) Sectional elevation

ii) Side view **(15 Marks)**

PART – B

3 Design a welded plate girder to carry a superimposed load of 50 kN/m and two concentrated loads of 200 kN each at one third span points. The effective span of the plate girder is 20 m. Assume that the girder is laterally supported throughout its length. **(40 Marks)**

Draw to a suitable scale.

i) Half sectional elevation

ii) C/section at midspan and at support. **(30 Marks)**

4 Design a simply supported Gantry girder to carry a superimposed load for the following data:

Span of the girder = 20 m
Span of the gantry girder = 7 m
Capacity of the crane = 220 kN
Self weight of crane excluding the crab = 200 kN
Weight of the crab = 60 kN
Wheel base distance = 3.4 m
Minimum hook approach = 1.1 m
Self weight of rail = 0.3 kN/m
Height of rail = 75 mm **(40 Marks)**

Draw to a suitable scale:
i) C/section of the gantry girder
ii) Plan details **(30 Marks)**

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10CV833

Eighth Semester B.E. Degree Examination, Dec.2018/Jan.2019
Pavement Design

Time: 3 hrs. Max. Marks:100

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

PART – A

1 a. With the help of sketches mention the various layers of flexible and rigid pavements. Write the functions of each layer. **(10 Marks)**

b. Distinguish between highway pavement and airfield pavement. **(10 Marks)**

2 a. State assumptions and limitations of Boussinesq's theory. **(06 Marks)**

b. Find the vertical stress distribution in a homogeneous pavement upto a depth of 60cms. Due to a bullock cart with wheel load 600kg on a vertical plane.

i) Along the line of action of load.

ii) 5cm away from the line of action of load. **(14 Marks)**

3 a. Explain the ESWL concept with neat figure. **(08 Marks)**

b. Find the ESWL by graphical method for a dual wheel load assembly with 2000kg on each wheel and tyre pressure of 6.5kg/km^2 if the centre to centre spacing between the wheels is 25cm. Consider the pavement thickness of 25cm and 45cm. (Use plain graph paper). **(12 Marks)**

4 a. Design the pavement section by triaxial leansus method using the following data:
Wheel load = 41kN
E-value of subgrade soil = 10N/mm^2
E-value of base course material = 40 N/mm^2
E-value of wearing course = 100 N/mm^2 which is 7.5cm thick
Traffic coefficient = 1.5
Rainfall coefficient = 0.9
Radius of contact area = 150mm
Design deflection = 2.5mm
Sketch the pavement section. **(10 Marks)**

b. Explain the design of flexible pavement by revised CBR method as per IRC quick lines. **(10 Marks)**

PART – B

5 a. Explain the following:

i) Types and objectives of joints in cement concrete pavement.

ii) Critical combination of stress in a CC pavement. **(10 Marks)**

b. A cement concrete pavement has a thickness of 20cms, has 2 lanes of slab width a 3.35m coefficient of friction between slab and subgrade = 1.5. Weight of slab = 480 kg/m^2. Allowable working stress in steel = 1400 kg/km^2. Maximum permissible bond stress,

i) Plain bars, 17.5 kg/km^2.

ii) Deformed bars, 24 kg/cm^2. Design a tie – bar system. **(10 Marks)**

6 a. Explain different types of stresses due to wheel loads. **(10 Marks)**

b. Using the data given below, calculate the wheel load stresses at i) Interior ii) Edge and iii) Corner regions of a cement concrete pavement using Westergaard's stress equation. Also determine the probable location where the crack is likely to develop due to corner loading. Wheel load P = 5100kg, $E_C = 3.0 \times 10^5$ kg/cm^2, Pavement thickness, h = 18cms, Poisson's ratio of concrete = $\mu = 0.15$, K = 6.0 kg/km^3 and radius of contact area, a = 15cm. **(10 Marks)**

7 a. Explain Benkelman Beam deflection method. **(10 Marks)**

b. What are the requirements of airport pavement? **(10 Marks)**

8 a. Explain failures in flexible pavements. **(10 Marks)**

b. Write short notes on: i) Mud pumping ii) Structural cracks. **(10 Marks)**

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10CV835

Eighth Semester B.E. Degree Examination, Dec.2018/Jan.2019
Industrial Waste Water Treatment

Time: 3 hrs. Max. Marks:100

Note: *1. Answer FIVE full questions, selecting at least TWO full questions from each part.*
2. Draw neat labeled diagram wherever necessary
3. Suitable data can be assumed.

