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Seventh Semester B.E. Degree Examination, Dec.2014/Jan.2015
Environmental Engineering – II

Time: 3 hrs.

Max. Marks:100

Note: 1. Answer FIVE full questions, selecting at least TWO questions from each part.
2. Assume suitable data wherever required.

PART – A

- 1 a. Explain merits, demerits and suitability of combined system and separate system of sewerage. (12 Marks)
- b. Differentiate between:
 - i) Sewage and Sullage
 - ii) Infiltration and exfiltration.
 - iii) Minimum and Maximum velocities in sewers.
 - iv) D.W.F and W.W.F (08 Marks)
- 2 a. Explain the differences in the hydraulic design of water supply lines and sewer lines. (06 Marks)
- b. Explain the factors affecting dry weather flow. (06 Marks)
- c. Find the minimum velocity and gradient required to transport coarse sand through a sewer of 60 cm diameter with sand particles of 1 mm diameter and specific gravity 2.66. Assume $\beta = 0.06$ and $f = 0.02$. Assume the sewer to run half full. Take $N = 0.012$. (08 Marks)
- 3 a. What are sewer appurtenances? Explain with a neat sketch, construction and working of a manhole. (10 Marks)
- b. Explain the following, with sketches:
 - i) Catch basins.
 - ii) Oil and grease traps. (10 Marks)
- 4 a. Define BOD. Derive the expression for first stage BOD. (08 Marks)
- b. Write a note on carbon cycle. (04 Marks)
- c. The BOD_5 of wastewater has been analysed as 600 mg/L. If $K_1 = 0.23/\text{day}$ (base e), what is the ultimate BOD_u of the waste. What proportion of BOD_u would remain unoxidised after 20 days? (08 Marks)

PART – B

- 5 a. Explain : i) Self purification of streams ii) Zones of purification. (05 Marks)
- b. Explain : i) Sewage farming ii) Sewage sickness. (05 Marks)
- c. A stream, saturated with D.O., has a flow of $1.2 \text{ m}^3/\text{sec}$, BOD of 4 mg/L and rate constant of 0.3 per day. It receives an effluent discharge of $0.25 \text{ m}^3/\text{sec}$ having BOD of 20 mg/L, D.O. 5 mg/L and rate constant 0.13 per day. The average velocity of flow of the stream is 0.18 m/sec. Calculate the D.O. deficit at point 20 kms and 40 kms downstream. Assume the temperature as 20°C , throughout and BOD is measured at 5 days. Take saturation D.O. at 20°C as 9.17 mg/L. (10 Marks)

- 6 a. Draw a flow diagram of a municipal sewage treatment plant including sludge digestion. Give the removal of important polluting parameters by each of the treatment units. (10 Marks)
- b. Explain the importance of screens and types of screens in the sewage treatment process. (10 Marks)
- 7 a. Give the comparison between conventional and high rate trickling filters. (10 Marks)
- b. Design the dimensions of a septic tank for a small colony of 150 persons provided with an assured water supply of 120 lpcd. Assume any data, you may need. (10 Marks)
- 8 Write short notes on:
- a. Sludge digestion tank.
- b. Sampling techniques.
- c. Skimming tank.
- d. Reuse and recycle of sewage. (20 Marks)

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Seventh Semester B.E. Degree Examination, Dec.2014/Jan.2015

Design of Steel 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 800-200 and steel tables permitted.
3. Assume missing data suitably.

PART - A

- 1
 - a. Mention the advantages and disadvantages of the steel structures. (06 Marks)
 - b. What are the requirements that govern the structural design of steel structures? (06 Marks)
 - c. Mention the different loads used in the steel sections and also the combination of loads. (08 Marks)

- 2
 - a. Explain various modes of failures of bolted connections with neat sketch. (06 Marks)
 - b. Two ISF sections 200 mm × 10 mm each and 1.5 m long are to be joined to make a member of length 3.0 m. Design a butt joint with the bolts arranged in a diamond pattern. The flats are supposed to carry a factored tensile force of 450 kN. Adopt HSFG bolts of property class 8.8, dia of bolt = 20 mm, coefficient of friction $\mu_f = 0.4$, slip resistance designated at ultimate load. Also, determine the efficiency of the joint. (14 Marks)

- 3
 - a. A tie member of a roof truss consists of 2-ISA 125 × 75 × 10 mm. The tie member is subjected to pull of 250 kN. The angles are connected on either side of a gusset plate of 10 mm thick with long legs back to back. Design the end connection assuming field weld. (06 Marks)
 - b. For the welded bracket shown in Fig.Q3(b), determine the greatest safe load that can be applied at a distance of 120 mm from flanges of column. The size of weld is 6 mm. Assume shop weld. (14 Marks)

