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10CV71

Seventh Semester B.E. Degree Examination, Dec.2017/Jan.2018

**Environmental Engineering - II**

Time: 3 hrs.

Max. Marks:100

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

**PART - A**

- 1 a. Define Dry Weather Flow and explain the various factors affecting the dry weather flow. (05 Marks)  
b. Differentiate between Conservancy system and Water carriage system. (05 Marks)  
c. A population of 50,000 is residing in a town having an area of 100 hectares. If the average impermeability coefficient for this area is 0.55, and time of concentration of the design rain is 40 minutes, calculate the discharge for which the sewers of a proposed combined system will be designed for the town in question. Assume rate of water supply is 150  $\ell$ /pcd and 80% of water supplied will reach the sewers and peak flow of sewage is 3 times the average flow. Use US Ministry of Health formula for calculating rainfall intensity. (10 Marks)
- 2 a. Explain the factors to be considered while selecting the sewer material. What are the commonly used sewer materials? (06 Marks)  
b. Briefly explain any two testing of sewer lines. (04 Marks)  
c. A town has a population of one lakh with a per capita average sewage flow as 300  $\ell$ /pcd. Design a sewer running 0.6 times full depth at peak discharge. The sewer is to be laid at a slope of 1 in 625. Take Manning's N as 0.013 and peak factor as 3. (10 Marks)
- 3 a. With neat sketches, explain the following sewer appurtenances :  
i) Deep manhole ii) Automatic flushing tank. (10 Marks)  
b. Explain the basic principles considered in house drainage work. (10 Marks)
- 4 a. Define BOD. Deduce an expression for the first stage BOD. (10 Marks)  
b. Calculate 3 day BOD and ultimate BOD of a sample of sewage for the following test data :  
i) DO of raw sewage = 0.6 mg/ $\ell$  ii) DO of dilution water = 6mg/ $\ell$   
iii) DO of mix of dilution water and sewage after 3 days of incubation = 1.1 mg/ $\ell$ .  
iv) Dilution ratio = 3%. Assume  $K_D = 0.12$ /day at test temperature. (10 Marks)

**PART - B**

- 5 a. Explain the phenomena of self purification of streams. What are the factors affecting self purification process. (08 Marks)  
b. Disposal by dilution is adopted for a city which discharges  $150\text{m}^3/\text{s}$  of sewage into a river which is fully saturated with oxygen and is flowing at the rate of  $1000\text{m}^3/\text{s}$  during its lean period with a velocity of 0.2m/s. The 5 - day BOD of the sewage is 300mg/ $\ell$ . Find when and where the critical DO deficit will occur in the downstream and what is its amount. Assume  $f = 4$ ,  $K_D = 0.1$ /day and saturation DO = 9.2mg/ $\ell$ . (12 Marks)

- 6 a. Explain the working of a Grit chamber and Skimming tank with figures. (10 Marks)  
b. Design a primary sedimentation tank of circular cross – section, for a sewage of 10MLD, detention period of 2 hours and assume the surface loading rate to be  $30\text{m}^3/\text{m}^2/\text{d}$ . (10 Marks)
- 7 a. Explain the working of conventional activated sludge process (ASP) with flow diagram. (10 Marks)  
b. The average flow of a sedimented sewage is 4.5 MLD and have its 5-day BOD as  $150\text{mg}/\ell$ . The sewage is ready to be applied on a standard rate trickling filter. The surface loading is  $3000\ \ell/\text{m}^2/\text{d}$  and the organic loading is  $150\text{gm}/\text{m}^3/\text{d}$ . Determine the volume , depth and efficiency of the standard rate trickling filter. (10 Marks)
- 8 Write notes on :  
a. Sludge digestion tank.  
b. Oxidation ditch.  
c. Reuse and Recycle of wastewater.  
d. Sludge drying bed. (20 Marks)

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10CV72

**Seventh Semester B.E. Degree Examination, Dec.2017/Jan.2018**  
**Design of Steel Structures**

Time: 3 hrs.

