USN | 1 | K | 9 | 1 | 5 | C | V | 4 | 1 | 9 | **10CV81**

Time: 3 hrs.   Max. Marks:100

Note: *1. Answer any FIVE full questions, selecting*
atleast TWO questions from each part.
2. Missing daya may be suitably assumed.
3. Use of IS:10262-2009 and IS456-2000 are permitted.

PART – A

1   a. Enumerate the importance of Bogue's compounds in ordinary portland cement. **(07 Marks)**
    b. Explain the rheology of concrete in terms of Bingham's parameter. **(07 Marks)**
    c. Determine capillary porosity, total porosity and gel space ratio for a cement paste with W/C ratio 0.5 and degree of hydrogen 90% **(06 Marks)**

2   a. Explain the mechanism of 'deflocculation' of cement particles by super plasticizers with neat sketches. **(10 Marks)**
    b. Explain the Marsh cone test for optimum dosage of superplasticizer. **(05 Marks)**
    c. Explain the effect of Flyash on hardened concrete. **(05 Marks)**

3   a. Explain the factors affecting the mix design of concrete. **(06 Marks)**
    b. Design a concrete mix of M_{20} grade for the following data [M_{20} grade].
       Maximum size of aggregate = 20 mm
       Workability = 100 mm [Slurry]
       Degree of quality control = good
       Type of exposure = mild
       Specific gravity of cement = 3.15.
       Specific gravity of coarse aggregate = 2.65
       Specific gravity of fine aggregate = 2.60
       Water absorption of coarse aggregate = 0.5%
       Water absorption of fine aggregate = 1.0%
       Free surface moisture coarse aggregate = Nil
       Free surface moisture fine aggregate = 2.0%
       Coarse aggregate percentage of different fractions 60% : 40%
       Fine aggregate belongs to Zone II. **(14 Marks)**

4   a. Explain the influence of W/C ratio and age on permeability of concrete. **(07 Marks)**
    b. Discuss in brief alkali aggregate reaction. What precautions are necessary to minimize? **(07 Marks)**
    c. What is sulphate attack? Explain briefly the methods of controlling sulphate attack. **(06 Marks)**

PART – B

5   a. What is RMC? Explain briefly advantages of RMC. **(06 Marks)**
    b. Explain shot crete and under water concreting. **(06 Marks)**
    c. What are the advantages of self compacting concrete? What are different test methods for determining the rheology of self compacting concrete? **(08 Marks)**

6 a. What are the different types of fibres used in concrete? (06 Marks)
   b. What are the factors effecting properties of fibre reinforced concrete. (08 Marks)
   c. What is ferro-cement? List the various applications of Ferro cement. (06 Marks)

7 a. Write short notes on :
      (i) Light weight concrete
      (ii) High density concrete (06 Marks)
   b. What is 'High performance concrete [HPC]'? What are the applications of high performance concrete? (06 Marks)
   c. Discuss in brief the properties of High performance concrete in fresh and hardened state. (08 Marks)

8 Explain the following :
   a. Tests on hardened concrete (08 Marks)
   b. Rebound Hammer Test (NDT) (06 Marks)
   c. Pulse Velocity Test (NDT) (06 Marks)

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Eighth Semester B.E. Degree Examination, June/July 2018
Pavement Design

Time: 3 hrs.   Max. Marks:100

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

PART – A

1   a. What are the different layers of flexible pavements? Explain the functions of each. **(08 Marks)**
     b. Bring out the points of difference between highway and airfield pavements.   **(06 Marks)**
     c. List the various factors to be considered for the selection of type of pavement. Also list the factors affecting pavement performance. **(06 Marks)**