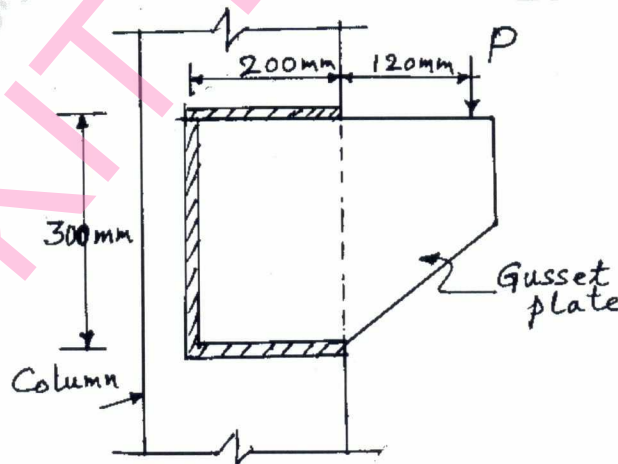


Fig.Q3(b)

(14 Marks)

- 4
 - a. Determine the shape factor of a rectangular section of breadth 'b' and depth 'd'. (06 Marks)
 - b. Find out the collapse load for a propped cantilever subjected to a uniformly distributed load/unit length. The plastic capacity of the beam is M_p . (14 Marks)

PART – B

- 5 a. What is lug angle and why is it not preferred? Explain. (06 Marks)
b. Design an unequal single angle section to act as a tie member of length 1.56 m in a roof truss, if it is to carry an axial load of 60 kN, when subjected to possible reversal of stress into compression resulting from the action of wind or earthquake. Design welded connection. (14 Marks)
- 6 a. A column square in cross section (plan) of side 360 mm consists of 4 angles of ISA 80 × 80 × 10 mm at each corner with suitable lacing. Find the load carrying capacity of the column, if the height of the column is 5 m and effectively held in position at both ends, but not restrained against rotation. (06 Marks)
b. Design a single angle strut for a roof truss carrying a compressive load of 100 kN. The length of strut between c/c intersections is 210 cm. Also design bolted end connection with 4.6 grade bolt. (14 Marks)
- 7 a. Distinguish between the slab base and gusseted base and draw a neat sketch of sectional elevation of gusseted base indicating the salient features. (06 Marks)
b. A built up column consists of ISHB 350 @ 674 N/m with 400 × 20 mm flange plates carries an axial load of 1800 kN. Design a suitable gusseted base. Bearing strength of concrete is 0.45 f_{ck}. Assume M₂₅ grade concrete and M₂₀ bolts of grade 5.6. SBC of soil = 180 kN/m². (14 Marks)
- 8 a. Distinguish between laterally restrained and unrestrained beams with the help of sketches. (06 Marks)
b. A roof of a hall measuring 5 × 12 m consists of 120 mm thick RCC slab supported on steel I-section spaced at 3.0 m c/c. Take live load 3.5 kN/m² and finishes 1.5 kN/m². Bearing of wall = 400 mm. the beam is laterally restrained. Design one of the interior beam supporting the roof. Check for shear, moment capacity and deflection. (14 Marks)

Seventh Semester B.E. Degree Examination, Dec.2014/Jan.2015
Estimation and Valuations

Time: 3 hrs.

Max. Marks:100

- Note: 1. Answer full question from PART – A**
2. Answer FOUR questions selecting at least
TWO full questions each from Part B and C.

PART – A

- 1** Prepare a detailed estimate for a residential building shown in Fig. Q1(i) and Q1(ii) for the following items of work. Prepare an abstract also,
 i) Earth work excavation for foundation in hard soil @ Rs 100/- m³
 ii) CC bed 1 : 4 : 8 for walls @ Rs 2250/- m³
 iii) SSM with CM 1 : 4 in foundation and basement @ Rs. 3500/- m³
 iv) CC plinth 1 : 2 : 4 @ Rs. 3900/- m³
 v) BBM walls with CM 1 : 6 for superstructure @ Rs 4000/- m³. (40 Marks)

PART – B

- 2** The details of manhole is shown in Fig. Q2. Estimate the quantities of the following items of work.
 i) Earthwork excavation
 ii) C. C. Bed with 1 : 3 : 6
 iii) First class brick work in CM 1 : 4
 iv) 20 mm thick cement mortar plaster. (15 Marks)
- 3** Write the detailed specification for any three of the following :
 i) Earth work
 ii) Damp proof course 25 mm thick in CM 1 : 1½ : 3
 iii) First class brick work in superstructure in CM 1 : 6
 iv) Cement plastering in CM 1 : 4. (15 Marks)
- 4** What is an estimate? Classify the types of estimate. Explain them with their limitations. (15 Marks)