Max. Marks:100

- Note: 1. Answer any FIVE full questions, selecting at least TWO questions from each part.**  
**2. Use of IS – 800 – 2007, SP(6) – 1 or Steel table permitted.**

**PART – A**

- 1
  - a. Distinguish between two major philosophy of design. (08 Marks)
  - b. What are the preliminary loads to be considered in the design of steel structures? (08 Marks)
  - c. Mention the classification of sections as per IS 800 : 2007. (04 Marks)
  
- 2
  - a. Write a note on HSFG bolts. (06 Marks)
  - b. Two plates of 10mm and 18mm thick are to be joined by double cover butt joint. Design the joint for the data. Factored design load = 750kN, bolt diameter = 20mm, grade of steel = Fe410 cover plates on each side 8mm, grade of bolts 4.6. (14 Marks)
  
- 3
  - a. What are the requirements of an ideal welded joint? (06 Marks)
  - b. An I section bracket is connected to the flange of column. Determine the load if the flange weld is 16mm and the web weld is 10mm. (14 Marks)

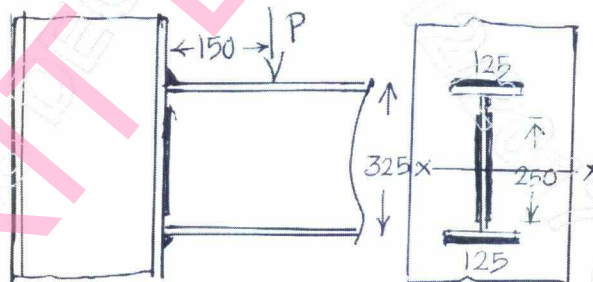


Fig.Q3(b)

- 4
  - a. Define : i) Plastic hinge ii) Mechanism and iii) Shape factor. (06 Marks)
  - b. Determine the collapse load for a fixed beam subjected to udl using upper-bound theorem. (04 Marks)
  - c. Determine the plastic moment capacity of the beam shown in Fig.Q4(c). (10 Marks)

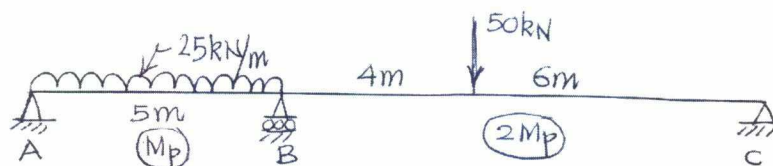


Fig.Q4(c)

## PART – B

- 5 a. Determine the tensile capacity of the tie member  $2L_S$  ISA  $100 \times 65 \times 10$ mm connected long legs to a gusset plate using four bolts of 20mm diameter when. (10 Marks)
- Angles are on both sides of the gusset plate with tack bolts
  - Angles are on the same side of the gusset plate with tack bolts
  - With tack bolts.
- b. Design a single angle section of a tension member of a roof truss to carry a factored load of 225 kN. The member is subjected to possible reversal of stresses due to the action of wind. The length of member is 3m. Use M20 bolts of property class 4.6 in a single line. The yield and ultimate strength of steel are 250MPa and 410MPa respectively. (10 Marks)
- 6 a. Explain briefly :
- Imperfection factor
  - Stress reduction factor. (06 Marks)
- b. Design a laced column with two channels back to back of 8m to carry an axial load of 1000kN. The columns are hinged at the ends. (14 Marks)
- 7 Design a gusseted base for a columns ISHB350@661N/m carrying a factored an axial load of 2500kN. The base plate rests on M20 grade concrete. M24 dia bolts of grade 4.6. (20 Marks)
- 8 A simply supported beam carries a udl of 15 kN/m including self weight and live load of 25kN/m in addition to a concentrated load of 75kN over a clear span of 9.7m, base plate 300mm. Available rolled section ISWB600@133.7ks/m. The beam is laterally supported. Design the beam. (20 Marks)

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10CV/CT73

**Seventh Semester B.E. Degree Examination, Dec.2017/Jan.2018**

**Estimation and Valuation**

Time: 3 hrs.

