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Eighth Semester B.E. Degree Examination, June/July 2015**Advanced Concrete Technology**

Time: 3 hrs.

Max. Marks: 100

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

- 1 a. Clearly mention the four Bogue equations used for estimating potential compound composition of Portland cement. Also mention the two basic assumptions made while developing Bogue equations. Mention its importance. (08 Marks)
- b. Write note on interfacial transition zone in concrete. (04 Marks)
- c. Draw typical stress – strain curves for concrete under :
 - i) Biaxial compression
 - ii) Combined compression and tension
 - iii) Biaxial tension, and mark salient points. (08 Marks)
- 2 a. What are plasticizers? Mention the types of plasticizers. Write brief note on electro chemical activity of super plasticizers. (10 Marks)
- b. With sketch explain the activity of air – entraining agents. (05 Marks)
- c. What are mineral admixtures? Explain briefly the role of i) metakaoline ii) silica fume and iii) fly ash as mineral admixtures. (05 Marks)
- 3 a. Explain briefly the steps involved in concrete mix design as per Bureau of Indian standards. (10 Marks)
- b. Calculate :
 - i) Water-cement ratio to achieve $f_{ck} = 20 \text{ N/mm}^2$ at 28 days assuming 30 samples with standard deviation 4.6 for 43 grade cement
 - ii) Target strength if standard deviation is 5, for $f_{ck} = 20 \text{ N/mm}^2$. (05 Marks)
- c. Mention the relation used for calculating volume of sand and coarse aggregate as per Indian standards, by absolute volume method. (05 Marks)
- 4 a. Explain briefly thermal diffusivity and thermal conductivity. (05 Marks)
- b. Mention the Alkali Silica reaction. What circumstances are required for the Alkali Silica reaction (ASR) to take place? (05 Marks)
- c. Mention the three parameters included in the concrete work specification to ensure required impermeability of concrete. (03 Marks)
- d. Define : i) Durability ii) specific heat iii) Efflorescence. (07 Marks)

PART – B

- 5 a. Sketch a typical layout of the site for RMC plant with auxiliary. Explain any two of the auxiliary in brief. (12 Marks)
- b. Mention the various tests performed to check the properties of fresh self compacting concrete (SCC). Explain any one of them briefly, with sketches. (08 Marks)
- 6 a. Explain briefly the behavior of fibre reinforced concrete under :
 - i) Tension ii) Compression iii) Flexure. (12 Marks)
- b. What is Ferro concrete? Mention its properties with application in civil engineering field. (08 Marks)

- 7 a. Write a brief note on proportioning of light weight concrete. (04 Marks)
b. Explain briefly the salient high performance requirements to produce high performance concrete. (04 Marks)
c. What is high density concrete? Mention its properties and any four important applications. (12 Marks)
- 8 Write short notes on :
a. Pulse velocity method
b. Rheology of concrete
c. Post and pre-cracking FRC beams
d. Marsh cone test. (20 Marks)

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Eighth Semester B.E. Degree Examination, June/July 2015
Design and Drawing of Steel Structures

Time: 4 hrs.

Max. Marks:100

Note: 1. Answer ONE question, from Part-A and ONE question from Part-B.
2. Use of IS:800-2007 and steel table are permitted.