PART – C

- 5** Carry out the rate analysis for any three of the following :
 i) CC 1 : 4 : 8 for foundation bed
 ii) Coursed rubble stone masonry in CM for 1 : 6 in foundation
 iii) 12 mm thick cement plastering in CM 1 : 6
 iv) 75 mm thick cement concrete flooring with CC 1 : 4 : 8. (15 Marks)
- 6** Estimate the cost of earthwork for a portion of the road from the following data. Formation width of the road is 10 m. Side slopes are 2 : 1 in filling and 1.5 : 1 in cutting. The cost filling is Rs. 180/m³ and cutting Rs. 120/m³.

Chainage, m	0	40	80	120	160	200	240	280
RL of GL, m	100.6	100.2	99.8	100.2	100.8	101.9	102.4	102.5
RL of formation level, m	101	→ Raising Gradient 1 in 400						

(15 Marks)

- 7** Write short notes on any three of the following :
 i) Day work
 ii) Schedule of rates
 iii) Administrative approval
 iv) Earnest money deposit. (15 Marks)

ALL DIMENSIONS ARE IN METRES

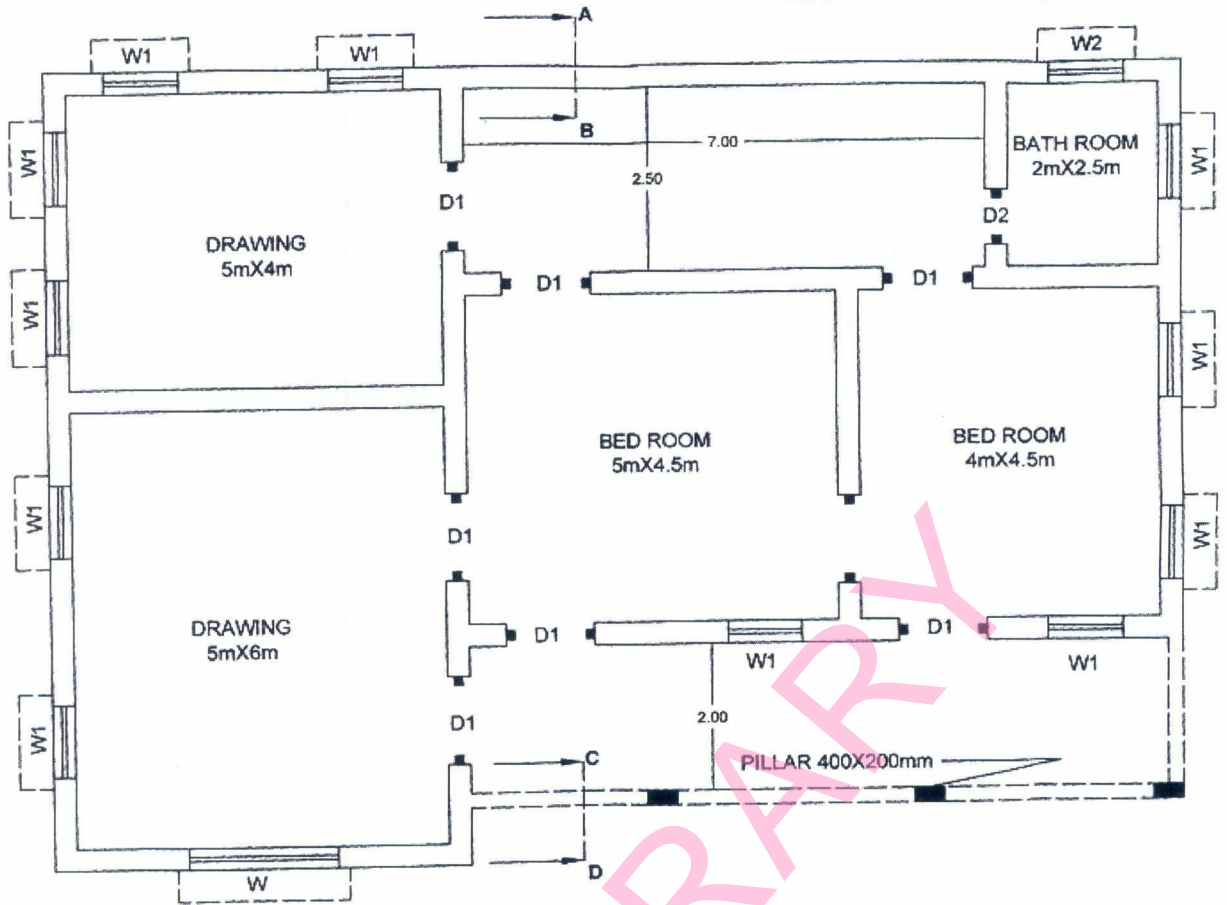
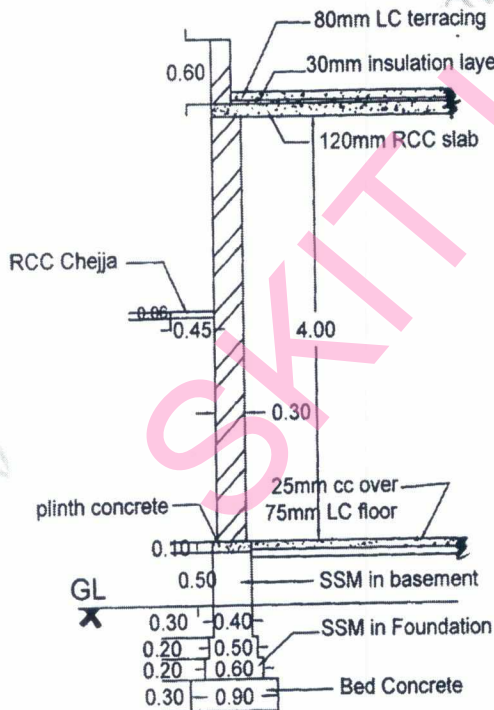
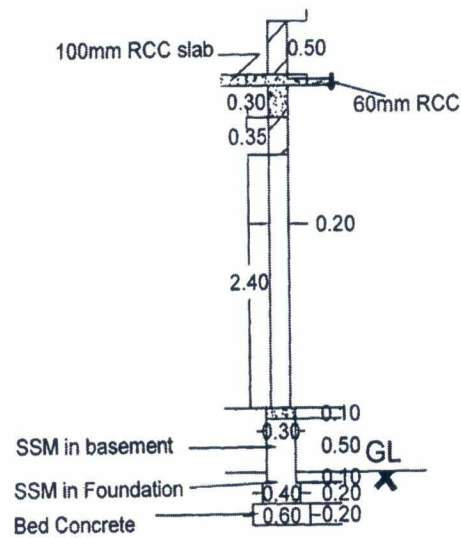