Max. Marks:100

**Note: 1. Part – A Q.No. 1 which is compulsory, Answer any FOUR questions by Selecting any TWO from part B and TWO from part C each.**  
**2. Missing data, if any, may be suitably assumed.**

**PART – A**

- 1 The plan and cross section of walls of residential building are as shown in Fig. Q1. Work out the quantities and prepare the cost abstract of the following items of work by centre line method.
- Earth work excavation for foundation in ordinary soil @ Rs 115/m<sup>3</sup>.
  - Cement concrete Bed 1:4:8 @ Rs 2850/-M<sup>3</sup>
  - Size stone masonry in foundation and basement with CM1:6 @ Rs 2800/-m<sup>3</sup> and Rs 3450/-m<sup>3</sup> (Basement)
  - First class brick masonry for super structure is CM 1:6 @3800/-m<sup>3</sup> (only for main wall)

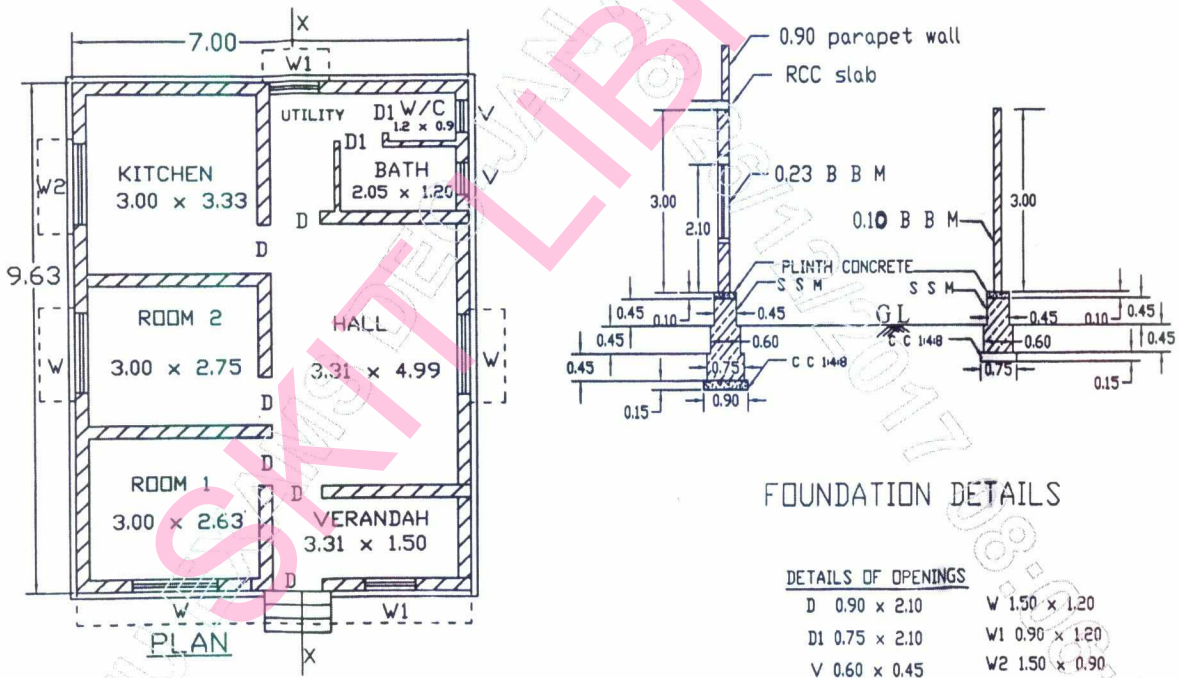


Fig Q1

(40 Marks)

**PART – B**

- 2 a. List and explain briefly various types of estimate. (11 Marks)  
 b. Write a note on cost of materials. (04 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.

- 3 The details of man hole is as shown in Fig. Q3. Estimate the quantities for the following item of work
- Earth work excavation in foundation
  - Cement concrete 1:3:6 floor and foundation
  - First class Brick work with C.M. 1:4
  - 20mm thick cement plaster 1:3 in floor and channel.
- (15 Marks)