2   a. Explain Frost action. What are the measures adopted to reduce it's effects. **(06 Marks)**
     b. State the assumptions and limitations of Elastic Single layer theory and Burmister's two layer theory. **(06 Marks)**
     c. The plate bearing tests were conducted with 30 cm plate diameter on soil subgrade and over 45 cm base course. The pressure yielded at 0.5 cm deflection are 1.25 kg/cm^2 and 8 kg/cm^2 respectively. Design the pavement section for 5100 kg wheel load with tyre pressure of 7 kg/cm^2 for an allowable deflection of 0.5 cm using Burmister's approach. (Refer chart given for Burmister's two layer deflection factors in Fig. Q2 (c)) **(08 Marks)**
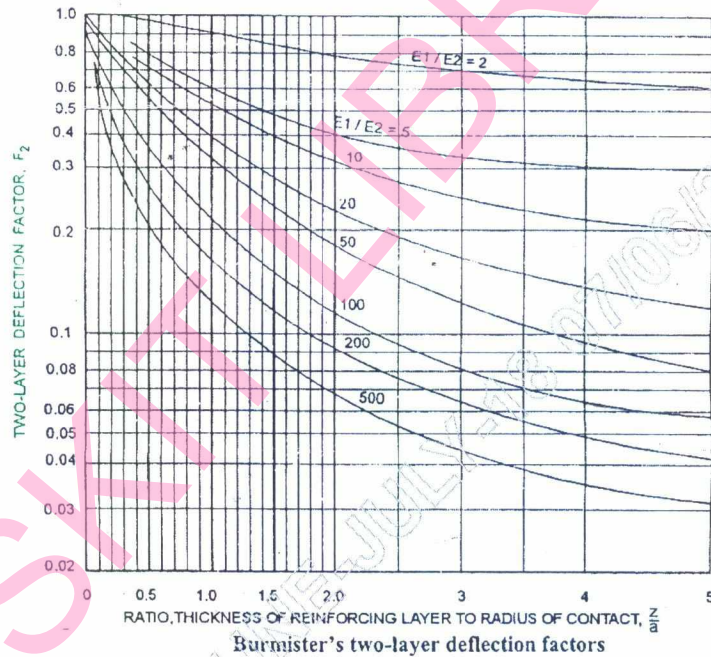

Burmister's two-layer deflection factors   Fig. Q2 (c)

3   a. Calculate the ESWL of a dual wheel assembly carrying 2044 kg each for pavement thickness of 15 cm, 20 cm and 25 cm. Centre to centre tyre spacing is 27 cm and distance between the walls of the tyre is 11 cms (Use Graphical Method). **(10 Marks)**
     b. Calculate the design repetitions for 20 year period for various wheel loads equivalent to 22.68 kN wheel load using the following data on a four lane road. **(10 Marks)**

Load in KN	22.68	27.22	31.75	40.82	45.36	49.90	54.43
Volume per day	30	25	20	15	10	5	1
EWLF	1	2	4	8	16	32	64

4 a. Design the pavement section by triaxial-Kansas method using the following data:
Wheel load – 41 KN
E value of base course = 40 N/mm^2
E value of subgrade soil = 10 N/mm^2
E value of wearing course = 100 N/mm^2
Radius of contact area = 150 mm
Design deflection = 2.5 mm
Sketch the pavement section. **(10 Marks)**

   b. Briefly explain the procedure of CSA method for the flexible pavement, design as per IRC-37-2001. **(10 Marks)**

PART – B

5 a. Define modulus of subgrade reaction and radius of relative stiffness. **(06 Marks)**

   b. Write the commonly used equations for the theoretical computation of wheel load stress by Westergaard's analysis of Interior; Edge and corner loadings. **(06 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 = 5100 kg ; E = 3×10^5 kg/cm^2 ; μ = 0.15; Pavement thickness = 18 cm
Modulus of subgrade reaction = 6 kg/cm^3; Radius of contact area = 15 cm **(08 Marks)**

6 a. List the various requirements of joints in cement concrete slabs. Explain in detail with sketches: (i) Expansion joints. (ii) Contraction joints. **(10 Marks)**

   b. A CC pavement has thickness of 18 cm and has two lanes of 7.2 mts with a longitudinal joint along the centre. Design the dimensions and spacings of the tie bar. The other data are –
allowable working stress in tension – 1400 kg/m^2
Unit weight of concrete – 2400 kg/m^3
Coefficient of friction – 1.5
Allowable bond stress in deformed bars in concrete – 24.6 kg/m^2. **(10 Marks)**

7 a. 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 at 5 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 over lay 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 guideline. 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, 1.45 mm **(14 Marks)**

   b. What are the causes of formation of waves and corrugations in flexible pavements? Suggest remedial measures. **(06 Marks)**

8 a. Explain various types of rigid pavement failures with neat sketches. **(10 Marks)**

   b. Explain briefly the pavement evaluation. **(10 Marks)**

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Eighth Semester B.E. Degree Examination, June/July 2018
Industrial Wastewater Treatment

Time: 3 hrs.   Max. Marks:100

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

PART – A

1 a. Differentiate between Domestic and Industrial waste water. **(06 Marks)**
   b. Discuss the factors to be considered in stream sampling. **(08 Marks)**
   c. Explain the terms Effluent standards, Stream standards and Stream classification.
   (06 Marks)

2 a. Explain in detail Streeter – Phelps formulation of mathematical analysis. **(10 Marks)**
   b. Obtain the DO, Deficit profile for 100km given the city discharge is 20000 m^3/day of
   sewage and river discharge is 0.7m^3/sec. **(10 Marks)**
   Data given :