PART – A

1 a. Write the effect of industrial waste water on municipal sewage treatment plants. **(05 Marks)**

b. Define stream sampling and explain in brief the factors to be considered during sampling. **(05 Marks)**

c. Briefly explain effluent and stream standards and legislation to control water pollution. **(10 Marks)**

2 a. Explain self purification o streams with oxygen sag curve. **(10 Marks)**

b. A waste water effluent of 570 *l*/s with a BOD = 55 mg/*l*, DO = 2.5 mg/*l* and temperature of 25°C enters a river where the flow is 30m^3/sec and BOD = 4 mg/*l*. DO = 8.4 mg/*l* and temperature of 17°C. Deoxygenation constant for the waste is 0.10 per day at 20°C. The velocity of water in the river downstream is 0.15 m/s and depth of flow is 1.2m. Determine the following after mixing of waste water. i) Combined discharge; ii) BOD of mix; iii) D.O of mix and iv) Temperature of mix. **(10 Marks)**

3 a. Write short notes on: i) Strength reduction; ii) Neutralization. **(10 Marks)**

b. Equalization and proportioning is of much importance in industrial waste water. Justify with proper procedure. **(10 Marks)**

4 a. Write short notes on: i) Reverse osmosis; ii) Dialysis. **(10 Marks)**

b. Explain the methods for treatment and disposal of sludge solids. **(10 Marks)**

PART – B

5 a. Write the advantages of combined treatment of industrial waste water with domestic waste. **(05 Marks)**

b. Explain the stages of Tanning process. **(05 Marks)**

c. Write the procedure with suitable example for discharge of partially treated and completely treated wastes into streams. **(10 Marks)**

6 a. Describe the characteristics and treatment of waste water from a sugar industry. **(10 Marks)**

b. With a flow diagram explain treatment of cotton textile mill wastes. **(10 Marks)**

7 a. Explain the treatment methods to treat waste water generated from steel industry with a flow diagram and add a note on its waste water characterization. **(10 Marks)**

b. Write short notes on:
i) Reusing and recycling of waste water.
ii) Characteristics of Indian Tannery Industrial Waste Water. **(10 Marks)**

8 a. With a flow diagram, explain the treatment of combined antibiotics and chemical wastes. **(10 Marks)**

b. Write the characteristics of combined effluent of a pulp and paper mill and add its effects of wastes on sewers. **(10 Marks)**

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10CV843

Eighth Semester B.E. Degree Examination, Dec.2018/Jan.2019
Urban Transport Planning

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions, selecting atleast TWO questions from each part.***

PART – A

1 a. Explain the scope of Urban Transport Planning. **(05 Marks)**

b. Discuss the interdependence of the land use and traffic. **(07 Marks)**

c. With a help of flow chart, explain system approach to Urban planning. **(08 Marks)**

2 a. Explain the various stages involved in transport planning. **(10 Marks)**

b. The following information was obtained from a transportation survey of a town, develop a linear regression model for estimating the trips from each zone. If the population in a particular zone increases to 60,000 predict the expected trip generation from that zone. **(10 Marks)**

Zone	1	2	3	4	5	6	7	8
X	52	56	62	66	44	60	40	50
Y	24	22	34	30	24	30	18	26

3 a. Define a 'Zone'. Mention the different factors considered in dividing the whole area into zones. **(10 Marks)**

b. With a neat sketch, explain the road side interview survey method. **(10 Marks)**

4 a. Explain the factors governing the trip generation and attraction. **(10 Marks)**

b. Explain the category analysis with the assumptions. Mention the advantages and disadvantages of this method. **(10 Marks)**

PART – B

5 a. Obtain the future trip table by using : i) Uniform Rate method ii) Average growth factor method. **(10 Marks)**

O \ D	1	2	3
1	50	40	60
2	40	20	30
3	60	30	20

The future trips generated in zone 1, 2, 3 are expected to be 300, 180, 320.

b. The number of trips produced in and attracted to the three zones 1, 2, and 3 are tabulated as follows :

Zone	1	2	3
Trips produced (Pi)	14	33	28
Trips Attracted (Aj)	33	28	14

As a result of calibration the friction factors to be associated with the impedance values between the various zones have been found to be as follows :

Impedance units	1	2	3	4	5	6	7	8
Friction factors	82	52	50	41	39	26	20	13

The impedance values between the various zones can be taken from the following matrix.

O \ D	1	2	3
1	8	1	4
2	3	6	5
3	2	7	4

Distribute the trips between the various zones. (At least two iterations) **(10 Marks)**

6 a. Explain the factors affecting the Model split. **(10 Marks)**

b. With a help of flow diagram, explain the modal split carried out between trip generation and trip distribution. **(10 Marks)**

7 a. Briefly explain the important considerations in selecting a land use transport models. **(10 Marks)**

b. With a flow chart, explain the structure of Lowry model. **(10 Marks)**

8 Write short notes on the following :

a. Moore's algorithm. **(05 Marks)**

b. Diversion curve. **(05 Marks)**

c. Recent developments in model split analysis. **(05 Marks)**

d. Difficulties in transport planning for small and medium cities. **(05 Marks)**

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