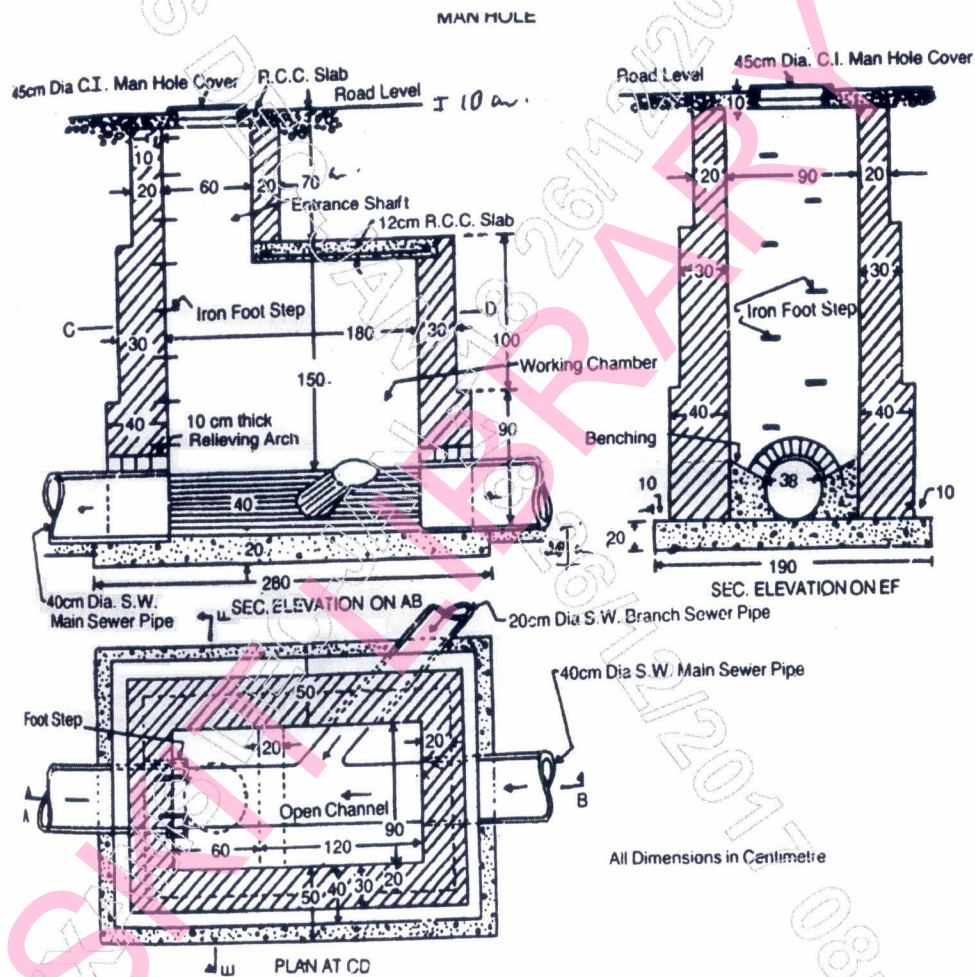


Fig Q3

- 4 Write specifications for any three of the following :
- Burnt Brick masonry in CM 1:6
  - Mosaic or Terrazzo Floor
  - Painting work
  - Earth work excavation.

(15 Marks)

**PART – C**

- 5 Carry out rate analysis for any three of the following :
- PCC (1:3:6) for foundations using 20mm and down size aggregates.
  - First class brick masonry for super structure is CM1:4
  - 12mm thick plastering for walls with CM1:6
  - 20mm thick DPC with CM1:5.

(15 Marks)

- 6 Estimate the quantity of earth work for a portion of road work from the following data, using mid sectional area method : Formation width = 4m ; side slope 2:1 is filling ; side slope 1.5:1 is cutting

Chainage m	0	40	80	120	160	200	240	280
RL of ground m	100.6	100.2	99.8	100.2	100.8	101.9	102.4	102.5
RL of formation level	101.00	Raising gradient 1 to 400 ----->						

(15 Marks)

- 7 Write a note on any three of the following :

- EMD and security deposit
- Technical sanction
- Measurement books
- Method of valuation.

(15 Marks)

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10CV74

**Seventh Semester B.E. Degree Examination, Dec.2017/Jan.2018**  
**Design of Prestressed Concrete Structures**

Time: 3 hrs.

Max. Marks:100

**Note:** 1. Answer FIVE full questions, selecting at least TWO questions from each part.  
 2. Use of IS : 1343 – 1980 is permitted.