Fig. Q1(i)



SECTION ON AB

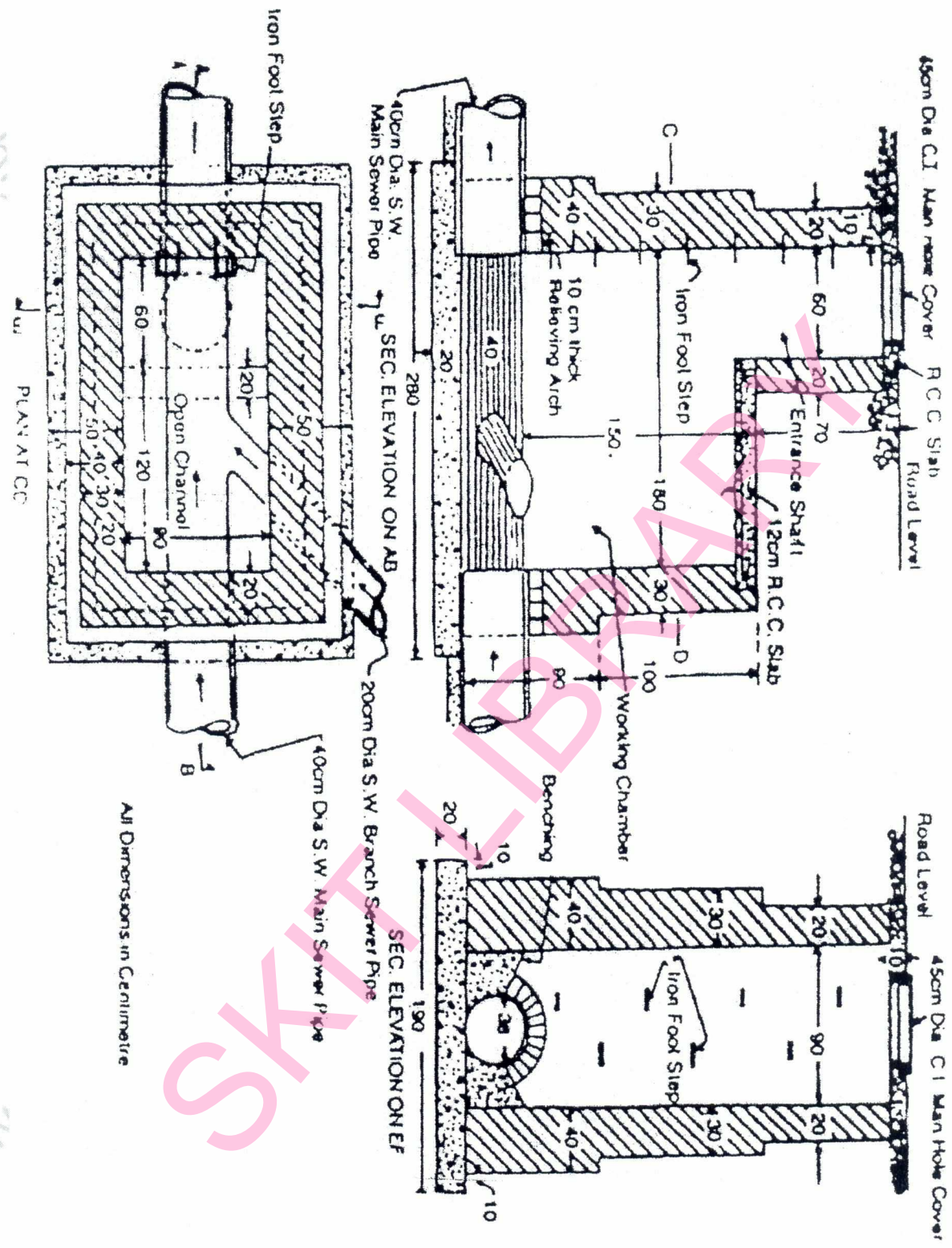


SECTION ON CD

- INDEX**
- DOORS**
 D1 - 1.2x2.1
 D2 - 1.0x2.1
- WINDOWS**
 W - 2.0x1.5
 W1 - 1.0x1.5
 W2 - 0.75x1.2

Fig. Q1(ii)

MANHOLE



All Dimensions in Centimetre

Fig. Q2

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Seventh Semester B.E. Degree Examination, Dec.2014/Jan.2015
Design of Pre-stressed Concrete Structures

Time: 3 hrs.

Max. Marks:100

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

PART – A

1.
 - a. Define pre-stressed concrete. State its advantage over reinforced concrete. **(06 Marks)**
 - b. Explain with neat sketches, 'Fryssinet' system of pre-stressing. **(06 Marks)**
 - c. A pre-stressed concrete beam supports a live load of 4 kN/m over a simply supported span of 8 m. The beam has an I – section with an overall depth of 400 mm. The thickness of flanges and web are 60 and 80 mm respectively. The width of the flanges is 200 mm. The beam is to be pre-stressed by an effective force of 235 kN at a suitable eccentricity such that the resultant stresses at the soffit of the beam at the centre of span is zero.
 - i) Find the eccentricity required for the force
 - ii) If the tendon is concentric, what should be the magnitude of the pre-stressing force for the resultant stress to be zero at the bottom fibre of the central span section? **(08 Marks)**

2.
 - a. Explain concept of load balancing in pre-stressed concrete design. **(06 Marks)**
 - b. A concrete beam with a "double overhang" has the middle span equal to 10 m and the equal overhanging on either side is 2.5 m. Determine the profile of the pre-stressing cable with an effective force of 250 kN which can balance a uniformly distributed load of 8 kN/m on the beam, which includes the self weight of the beam. Sketch the cable profile marking the eccentricity of cable at the support and mid-span. **(14 Marks)**

3.
 - a. List the various types of losses in pre-stressed concrete members and the equations used to determine them. **(06 Marks)**
 - b. A rectangular beam 180 mm wide by 400 mm deep is simply supported over a span of 8 m and is reinforced with 3 wires of 8 mm dia meter. The wires are located at a constant eccentricity of 80 mm and are subjected to an initial stress of 1200 N/mm². Calculate the percentage loss of stress in the wires if the beam is i) pre tensioned ii) post tensioned. Take $E_s = 210 \text{ kN/mm}^2$, modular ratio = 6, slip at anchorage = 0.8 mm, friction coefficient = 0.002/m, relaxation of steel stress = 6%. Adopt creep and shrinkage co-efficient as per IS : 1343 code specifications. **(14 Marks)**