PART – A

- 1** a. A secondary beam ISLB 450 @ 640 N/m is connected to a main beam ISLB 600 @ 975 N/m with top flanges of the beams at the same level. Two angles ISA 100 × 100 × 8 mm are used for connection 5 bolts of diameter 20mm are used to connect each angle to the web of the main beam, 5 bolts of diameter 20mm are used to connect angles with web of secondary beams:
Draw to a suitable scale:
i) Sectional elevation. (08 Marks)
ii) Side view. (07 Marks)
- b. An upper storey column ISHB300 @ 577 N/m is to be spliced with a lower storey column ISHB400 @ 758.5 N/m. The two column are coaxial. Provide 50mm thick bearing plate and 6mm thick flange splice plate. Use 10 bolts of 20mm diameter on each side of the joint in two lines of 5 bolts each for connecting flanges of the columns to flange splice plate.
Draw to a suitable scale:
i) Sectional elevation. (08 Marks)
ii) Side view with details. (07 Marks)
- 2** a. A beam ISMB400 @ 604 N/m is to be connected to the flange of the column ISHB450 @ 907 N/m by means of stiffened connection. Provide top cleat angle ISA 75 × 75 × 6mm and use 4mm fillet weld for connection. Provide 120 × 140 × 16mm bearing plate and stiffening plate 220 × 120 × 12mm. Reduce the width of the stiffening plate to 50mm at the bottom. Use 5mm fillet weld all around for connection.
Draw to a suitable scale:
i) Elevation. (06 Marks)
ii) Side view. (06 Marks)
- b. A gusseted base is to be detailed for a column ISHB 450 @ 855.4 N/m built up with one cover plate of section 250 × 12mm on each flange size of the base plate is 800 × 800 × 20mm. The gusset angles are ISA 150 × 150 × 12mm. The gusset plates are 12mm thick with one plate at each face of the column. Provide 4 bolts of 30mm diameter in 2 rows along one face of column to connect the flange of column, gusset plate and gusset angle. 6 bolts of 20mm diameter, in 2 rows are used to connect gusset plate with each flange of the column. Nominal bolts of 20mm diameter shall be provided for connecting gusset plate and gusset angle on the sides.
Draw to a suitable scale.
i) Plan (06 Marks)
ii) Sectional elevation (07 Marks)
iii) Side view. (05 Marks)

PART – B

- 3 The centre line of a roof truss is as shown in the Fig.Q.3, The magnitude and nature of forces under service conditions are
 Top chord members – 120 kN compression
 Bottom tie members – 100 kN tension
 Interior member – 60 kN tension and 50 kN compression.
 For all the interior members use similar single angle section. Design all the members and use black bolt of grade 4.6 for end connections. Also design a bearing plate and anchor bolts, 4 in numbers for a pull of 60kN to connect the truss to an RCC column 300 × 300 mm of M₂₀ grade concrete. **(40 Marks)**
 Draw to a suitable scale.
 i) Elevation of truss greater than half space. **(10 Marks)**
 ii) Elevation of joint C to a larger scale. **(10 Marks)**
 iii) Elevation of support A. **(10 Marks)**

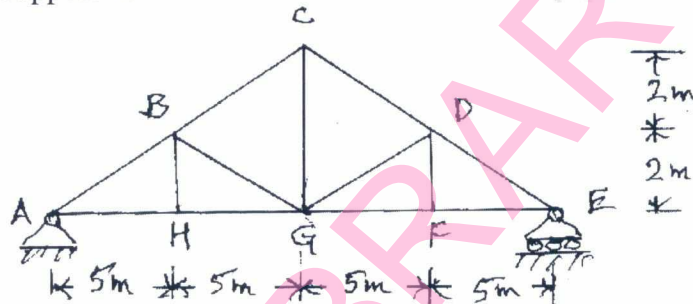


Fig.Q.3

- 4 Design a simply supported Gantry girder for an industrial shed to support an electric overhead crane using the following data:
- | | |
|--|----------|
| Span Gantry girder | - 4m |
| Crane capacity | - 160 kN |
| Weight of the crane excluding the crab | - 250 kN |
| Weight of the crab | - 60 kN |
| Minimum hook approach | - 0.8m |
| Wheel base | - 5.3m |
| Span crane girder | - 20m |
| Height of the rail | - 105mm |

(40 Marks)

Draw to a suitable scale

- i) Cross section of gantry girder **(05 Marks)**
 ii) Plan details **(10 Marks)**
 iii) Elevation. **(15 Marks)**

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

Pavement Design

Time: 3 hrs.

Max. Marks:100

- Note: 1. Answer FIVE full questions, selecting at least TWO questions from each part.**
2. Use of specified charts and tables is permitted.