PART – A

- 1 a. Explain the necessity of using high strength concrete and high tensile steel in prestressed concrete structures. (08 Marks)  
 b. Distinguish between pretensioning and post tensioning. (06 Marks)  
 c. Explain with neat sketches, Freyssinet system of pre-stressing. (06 Marks)
  
- 2 a. Explain the concept of load balancing with different cable profiles. (06 Marks)  
 b. A rectangular concrete beam, 100mm wide by 250mm deep spanning over 8m is prestressed by a straight cable carrying an effective pre-stressing force of 250kN located at an eccentricity of 40mm. The beam supports a live load 1.2kN/m.  
     i) Calculate the resultant stress distribution for the central cross section of the beam. The density of concrete is 24kN/m<sup>3</sup>.  
     ii) Find the magnitude of prestressing force with an eccentricity of 40mm which can balance the stresses due to dead and live loads at the bottom fibre of the central section of the beam. (14 Marks)
  
- 3 a. List the various types of losses in PSC beams and write the equations used to determine them. (06 Marks)  
 b. A pretensioned beam, 200mm wide and 300mm deep is prestressed by 10 wires of 7mm diameter, initially stressed to 1200N/mm<sup>2</sup>, with their centroids located 100mm from the soffit. Find the maximum stress in concrete immediately after transfer, allowing only for elastic shortening of concrete.  
     If the concrete undergoes a further shortening due to creep and shrinkage, while there is a relaxation of five percent of steel stress, estimate the final percentage loss of stress in the wires using IS:1343 regulations. Use following data :  $E_s = 210\text{kN/mm}^2$  ;  $E_c = 5700 \sqrt{f_{ck}}$  ,  $f_{ck} = 42\text{N/mm}^2$ , Creep coefficient is 1.6 and total residual shrinkage strain is  $3 \times 10^{-4}$ . (14 Marks)
  
- 4 a. List the factors influencing deflections. (04 Marks)  
 b. Obtain an expression for computing deflection at midspan in a PSC beam with trapezoidal tendons with eccentricity 'e' at mid third points, with linear variation towards support. The Mohr's theorem. (04 Marks)  
 c. A concrete beam having rectangular section 100mm wide and 300mm deep is prestressed by a parabolic cable carrying an initial force of 240kN. The cable has an eccentricity of 50mm at the centre of span and is concentric at the supports. If the span of the beam is 10m and live load is 2kN/m. estimate short term deflection at the centre of span. Assuming  $E = 38\text{kN/mm}^2$  and creep coefficient  $\phi = 2.0$ , loss of prestress is 20 percent of the initial stress after 6 months. Estimate the long term deflection at the centre of span at this stage, assuming that the dead and live loads are simultaneously applied after the release of prestress. (12 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.



**PART – B**

- 5 a. Explain with sketches, the different types of flexural failures in PSC beam. (06 Marks)
- b. A post tensioned beam with unbounded tendons is of rectangular section 400mm wide with an effective depth of 800mm. The cross sectional area of the pre-stressing steel is 2840mm<sup>2</sup>. The effective pre-stress in steel after all losses is 900N/mm<sup>2</sup>. The effective span of the beam is 16m. If  $f_{ck} = 40\text{N/mm}^2$ , estimate the ultimate moment of resistance of the section using IS : 1343. (07 Marks)
- c. A post tensioned pre-stressed concrete T-beam with unbounded tendons is made up of a flange 300mm wide and 150mm thick and the width of the rib is 150mm. The effective depth of the section is 320mm. The beam is pre-stressed by 24wires of 5mm diameter having a characteristic strength of 1650N/mm<sup>2</sup>. The effective stress after all losses is 900N/mm<sup>2</sup>. If the cube strength of concrete is 56N/mm<sup>2</sup>. Estimate the flexural strength of the section using IS:1343 – 1980. Assume  $\left(\frac{L}{\delta}\right)$  ratio as 20. (07 Marks)
- 6 a. Explain the types of shear cracks in structural concrete. (06 Marks)
- b. A concrete beam of rectangular section 200mm wide and 650mm deep is prestressed by a parabolic cable located at an eccentricity of 120mm at midspan and zero at the supports. If the beam has a span of 12m and carries a uniformly distributed live load of 4.5kN/m, find the effective force necessary in the cable for zero shear stress at the support section. For this condition, calculate the principal stresses. The density of concrete is 25kN/m<sup>3</sup>. (14 Marks)
- 7 a. Explain the concept of stress distribution in End block. (08 Marks)
- b. The end block of a post tensioned beam is 300mm wide and 400mm deep. Ten cables each made up of 12 wires of 5mm diameter strands are stressed to 1200N/mm<sup>2</sup>. The wires are located at constant eccentricity of 100mm below the centroidal axis. Design the end block and detail the reinforcement. If the anchorage plate is 200mm×200mm and diameter of the duct is 100mm, permissible stress in concrete at transfer is 20N/mm<sup>2</sup>, permissible shear stress in steel is 94.5N/mm<sup>2</sup>. Determine the thickness of anchorage pate. (12 Marks)
- 8 A prestressed beam has an unsymmetrical I-section with an overall depth of 1840mm. The top and bottom flange widths are 1800 and 820mm respectively. The thickness of the top flange varies from 180mm at the ends to 430mm at the junction of web, which is 1800mm thick. The thickness of the bottom flange varies from 150mm at the ends to 450mm at the junction of the web. The beam is designed for a simply supported span of 40m. the permissible compressive stress at the transfer and working load is limited to 16N/mm<sup>2</sup>, while the tensile stress at the transfer and working load is limited to zero and 1.4N/mm<sup>2</sup>, respectively. The loss ratio is 0.80 calculate :
- a. The permissible uniformly distributed imposed load
- b. The magnitude of the prestressed face if at the mid-span section if is located 130mm from the soffit and
- c. The vertical limits within which the cable must is at midspan and support sections. (20 Marks)

