Code No: RT31013 **R13** SET - 1

III B. Tech I Semester Regular Examinations, November - 2015
DESIGN AND DRAWING OF REINFORCED CONCRETE STRUCTURES
(Civil Engineering)

Time: 3 hours Max. Marks: 70

Answer any ONE Question from Part – A and any THREE Questions from Part – B
Use of IS: 456-2000 and design charts from SP-16 is allowed.
For all designs adopt Limit State Method

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PART –A

1 A rectangular reinforced concrete beam is simply supported on two masonry walls 230 mm thick and 6 m apart (centre to centre). The beam is carrying an imposed load of 15 kN/m. Design the beam with all necessary checks. Use M25 concrete and Fe 415 steel. Sketch the details of reinforcement. [28M]

(OR)

2 Design a reinforced concrete slab for a room of clear dimensions 4 m x 5 m. The slab is supported on walls of width 300 mm. The slab is carrying a live load of 4 kN/m^2 and floor finish 1 kN/m^2. Use M20 concrete and Fe 415 steel. The corners of slab are held down. Sketch the layout of the reinforcement. [28M]

PART -B

3 a) What are different methods of design in R.C.C? [7M]
b) Draw stress-strain relationship for concrete and explain it briefly. [7M]

4 A simply supported R.C.C. beam 250 mm wide and 450 mm deep (effective) is reinforced with 4 numbers of 18 mm diameter bars. Design the shear reinforcement if M20 grade of concrete and Fe 415 steel is used and beam is subjected to a shear force of 150 kN at service state. [14M]

5 Design a short R.C.C. column to carry an axial load of 1600 kN. It is 4 m long, effectively held in position and restrained against rotation at both ends. Use M20 concrete and Fe 415 steel. [14M]

6 Design a square footing of uniform thickness for an axially loaded column of 450 mm x 450 mm size. The safe bearing capacity of soil is 190 kN/m^2. Load on column is 850 kN. Use M20 concrete and Fe 415 steel. [14M]

7 Design a flight (waist slab) between landing to landing of a tread-riser type of staircase, with 10 risers, each 150 mm, and with tread of 270 mm. The upper and lower landings are 1200 mm wide each supported on 230 mm thick masonry walls at the edges, parallel to the risers. The risers are liable to be overcrowding. The materials to be used for construction are M20 grade concrete and HYSD bars of grade Fe 415. [14M]

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Code No: RT31013 **R13** SET - 2

III B. Tech I Semester Regular Examinations, November - 2015
DESIGN AND DRAWING OF REINFORCED CONCRETE STRUCTURES
(Civil Engineering)

Time: 3 hours Max. Marks: 70

Answer any ONE Question from Part – A and any THREE Questions from Part – B
Use of IS: 456-2000 and design charts from SP-16 is allowed.
For all designs adopt Limit State Method

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PART –A

1 Design a reinforced concrete beam of span 7 m carrying a load of 20 kN/m throughout its length. The beam is simply supported on brick masonry walls with 230 mm width. Use M30 grade concrete and Fe500 steel bars. Keep the depth as 1.5 times the width. Sketch the details of reinforcement. [28M]

(OR)

2 A reinforced concrete slab of size 6m x 4m whose adjacent short edges are discontinuous and monolithic construction with the supports. The slab has to carry a live load of 5 kN/m^2 and a floor finish of 1.5 kN/m^2 and the floor partition is 1 kN/m^2. Use M20 concrete and Fe415 steel. Sketch the details of reinforcement also. [28M]

PART -B

3 Draw stress block diagram and evaluate the following expressions for limit state design:

a) Neutral Axis depth [5M]
b) Lever arm [4M]
c) Moment of resistance. [5M]

4 A simply supported R.C.C. beam 230 mm wide and 450 mm over all depth is reinforced with 4 numbers of 16 mm diameter bars. Design the shear reinforcement if the shear force at service state is 180 kN. Use M20 grade of concrete and Fe 415 grade steel. [14M]