Parameter	River	Sewage effluent from STP
DO	8.2 mg/L	2.0 mg/L
Temperature	23^0C	26^0C
BOD 5d, 40^0C	3.4 mg/L	45mg/L

3 a. Explain the necessicity and process of volume reduction as a strategy in industrial waste
   water treatment. **(10 Marks)**
   b. Discuss the terms Neutralization, Equalization, Proportioning and By – product recovery.
   (10 Marks)

4 a. Explain the unit operations adopted for removal of suspended solids and inorganic solids.
   (10 Marks)
   b. Explain with a neat sketch, suspended growth biological process. **(10 Marks)**

PART – B

5 a. Combined treatment in common effluent treatment facility is very effective for industrial
   estates. Discuss the reasons and consequences. **(10 Marks)**
   b. Explain the effects of discharging treated and partially treated waste water into rivers.
   (10 Marks)

6 a. Draw a neat flow diagram to show the points of generation of wastes in a cotton textile mill
   and explain. **(10 Marks)**
   b. How does Tannery waste affect the water bodies? Explain the production and treatment of
   waste water with a flow diagram. **(10 Marks)**

7 a. Discuss the effects of dairy waste on streams and propose a treatment strategy for
   prevention of effects on a river. **(10 Marks)**
   b. How is ecology of estuaries affected by establishing cannery for fish export industry?
   Explain. **(05 Marks)**

c. Give the sources of effluents from a cement manufacturing process. **(05 Marks)**

8 a. Draw a neat flow diagram for the manufacture of paper and pulp and give a treatment strategy for the combined waste. **(10 Marks)**

b. Give the strategy of treating using bacteria for antibiotic waste from a pharmaceutical industry. **(05 Marks)**

c. Effective maintenance of food to micro – organism ratio is essential for treating industrial wastes. Explain. **(05 Marks)**

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Eighth Semester B.E. Degree Examination, June/July 2018
Urban Transport Planning

Time: 3 hrs.   Max. Marks:100

Note:1. *Answer any FIVE full questions, selecting atleast TWO questions from each part.*
2. *Assume suitable data wherever necessary.*

PART – A

1   a. Define "System Approach". Explain with flow diagram, system approach to Transport Planning.   **(10 Marks)**
    b. Explain briefly the various stages involved in Transportation Planning Process.   **(10 Marks)**

2   a. Define "Zone". Mention the different factors considered in dividing the whole area into zones.   **(10 Marks)**
    b. Explain the inventory of Transportation Facilities.   **(05 Marks)**
    c. Explain with sketch, about the basic movements in transportation survey.   **(05 Marks)**

3   a. Explain Home – Based and Non – Home Based trip.   **(05 Marks)**
    b. Explain the assumptions made in categories analysis.   **(06 Marks)**
    c. Let the trip rate of zone is explained by the household size done from the field survey. It was found that the household size are 1,2, 3 and 4. The trip rates of the corresponding household is shown in the table below. Fit a linear equation relating trip rate and household size.   **(09 Marks)**

House Hold Size (x)

	1	2	3	4
Trips	1	2	4	6
Per	2	4	5	7
Day (y)	2	3	3	4
$\in(y)$	5	9	12	17

4   Write a short note on :
    a. Study area.
    b. Expansion of Data from samples.
    c. Trip distribution.
    d. Home interview surveys.   **(20 Marks)**

PART – B

5   a. Explain Average growth factor methods in Trip distribution.   **(05 Marks)**
    b. Explain Fratar method in trip distribution.   **(05 Marks)**
    c. The base year trip matrix for a study area consisting of three zones is given below.

	1	2	3	O_i
1	20	30	28	78
2	36	32	24	92
3	22	34	26	82
d_j	88	96	78	252

The productions from the zone 1, 2, and 3 for the horizon year is expected to grow to 98, 106 and 122 respectively. The attractions from these zones are expected to increase to 102, 118, 106 respectively. Compute the matrix for the horizon year using doubly constrained growth factor model using Furness method.   **(10 Marks)**

6 a. Define Modal split and explain in brief the factors affecting modal split. **(10 Marks)**
  b. Explain advantages and disadvantages of Pre – distribution modal split. **(05 Marks)**
  c. Draw the flow diagram for Modal split carried out after trip distribution. **(05 Marks)**

7 a. Explain the application of the traffic assignment. **(05 Marks)**
  b. Write a flow chart of fundamental structure of Lowry Model. **(05 Marks)**
  c. List the various assignment techniques and explain any two methods. **(10 Marks)**

8 Write short notes on :
  a. Difficulties in transport planning for small and medium cities.
  b. Quick response techniques.
  c. Grain – Lowry model.
  d. Furness method. **(20 Marks)**

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