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**Seventh Semester B.E. Degree Examination, Dec.2017/Jan.2018**  
**Highway Geometric Design**

Time: 3 hrs.

Max. Marks:100

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

**PART – A**

- 1 a. Briefly discuss the various design factors to be considered for geometric design of highways. (10 Marks)  
 b. Enumerate the concept of PCU in geometric design of Highways. List out the factors governing PCU. Give some typical values as recommended by IRC. (10 Marks)
- 2 a. What is camber? List the functions of camber. Discuss the factors governing the camber. Discuss shapes of camber with the help of neat sketch. (10 Marks)  
 b. Write a note on following and mention the IRC standards :  
 i) Carriage way ii) Right of way. (10 Marks)
- 3 a. With sketches indicate the circumstances in which sight distance is affected, describe how the sight distance required at an uncontrolled intersection is estimated. (10 Marks)  
 b. The speed of overtaking and overtaken vehicles are 70kmph and 40kmph, respectively on a two way traffic road. If the acceleration of overtaking vehicles is  $0.99 \text{ m/sec}^2$ .  
 i) Calculate safe overtaking sight distance.  
 ii) Mention the minimum length of overtaking zone  
 iii) Draw a neat sketch of overtaking zone and show the position of the sign posts. (10 Marks)
- 4 a. Write note on mechanical widening and psychological widening. (06 Marks)  
 b. What is transition curve? Explain types of transition curve. (06 Marks)  
 c. Calculate the length of transition curve and the shift using the following data. Design speed of 65 kmph, radius of circular curve = 220m. Allowable rate of introduction of super elevation 1 in 150, pavement is rotated about the centre line and pavement width including extra widening is = 7.5m. (08 Marks)

**PART – B**

- 5 a. What are the circumstances in which a valley curve is formed? Indicate with sketches. (06 Marks)  
 b. Derive the expression for calculating length of valley curve of parabolic shape for comfort condition. (06 Marks)  
 c. A vertical summit curve is formed at the intersection of two gradients, +3.0 and -5.0 percent. Design the length of summit curve to provide stopping sight distance for a design speed of 80kmph. Assume data as per IRC. (08 Marks)
- 6 a. Explain the need of grade separated intersection and give advantages and disadvantages of grade separated intersection. (10 Marks)  
 b. With a neat sketch, explain channelized intersection also discuss advantages of channelized intersection. (10 Marks)