4.
 - a. Explain the significance of long term deflections in PSC beams and indicate how it is calculated. **(06 Marks)**
 - b. What are the factors influencing the deflection of PSC beams? Briefly discuss them. **(04 Marks)**
 - c. A concrete beam having a rectangular section 150 mm wide by 300 mm deep is pre –stressed by a parabolic cable having an eccentricity of 75 mm at centre of span towards the soffit and an eccentricity of 25 mm towards the top at support sections. The effective force in the cable is 350 kN. The beam supports a concentrated load of 20 kN at the centre of span in addition to the self weight. If the modulus of elasticity of concrete is 38 kN/mm² and span is 8 m,, calculate,
 - i) Short term deflection at centre of span under prestress, self weight and live load
 - ii) Long term deflection assuming the loss ratio as 0.8 and creep co-efficient as 1.6. **(10 Marks)**

PART – B

- 5 a. What are the different types of flexural failures observed in a pre-stressed concrete beam? Explain with sketches. (06 Marks)
- b. A double Tee section having a flange 1200 mm wide and 150 mm thick is pre-stressed by 4700 mm² of high tensile steel located at an effective depth of 1600 mm. The ribs have a thickness of 1500 mm each. The cube strength of concrete is 40 N/mm² and tensile strength of steel is 1600 N/mm². Determine the flexural strength of the double tee girder using IS : 1343 code provisions. (07 Marks)
- c. A post – tensioned beam with “unbounded tendons” is of rectangular cross section 500 mm × 1000 mm. The cross sectional area of pre-stressing steel is 3000 mm². The effective pre-stress after considering all losses is 1000 MPa. The effective span of the beam made M40 concrete is 15 m. Estimate the ultimate moment of resistance of the section using codal provisions. (07 Marks)
- 6 a. Discuss briefly the modes of failure due to shear. (05 Marks)
- b. A concrete beam of rectangular section, 200 mm wide and 600 mm deep, is pre-stressed by a parabolic cable located at an eccentricity of 100 mm at mid-span and zero at the supports. If the beam has a span of 10 m and carries a uniformly distributed live load of 4 kN/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 24 kN/m³. (07 Marks)
- c. A PSC beam 250 mm wide and 150 mm deep is subjected to a shearing force of 900 kN. The fibre stress under working loads is 4 N/mm². If the effective pre-stresses is 1000 N/mm² and area of cables 1500 mm². Design the shear reinforcement. The cables are inclined at an angle of $\sin^{-1}(\frac{1}{6})$ with horizontal. (08 Marks)
- 7 a. Explain Magnal method of end block design. (08 Marks)
- b. The end block of a post tensioned beam is 300 mm wide by 300 mm deep and is pre-stressed concentrically by a Fryssinet cylindrical anchorage of 150 mm diameter with a jacking force of 800 kN. Design suitable anchorage zone reinforcement and sketch the details. (12 Marks)
- 8 Design a pre-tensioned symmetrical I – beam for an effective span of 7 m to support a super imposed load of 6 kN/m. The beam is to be pre cast in a factory and is to be designed for handling at any point along length during transport and erection. Load factors against failure by bending or shear. For dead load = 1.5, for live load = 2.5
Permissible stresses :
At transfer,
Compressive stress = 1.4 N/mm²
Tensile stress = 1.4 N/mm²
At working load,
Compressive stress = 16 N/mm²
Tensile stress = 1.4 N/mm².
The specified 28 day cube strength of concrete is 50 N/mm². The pre-stressing force is to be provided by 5 mm diameter high – tensile wires having an ultimate tensile strength of 1600 N/mm². The loss ratio is 0.8. Design the beam and sketch the cross – section showing the arrangement of wires. (20 Marks)

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Seventh Semester B.E. Degree Examination, Dec.2014/Jan.2015
Highway Geometric Design

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 a design vehicle? Indicate the IRC and AASHTO specifications with respect to dimensions and axel loads. **(06 Marks)**
 b. List and briefly describe the factors controlling geometric design of highways. **(08 Marks)**
 c. A one way city street has the following traffic count per hour during peak hour. Find the traffic in terms of PCU at
 i) Mid block section ii) At intersection

Vehicle	Number
Truck	200
Bus	400
Car	1000
Scooter	1000
Bicycle	1000

(06 Marks)

- 2 a. Mention the design requirements of a road hump. Sketch the details of a typical road hump. **(06 Marks)**
 b. Briefly describe the various road margins. **(08 Marks)**
 c. Determine the height of crown with respect to edges of road in the following cases:
 i) WBM road 3.8m wide in low rainfall area.
 ii) WBM road 7.0m wide in heavy rainfall area.
 iii) Bituminous road 7.5m in heavy rainfall area. **(06 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? **(08 Marks)**
 b. Calculate the overtaking sight distance as per AASHTO practice for a design speed of 100 Km/h making suitable assumptions. Also calculate the OSD as per IRC practice. **(12 Marks)**