5 Design a circular column of 4 m height is effectively held in position at one end and pinned at other end. The diameter of the column is 400 mm. Calculate the reinforcement if it is required to carry a factored axial load of 1600 kN. Use M30 mix and Fe 500 grade steel. [14M]

6 Design an isolated rectangular footing for an axial load of 1500 kN transmitted by the column. The cross section of the column is 230 mm x 450 mm. The SBC of soil is 180 kN/m^2. Adopt M20 grade concrete and Fe 415 grade steel. [14M]

7 Design a stair case slab for a three storied residential building. The dimensions of stair case room are 3.6 m x 4.5 m. The height of each storey is 3.6 m. Adopt M 20 grade concrete and Fe 415 grade steel. [14M]

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Code No: RT31013 **R13** SET - 3

III B. Tech I Semester Regular Examinations, November - 2015
DESIGN AND DRAWING OF REINFORCED CONCRETE STRUCTURES
(Civil Engineering)

Time: 3 hours Max. Marks: 70

Answer any ONE Question from Part – A and any THREE Questions from Part – B
Use of IS: 456-2000 and design charts from SP-16 is allowed.
For all designs adopt Limit State Method

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PART –A

1 A reinforced concrete beam is simply supported over a clear span of span 6 m. The beam carries a superimposed load of 10 kN/m. Design the beam if the width of the beam is 300 mm. Use M20 grade concrete and Fe 415 steel. The beam is resting on 400 mm thick walls. Sketch the details of reinforcement. [28M]

(OR)

2 Design an R.C.C. slab of size 5 m x 6 m, simply supported on all four edges with corners held down. The slab is carrying a load of 4 kN/m^2 including floor finish etc. Use M 20 concrete and Fe 415 steel. Sketch the details of reinforcement also. [28M]

PART -B

3 a) Write short notes on balanced, under reinforced and over reinforced sections with sketches (working stress method). [7M]

b) A doubly reinforced beam 300 mm x 680 mm effective is reinforced on tension and compression side with 4 numbers of 25 mm diameter bars. Compression steel is placed 40 mm from top of the beam. If the beam carries a bending moment of 215 x 10^6N-mm, find the stresses induced in steel and concrete. Take m = 13.33 [7M]

4 A simply supported R.C.C. beam 200 mm x 400 mm (effective) is reinforced with 4 bars of 22 mm diameter on tension side. The beam is carrying a load of 10 kN/m over a clear span of 8 m. Design the shear reinforcement. Use M 20 concrete and Fe 415 steel bars. [14M]

5 An R.C.C. short column of size 400 mm x 500 mm is carrying a factored load of 3000 kN. Design the column assuming e_{min} < 0.05 D. Use M25 concrete and Fe 415 steel. [14M]

6 Design a rectangular footing of uniform thickness for an axially loaded column of size 300 mm x 600 mm. Load on the column is 1150 kN. Safe bearing capacity of the soil is 200 kN/m^2. Use M20 concrete and Fe 415 steel. [14M]

7 Design the waist slab type stair case consisting of a straight flight of stairs resting on two stringer beams along the two sides. Assume the span of the slab as 2 m with risers of 160 mm and treads of 270 mm. Live load= 3 kN/m^2. Adopt M20 grade concrete and Fe 415 grade steel. [14M]

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Code No: RT31013 **R13** SET - 4

III B. Tech I Semester Regular Examinations, November - 2015
DESIGN AND DRAWING OF REINFORCED CONCRETE STRUCTURES
(Civil Engineering)

Time: 3 hours Max. Marks: 70

Answer any ONE Question from Part – A and any THREE Questions from Part – B
Use of IS: 456-2000 and design charts from SP-16 is allowed.
For all designs adopt Limit State Method

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PART –A

1 A simply supported R.C.C. beam over an effective span of 8 m carrying an imposed load of 30 kN/m. Design the beam using M20 grade concrete and Fe 415 steel. Sketch the details of reinforcement. [28M]