- 7 a. Draw a neat diagram of rotary intersection (roundabout) and show the different elements? (10 Marks)
- b. Draw a neat sketch of
- i) Diamond interchange
  - ii) Half clover leaf and explain any two advantages of each. (10 Marks)
- 8 a. With sketches explain the methods of sub surface drainage with respect to
- i) Lowering of water table
  - ii) Control of seepage flow. (10 Marks)
- b. A longitudinal channel with a trapezoidal cross section is to be constructed in a cut section. The longitudinal slope is 1 in 2500, soil is clay with Manning's coefficient as 0.024. take discharge of  $3\text{m}^3/\text{sec}$  and velocity of flow as  $0.6\text{m/s}$ . (10 Marks)

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10CV757

Seventh Semester B.E. Degree Examination, Dec.2017/Jan.2018

### Solid Waste Management

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 classification of functional elements of a solid waste management system with the help of flow diagram. (07 Marks)
- b. Estimate the energy content of a solid waste sample in unit energy content on dry basis and Ash free dry basis. Assume Ash 5%. (07 Marks)

Component	% by mass	% moisture content	Energy [kJ/kg]
Food waste	15	70	4650
Paper	45	06	16750
Cardboard	10	05	16300
Plastic	10	02	32600
Garden trimmings	10	60	6500
Wood	05	20	18600
Tin cans	05	03	700

- c. Briefly discuss on the various methods used to estimate waste quantities. (06 Marks)
- 2 a. With a neat sketch, explain hauled container system. (06 Marks)
- b. Discuss the factors influencing the solid waste generation rates. (06 Marks)
- c. The student population of a school is 881. The school has 30 standard classrooms, assuming five day school work with solid waste pick-ups on Wednesday and Friday before school starts in the morning, determine the size of the storage container required. Assume the rate of waste generated is equal to 0.11kg/cap.d plus 3.6kg per room and that the density of uncompacted municipal solid waste are 120.0kg/m<sup>3</sup>, standard container sizes are 1.5m<sup>3</sup>, 2.5m<sup>3</sup>, 3.0m<sup>3</sup> and 4.6m<sup>3</sup>. (08 Marks)
- 3 a. Discuss on the factors that must be considered in the design of transfer station. (08 Marks)
- b. Explain the mechanical volume reduction and chemical volume reduction. (08 Marks)
- c. List the principal components in the design of large municipal incinerators. (04 Marks)
- 4 a. Enumerate on various techniques of component separation. (07 Marks)
- b. With a neat sketch, explain municipal incinerators. (07 Marks)
- c. Explain the effect of 3T's in incineration process of solid waste. (06 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.

## PART – B

- 5 a. What are the important factors for the design considerations in anaerobic composting? (08 Marks)
- b. Briefly discuss on the difference between Indore and Bangalore process of composting of municipal solid waste. (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 :  $C_{50}H_{100}O_{40}N$ , use equation :
- $$C_aH_bO_cN_d + \frac{4a - b - 2c + 3d}{4}H_2O \rightarrow \frac{4a + b - 2c - 3d}{B}CH_4 + \frac{4a - b + 2c + 3d}{B}CO_2 + dNH_3$$
- (08 Marks)
- 6 a. Explain the various factors to be considered in selection of a site for sanitary land fill. (08 Marks)
- b. Explain the area method and trench method of landfilling techniques stating merits and demerits. (08 Marks)
- c. Determine the landfill area required for municipality with a population of 50,000 given that :  
 Solid waste generation = 360 gm/person/day  
 Compacted density of land fill = 504 kg/m<sup>3</sup>  
 Average depth of compacted solid waste = 3m. (04 Marks)
- 7 a. Explain the various ways of control of gas movement in landfills. (08 Marks)
- b. Define liachate and list out the factors that affect the composition of liachate. (04 Marks)
- c. List the advantages and disadvantages of open dumping and ocean disposal of solid waste. (08 Marks)
- 8 a. Outline the importance of recycle and reuse of plastic materials with examples. (06 Marks)
- b. Explain the categories of biomedical waste and method of disposal. (07 Marks)
- c. Explain the environmental significance of reuse and recycle solid waste. (07 Marks)