- 4 a. Derive the equation for calculating extra widening of a horizontal curve. **(06 Marks)**
 b. A 6 lane divided highway has a curve 1000m long and radius of 500m. The safe SSD is 200m. Calculate the minimum setback distance from inner edge of the curve to the inner edge of a building to ensure safe visibility. The width of pavement per lane is 3.5m. **(06 Marks)**
 c. A 2 lane NH passing through plain terrain has horizontal curve of radius 400m. The design speed is 100 Km/h. Design the length of transition curve. **(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.

PART – B

- 5 a. What are the circumstances in which a valley curve is formed? Indicate with sketches. (06 Marks)
- b. An ascending gradient of the 100 meets a descending gradient of the 120. A summit curve is to be designed for a speed of 80 Km/h so as to have an OSD of 470M. (06 Marks)
- c. Derive the expression for calculating length of valley curve of parabolic shape for comfort condition. (08 Marks)
- 6 a. Indicate the following with line sketches:
 i) Traffic manoeuvres at atgrade intersections.
 ii) Types of atgrade intersections. (10 Marks)
- b. What are advantages of channelized intersections? With sketches indicate the common types of channelized intersections. (10 Marks)
- 7 a. List the advantages and disadvantages of i) atgrade intersections; ii) Grade separated intersections. (10 Marks)
- b. Two roads in an urban area meet at 90° and have a carriage way width of 15m. Design a rotary intersection given that design speed is 30 Km/h, radius of entrance curve = 20m radius of exit curve = 40m. Determine the capacity of rotary with the following peak hour traffic:

Approach	Left turning			Straight ahead			Right turning		
	Cars	CV	TW	Cars	CV	TW	Cars	CV	TW
N	200	50	100	250	100	150	150	50	80
E	180	60	80	220	50	120	200	40	120
S	250	80	100	150	50	90	160	70	90
W	220	50	120	180	60	100	250	60	100

(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. List the step by step procedure of hydrologic and hydraulic design of longitudinal surface drain. (10 Marks)

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Seventh Semester B.E. Degree Examination, Dec.2014/Jan.2015

Solid Waste Management

Time: 3 hrs.

Max. Marks:100

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

PART – A

- 1 a. Define term solid wastes. Explain classification and sources of solid wastes. (10 Marks)
- b. Explain material flow and generation of solid waste in a technological society with figure. (10 Marks)
- 2 a. Distinguish between Hauled container system and Stationary container system with a schematic diagram. (10 Marks)
- b. Estimate the waste generation rate for a residential area consisting of 1000 houses. If the observation location is a local transfer station and period of generation is one week. The data as follows:
 Number of compactor truck load – 10, Volume of each compactor truck – 12 m³,
 Number of flat bed truck load – 08, Volume of each flat bed truck – 1.5 m³,
 Number of loads from individual residence – 20, Volume of individual residence – 0.3 m³,
 Density of compactor truck- 300 kg/m³, Flat bed truck – 150 kg/m³,
 Individual residence – 150 kg/m³, Number of persons in each house – 5. (06 Marks)
- c. Write note on Route optimization. (04 Marks)
- 3 a. Explain the factors to be considered in evaluating on site process techniques. (08 Marks)
- b. Explain : i) Mechanical size reduction ii) Magnetic component separation
 iii) Mechanical volume reduction. (12 Marks)
- 4 a. What is incineration? With the help of sketch, explain incineration processes. (10 Marks)
- b. Differentiate between combustion, pyrolysis and solification. Explain pyrolysis. (10 Marks)

PART – B

- 5 a. What are the factors that must be considered for the design of aerobic composting process? (10 Marks)
- b. Differentiate between aerobic and anaerobic process. (06 Marks)
- c. Write note on vermi composting. (04 Marks)
- 6 a. With a neat sketch, explain the methods of land filling of solid waste. (10 Marks)
- b. Explain with a neat sketch various vent systems used to control the lateral movement of gases in sanitary land fills. (10 Marks)
- 7 a. Estimate the required land fill area for a community having a population of 31,000. Assume the following : i) Solid waste generation is 2.9 kg/capita/day ii) Compacted density of solid waste in land fill 474.6 kg/m³ iii) Uncompacted density of solid waste is 907.2 kg/m³ iv) Average depth of compacted waste = 3.1 m. (10 Marks)
- b. List the various methods of disposal of solid waste. Describe any one of the method. (10 Marks)
- 8 a. Write a note on Importance of reuse and recycle of solid wastes with examples. (10 Marks)
- b. Explain environmental significance of plastic waste. (06 Marks)
- c. Write note on energy recovery operations of solid wastes. (04 Marks)

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Seventh Semester B.E. Degree Examination, Dec.2014/Jan.2015
Pavement Materials and Construction

Time: 3 hrs.