PART – A

1.
 - a. With a neat sketch of pavement cross section (flexible type), explain the various components and briefly bringout their functions. (10 Marks)
 - b. Briefly explain the desirable characteristics of pavement. (05 Marks)
 - c. Bring out the differences between highway pavements and air field pavements. (05 Marks)
2.
 - a. Explain briefly the factors affecting pavement design. (08 Marks)
 - b. A plate load test conducted with 0.3 m diameter plate on subgrade and on a pavement of thickness 0.4 m sustained pressure of 0.10 MN/m² and 0.40 MN/m² respectively at 5 mm deflection. Design the pavement section for 50 kN wheel load and contact pressure of 0.70 MN/m² for an allowable deflection of 8 mm using Burmisten's approach. If you want to maintain the deflection of 6.5 mm, what would be the required thickness? Use the chart in Fig. Q2 (b). (12 Marks)

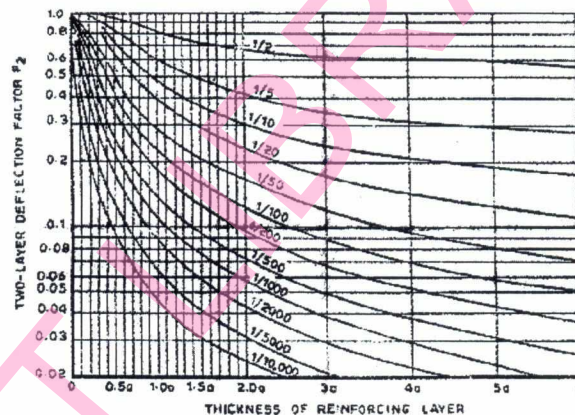


Fig. Q2 (b)

3.
 - a. Calculate the ESWL of a dual wheel assembly carrying 2044 kg each for pavement thickness of 150 mm, 200 mm and 250 mm. Centre to centre tyre spacing is 270 mm and distance between the walls of the tyres is 110 mm. (10 Marks)
 - b. Calculate the design repetitions for 20 years for various wheel loads equivalent to 2268 kg wheel load using the following traffic survey data on a four lane road. The average daily traffic in both the directions was 215. (10 Marks)

Wheel load (kg)	2268	2722	3175	3629	4082	4536
Percentage of total traffic volume (%)	13.17	15.30	11.76	14.11	6.21	5.84

4.
 - a. Explain Mcleod's method of highway pavement design with the help of appropriate charts. (08 Marks)
 - b. Design the pavement section by triaxial test method using the following data:
 Wheel load - 4100 kg ; Radius of contact area - 15 cm; Traffic coefficient, X - 1.5,
 Rainfall coefficient, Y - 0.9, Design deflection, Δ - 0.25 cm;
 E value of subgrade soil, $E_s = 100 \text{ kg/cm}^2$
 E value of base coarse material, $E_b = 400 \text{ kg/cm}^2$
 E value of 7.5 cm thick bituminous concrete surface course = 1000 kg/cm² (12 Marks)

PART – B

- 5 a. Explain the following:
- Modulus of subgrade reaction.
 - Relative stiffness of slab to subgrade.
 - Equivalent radius of resisting section. (10 Marks)
- b. Determine the warping stresses at interior, edge and corner regions in a 25 cm thick concrete pavement with transverse joints at 11 m intervals and longitudinal joints at 3.6 m intervals. The modulus of subgrade reaction (K) is 0.069 N/mm^3 . Assume temperature differential for day conditions to be 0.6°C per cm slab thickness. Assume radius of loaded area as 15 cm for computing warping stress at the corner. Take $e = 10 \times 10^{-6}$ per $^\circ\text{C}$, $E = 0.3 \times 10^5 \text{ N/mm}^2$ and $\mu = 0.15$. Use the chart in Fig. Q5 (b) (10 Marks)

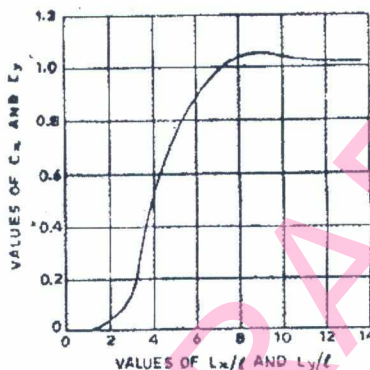


Fig. Q5 (b)