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10CV765

**Seventh Semester B.E. Degree Examination, Dec.2017/Jan.2018**

**Air Pollution and Control**

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 Emission inventory source classification. Give examples. (08 Marks)
  - b. A car emits CO as exhaust gas at 2% by volume. Calculate the concentration of CO in  $\mu\text{g}/\text{m}^3$  at  $0^\circ\text{C}$  and  $25^\circ\text{C}$  at 1 atmospheric pressure. (05 Marks)
  - c. Write a note on Photochemical Smog. (03 Marks)
- 2
  - a. Explain Air Pollutant on materials. (10 Marks)
  - b. Explain the cause for Bhopal gas tragedy. Also explain the after effects of the tragedy. (10 Marks)
- 3
  - a. Explain the effects of topography on pollutant dispersion. (10 Marks)
  - b. With a neat sketch, explain different types of Environmental Lapse Rate. (08 Marks)
  - c. Write the equation for Gaussian plume model for  $X(x, y, z)$ . (02 Marks)
- 4
  - a. An anemometer measures a wind speed of  $5\text{m/s}$  at a height of  $10\text{m}$  above ground. Find the wind speed at a height of  $150\text{m}$  if the change in temperature is :
    - i)  $-15^\circ\text{C}/1000\text{m}$       ii)  $+5^\circ\text{C}/1000\text{m}$ . (05 Marks)
  - b. What are the factors to be considered to select site for the construction of industry? (10 Marks)
  - c. Explain the working principle of Sound level meter. (05 Marks)

**PART – B**

- 5
  - a. With a neat sketch, explain method of using Ringelmann chart. (10 Marks)
  - b. Design a gravity settler to remove all the iron particulate from a dust laden gas stream with the data given as  $d_p = 35\mu\text{m}$  gas = air at ambient conditions.  $Q = 3.6\text{ m}^3/\text{s}$ ,  $\rho_p = 7.62\text{ g/cc}$ . (10 Marks)
- 6
  - a. Explain how particulate pollutants are measured. (10 Marks)
  - b. Explain the operational problems associated with fabric filters. (10 Marks)
- 7
  - a. What are Ozone holes? Explain the effects of Ozone holes. (10 Marks)
  - b. With a neat sketch, explain Box model for indoor air pollution. (10 Marks)
- 8
  - a. With a neat sketch, explain fixed bed unit to remove gaseous air pollutants. (10 Marks)
  - b. How Automobile Emission are Controlled? (10 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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10CV763

**Seventh Semester B.E. Degree Examination, Dec.2017/Jan.2018**  
**Pavement Materials & Construction**

Time: 3 hrs.

Max. Marks:100

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

**PART – A**

- 1 a. Explain desirable properties of Road aggregates used for construction. (06 Marks)  
b. Brief the classification of road aggregate's based on petrology. (06 Marks)  
c. List various tests on road aggregates. Explain impact test procedure in detail. (08 Marks)
- 2 a. Explain the manufacturing process of Bitumen with neat figure. (06 Marks)  
b. Differentiate between Bitumen and Tar. (06 Marks)  
c. List out tests conducted on Bitumen? Explain softening point test on bitumen with neat diagram. (08 Marks)
- 3 a. Explain briefly the preparation of Bitumen Emulsion. What are types of Bitumen Emulsion? With application of each type. (10 Marks)  
b. List out types of adhesion tests. Explain in brief about Immersion trafficking test with neat diagram. (10 Marks)
- 4 a. Briefly explain the desirable properties of bituminous mix. (08 Marks)  
b. Explain the Marshall method of bituminous mix design. (12 Marks)

**PART – B**

- 5 a. Discuss the use of different compacting equipments. Explain with neat diagram, working principle of sheep foot Roller with advantages. (12 Marks)  
b. Explain the working principle of,  
(i) Dozers.  
(ii) Drag line (08 Marks)
- 6 a. Bring out construction steps involved in subgrade preparation. What are the quality control checks carried out. (12 Marks)  
b. Enumerate the steps in the formation of an embankment. (08 Marks)
- 7 a. Write the specification of materials and construction procedure for WBM roads. (10 Marks)  
b. Explain briefly the construction steps involved in bituminous concrete with quality control tests. (10 Marks)
- 8 a. With the neat figures, explain the following types of joints in rigid pavements:  
(i) Expansion joint  
(ii) Longitudinal joint.  
(iii) Construction joint. (12 Marks)  
b. Enumerate the steps involved in construction of cement concrete pavements. (08 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.