(OR)

2 The panel of slab is 4.5 m x 5 m. One short edge and one long edge of the slab is discontinuous and other short edge and long edges are continuous. The slab is restrained with edge beam. Super imposed load is 3.5 kN/m^2 and floor finishes being 1.0 kN/m^2. Design the slab. Use M20 grade concrete and Fe 415 steel. Sketch the details of reinforcement also. [28M]

PART -B

3 a) Find the moment of resistance of a beam section 250 mm x 500 mm deep is reinforced with 2- 16 mm bars in tension at an effective cover of 40 mm. Use M20 concrete and Fe 500 grade of steel. [7M]

b) What would be the increase in the moment of resistance if it is reinforced with 2-16 mm bars of Fe 500 grade in compression at an effective cover of 40 mm. Whether the neutral axis would shift upwards or downwards, and by what amount? [7M]

4 A simply supported beam with clear span 6 m, width 400 mm and effective depth 560 mm carries a limit state load of 175 kN/m inclusive of self weight, dead load and live load. It is reinforced with 4 bars of 28 mm diameter tension steel which continue right into the support. Take f_{ck} = 20 N/mm^2, f_y= 250 N/mm^2, Design shear reinforcement. [14M]

5 Design a R.C.C. column to carry an axial load of 2000N. The size of the column is restricted to 600 mm square. The effective height of column is 9 m. Use M20 concrete and σ_{sc} = 190 N/mm^2. [14M]

6 Design the footing for a reinforced concrete column 225 x 450 mm carrying an axial load of 1075 kN. The bearing capacity of the soil is 100 kN/m^2. Use M20 concrete and Fe500 grade steel as reinforcement. [14M]

7 Design a single flight stair case slab to cover a horizontal span of 4.5 m if the total vertical rise is 3.6 m. There are total 18 steps to rise. The tread is 250 mm. Take live load as 3000 N/m^2. Use M25 concrete and Fe 415 steel. [14M]

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Code No: RT31014 **R13** SET - 1

III B. Tech I Semester Regular Examinations, November - 2015
ENGINEERING GEOLOGY
(Civil Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answering the question in **Part-A** is compulsory
3. Answer any **THREE** Questions from **Part-B**

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PART –A

1	a)	Write a detailed note on physical weathering.	[3M]
	b)	What is metamorphic rock? Discuss the various agents of metamorphism.	[4M]
	c)	Discuss the effect of faulting on various engineering projects.	[4M]
	d)	How are earthquakes classified? Explain their causes.	[3M]
	e)	Describe the electrical resistivity method of site investigation.	[4M]
	f)	Give an account of geological investigation of Dam site.	[4M]

PART -B

2	a)	Write a note on geological work of river.	[4M]
	b)	Give a brief account of the importance of geology in civil engineering. Explain your answer by giving suitable example.	[8M]
	c)	Define weathering. Add a note on engineering importance.	[4M]
3	a)	Explain physical properties of Quartz mineral.	[3M]
	b)	Explain how are the sedimentary rocks formed? Describe the various structures present in the rocks.	[8M]
	c)	Define the following terms: i) Hardness, ii) Luster, iii) Fracture, iv) Cleavage.	[5M]
4	a)	Explain, with neat sketches, the principal types of Faults as recognized on the basis of apparent movement and mode of occurrence.	[8M]
	b)	How are folds classified? Describe different types of folds.	[8M]
5	a)	Explain the following: i) Aquifer, ii) Aquiclude and iii) Hydrological cycle.	[8M]
	b)	Effects enumerate the classification and causes of landslides.	[8M]
6	a)	Write the importance of seismic refraction methods in civil engineering.	[8M]
	b)	Describe the importance of Electrical Resistivity studies in civil engineering.	[8M]
7	a)	Discuss the influence of structural attitudes of sedimentary rocks on dam stability.	[8M]
	b)	Explain the influence of geological structures, water table, and scope for preventive leakage for successful reservoir.	[8M]