- 6 a. Write a brief note on spacing of expansion and contraction joints. (06 Marks)
- b. Design the size and spacing of dowel bars at the expansion joints of a cement concrete pavement of thickness 25 cm with radius of relative stiffness 80 cm, for a design wheel load of 5000 kg. Assume load capacity of the dowel system as 40% of the design wheel load. Joint width is 2 cm, permissible shear and flexural stresses in dowel bar are 1000 and 1400 kg/cm^2 respectively and permissible bearing stress in CC is 100 kg/cm^2 . (14 Marks)
- 7 a. Explain any four typical flexible pavement failures. (08 Marks)
- b. Benkelman beam deflection studies were carried out on 15 selected points on a stretch of flexible pavement during summer season using a dual wheel load of 4085 kg, 5.6 kg/cm^2 pressure. The deflection values obtained in mm after making the necessary lag corrections are given below. If the present traffic consists of 750 commercial vehicles per day, determine the thickness of bituminous overlay required, if the pavement temperature during the test was 39°C and the correction factor for subsequent increase in subgrade moisture content is 1.3. Assume annual rate of growth of traffic as 7.5%. Adopt IRC guidelines 1.40, 1.32, 1.25, 1.35, 1.48, 1.60, 1.65, 1.55, 1.45, 1.40, 1.36, 1.46, 1.50, 1.52 and 1.45 mm. (12 Marks)
- 8 Write short notes on any four of the following:
- Rigid pavement failure.
 - Maintenance measures in rigid pavements.
 - Functional evaluation by visual inspection.
 - Uneven measurements.
 - Design factors for runway pavements.
 - Design methods for airfield pavements. (20 Marks)

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10CV835

Eighth Semester B.E. Degree Examination, June/July 2015
Industrial Waste Water Treatment

Time: 3 hrs.

Max. Marks:100

**Note: 1. Answer any FIVE full questions, selecting
atleast TWO questions from each part.
2. Missing data may be suitably assumed.**

PART - A

- 1 a. Briefly explain the effects of industrial wastewater on sewage treatment plants. (10 Marks)
b. Explain in detail the factors to be considered for stream sampling. (10 Marks)
- 2 a. With a neat sketch, explain the different zones of pollution in streams. (10 Marks)
b. A town discharges $80\text{m}^3/\text{sec}$ of sewage into a stream having a rate of flow of $1200\text{m}^3/\text{sec}$ during lean days. The 5 day BOD of sewage at the given temperature is $250\text{mg}/\ell$. Find the amount of critical DO deficit and its location in the downstream portion, if the velocity of flow of stream is $0.12\text{m}/\text{sec}$. Assume deoxygenation coefficient K as 0.1 and coefficient of self purification as 3.5. Assume saturation DO at the given temperature as $9.2\text{mg}/\ell$. (10 Marks)
- 3 a. Explain the volume reduction as applied to industrial wastewater. (10 Marks)
b. In what different ways the neutralization of industrial wastes is achieved? Explain. (10 Marks)
- 4 a. Explain briefly the methods for removal of suspended solids from industrial wastewater. (10 Marks)
b. Write short notes on :
i) Ion exchange method ii) Reverse osmosis process. (10 Marks)

PART - B

- 5 a. What are the advantages of combined treatment of industrial wastewater with domestic wastewater? (08 Marks)
b. List the various effects of discharging raw industrial waste to the streams. Briefly explain any four. (12 Marks)
- 6 a. With process flow diagram, explain the origin of waste from cane sugar mill. List its characteristics. (10 Marks)
b. Explain briefly with the help of flow diagram, the treatment of large distillery industry. (10 Marks)
- 7 a. What kind of wastes will origin from a typical dairy industry? Explain. (10 Marks)
b. How are the wastes from the following units in a steel plant treated :
i) Coal washery ii) Blast furnace iii) Coke ovens iv) Pickling. (10 Marks)
- 8 a. With a flow diagram, explain the treatment units adopted in the treatment of typical pulp and paper mill. (10 Marks)
b. How do you treat a synthetic drug waste from pharmaceutical industry? (10 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg. $42+8=50$, will be treated as malpractice.