Max. Marks:100

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

PART – A

1. a. Classify the road aggregates based on petrology and origin. (08 Marks)
b. What are the desirable properties of road aggregates? (06 Marks)
c. List the different methods for aggregate blending to meet specified gradation. Explain any one in brief. (06 Marks)
2. a. Briefly explain the preparation of Bitumen with neat figure. (06 Marks)
b. Bring out difference between Bitumen and Tar. (06 Marks)
c. Describe penetration test to be carried out on bitumen with standard values recommended for construction. (08 Marks)
3. a. List different adhesion tests. Explain immersion trafficking test with neat sketches. (08 Marks)
b. Mention different types of emulsions and cut backs. Under what conditions they are used? (12 Marks)
4. a. Explain the desirable properties of bituminous mix. (08 Marks)
b. The specific gravities and weight proportions for aggregate and bitumen are as under given, for the preparation of Marshall mix design. The volume and weight of one Marshall specimen was found to be 475CC and 1100gm. Assuming absorption of bitumen in aggregate as zero. Find V_v , V_b , VMA and VFB.

Item	Agg1	Agg2	Agg3	Agg4	Bitumen
Weight (gm)	825	1200	325	150	100
Sp gravity	2.63	2.5	2.46	2.43	1.05

(12 Marks)

PART – B

5. a. List and explain types of compacting equipments used for highway construction. Bring out advantages and disadvantages of sheep foot rollers. (10 Marks)
b. Write a note on the following: i) Power shovel ii) Drag line. (10 Marks)
6. a. Write a short note on:
i) Desirable properties of subgrade soil ii) Tests on subgrade soil. (10 Marks)
b. Bring out construction steps involved in subgrade preparation. What are the quality control checks conducted? (10 Marks)
7. a. Write the specification of materials and construction procedure for WMM roads. (10 Marks)
b. Explain briefly the construction procedure for bituminous concrete with quality control checks as per MORTH. (10 Marks)
8. a. With the help neat figures explain the following types of joints in rigid pavements:
i) Construction joint ii) Expansion joint iii) Longitudinal joint. (12 Marks)
b. Explain the construction procedure for cement concrete pavements. (08 Marks)

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Seventh Semester B.E. Degree Examination, Dec.2014/Jan.2015

Air Pollution and Control

Time: 3 hrs.

Max. Marks:100

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

PART - A

- 1 a. What are the methods of identifying air pollution? Explain briefly. (10 Marks)
- b. How air pollutants are classified? Give examples. (05 Marks)
- c. Briefly explain Smog. (05 Marks)
- 2 a. Explain air pollutants affecting plants. (10 Marks)
- b. Write a note on Bhopal Gas Tragedy. (10 Marks)
- 3 a. With sketch, explain plume behaviour in different atmospheric conditions. (10 Marks)
- b. What are the meteorological parameters that influence air pollution? (05 Marks)
- c. Write a note on wind rose. (05 Marks)
- 4 a. Briefly explain factors to be considered for industrial plant location. (10 Marks)
- b. Define Noise pollution. List the sources of noise pollution. (05 Marks)
- c. What are the effects of noise pollution? List the controlling measures used to control noise pollution. (05 Marks)

PART - B

- 5 a. Briefly explain preliminary considerations and stages of sampling. (10 Marks)
- b. Write a brief procedure for collection of suspended particulates. (10 Marks)
- 6 a. Briefly explain methods used to minimize the automobile exhausted emission. (10 Marks)
- b. What are the alternative methods available to control automobile emission? (05 Marks)
- c. Write a note on exhaust gas recycling and control of evaporative emissions. (05 Marks)
- 7 Write short notes on :
 - a. Acid rain. (07 Marks)
 - b. Green house effect. (07 Marks)
 - c. Indoor air pollution. (06 Marks)
- 8 a. Mention any five Environmental legislation. (05 Marks)
- b. Mention any 5 drinking water standards and 5 waste water standards as per Environmental Act. (05 Marks)
- c. List the Indian Air Quality standards as per category. (05 Marks)
- d. List the noise pollution standards. (05 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.