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10CV843

Eighth Semester B.E. Degree Examination, June/July 2015
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. Define "System Approach". Explain with flow diagram, system approach to transport planning. (10 Marks)
 b. Define Transport Planning. Explain the "Interdependence of land use and traffic". (10 Marks)
- 2 a. Define "Zone". Mention the different factors considered in dividing the whole area of zones. (10 Marks)
 b. Explain the Inventory of transportation facilities. (06 Marks)
 c. Mention the factors selection for an urban transport study area. (04 Marks)
- 3 a. Explain the factors governing trip generation and attraction rates. (10 Marks)
 b. What is Category analysis? Mention the assumptions made in category analysis. (10 Marks)
- 4 Write a short notes on :
 a. Trip generation.
 b. Trip distribution.
 c. Model split.
 d. Scope of Urban transport planning. (20 Marks)

PART - B

- 5 a. The total trips produced in and attracted to the three zones A, B and C of a survey area in the design year are tabulated as : (10 Marks)

Zone	Trip produced	Trips attracted
A	2000	3000
B	3000	4000
C	4000	2000

It is known that the trips between two zones are inversely proportional to the second power of the travel time between zones, which is uniformly 20min. If the trip interchange between zones B & C is known to be 600, calculate the trip interchange between zones A & B, A & C, B and A, C and B.

- b. Explain Growth factor method and Synthetic methods. (10 Marks)
- 6 a. Define Modal split. Explain in brief the factors affecting modal split. (10 Marks)
 b. What are the advantages and disadvantages of pre – distribution modal split? (10 Marks)
- 7 a. What is Traffic Assignment? Explain the applications of the traffic assignment. (10 Marks)
 b. What are the Traffic Assignment Techniques? Explain the All – or – nothing assignment technique. (10 Marks)
- 8 a. Explain the difficulties in transport planning for small and medium cities. (10 Marks)
 b. How you are using quick – response techniques for small and medium cities? (10 Marks)

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10CV847

Eighth Semester B.E. Degree Examination, June/July 2015
Environmental Impact Assessment

Time: 3 hrs.

Max. Marks:100

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

PART – A

- 1 a. What is meant by an Environmental Impact Analysis? Why is it essential? (10 Marks)
b. Explain briefly the function and purpose of the Environmental Impact Assessment processes. (10 Marks)
- 2 a. What are the objectives and scope of EIA studies? (10 Marks)
b. Explain the relationship between FONSI and EIS and EIA. (10 Marks)
- 3 a. Outline the frame work of impact assessment studies. (10 Marks)
b. Write a brief note on contents of EIA on required by CEQ. (10 Marks)
- 4 a. What are the various methodologies in EIA? Discuss overlays method briefly. (10 Marks)
b. Why public and community participation is essential to carry out EIA studies? (10 Marks)

PART – B

- 5 a. Bring out clearly the EIA guidelines for a development project. Substantiate with an example. (10 Marks)
b. Write short notes on :
i) Comprehensive EIA ii) Rapid EIA. (10 Marks)
- 6 a. Explain the Environmental Impacts of coal. (10 Marks)
b. Briefly explain the procedure for assessment of Impacts on surface water environment. (10 Marks)
- 7 a. Explain briefly the basic steps associated with prediction of changes in air quality and assessment of the impact of these changes. (10 Marks)
b. Outline the EIA aspects of a large scale highway construction project. (10 Marks)
- 8 Write short notes on any four :
a. Kaiga project.
b. E.I.A in India.
c. Environmental Protection Legislation.
d. Environmental Attributes in the Air & EIA study.
e. EIA review methodology.
f. Economic Impact Assessment. (20 Marks)

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