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Code No: RT31014 **R13** SET - 2

III B. Tech I Semester Regular Examinations, November - 2015
ENGINEERING GEOLOGY
(Civil Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answering the question in **Part-A** is compulsory
3. Answer any **THREE** Questions from **Part-B**
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PART –A

1	a)	River sorting of sediments.	[3M]
	b)	What do you understand by minerals? How minerals are formed?	[4M]
	c)	Describe the different types of unconformities and discuss the criteria for their recognition.	[4M]
	d)	Write notes on prevention, control and correction of landslides.	[3M]
	e)	Explain the necessities & importance of geophysical investigation.	[4M]
	f)	Explain the construction of a Gravity Dam?	[4M]

PART -B

2	a)	Briefly explain the different types of physical and chemical weathering.	[4M]
	b)	Explain in detail the geological work of Rivers	[8M]
	c)	Discuss how geological studies can be utilized in civil engineering projects.	[4M]
3	a)	Differentiate between Gneiss and Schist.	[3M]
	b)	Explain important physical properties of minerals that are commonly studied for their identification.	[8M]
	c)	Explain the importance of: i) Granite, ii) Quartzite iii) Shale, iv) slate and v) Schist.	[5M]
4	a)	How folds are classified? Explain with the help of neat sketch important types of folds as distinguished on the basis of a mode of occurrence.	[8M]
	b)	Geological structures and their significance in civil engineering projects.	[8M]
5	a)	Define ground water and hydrological cycle. Also explain water table and aquifers and its types.	[8M]
	b)	Explain Earthquake magnitude, Earthquake Intensity, Earthquake focus and Earthquake tening.	[8M]
6	a)	What are the principles of geophysical exploration? Discuss any one method used for interpreting subsurface structures.	[8M]
	b)	Comment on seismic exploration techniques for site investigation in civil engineering projects and for water exploration.	[8M]
7	a)	Explain with neat diagram favorable and unfavorable dips at a Tunnel site.	[8M]
	b)	What is a dam? With what purposes it will be constructed? Explain in detail the geological investigations of a good dam site.	[8M]

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Code No: RT31014 **R13** SET - 3

III B. Tech I Semester Regular Examinations, November - 2015
ENGINEERING GEOLOGY
(Civil Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answering the question in **Part-A** is compulsory
3. Answer any **THREE** Questions from **Part-B**

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PART –A

1	a)	What is a river capture? Explain how it occurs.	[3M]
	b)	Explain physical properties of Calcite mineral.	[4M]
	c)	What is the difference between a normal and reverse fault? Explain with neat diagrams.	[4M]
	d)	What are different causes of Earthquakes?	[3M]
	e)	Explain the factors and methods of gravity.	[4M]
	f)	Tunneling in horizontal and folded rocks.	[4M]

PART -B

2	a)	Discuss three important adverse geological conditions that would require remediation during construction of buildings.	[4M]
	b)	Define weathering. Explain types of weathering and add a note on its importance.	[8M]
	c)	Define river and river system. Give a detail geological work of rivers.	[4M]
3	a)	Define cleavage and fracture of a mineral with examples.	[3M]
	b)	Describe following Rock properties in detail: (i) Basalt, (ii) Marble, (iii) Phyllite. (iv) Lime stone.	[8M]
	c)	Write notes on texture and Structures of metamorphic Rocks? Explain with a neat diagram.	[5M]
4	a)	Explain the following with neat sketches: (i) Dip and strike (ii) Parts of fold (iii) Mural Joints. (iv) Dome and Basin.	[8M]
	b)	Write short notes on the following with neat sketches: (i) Fan fold (ii) Columnar joints (iii) Angular unconformities and (iv) Radial faults.	[8M]
5	a)	Describe the Water Table and types of Ground Water.	[8M]
	b)	What are landslides? Discuss briefly their types, causes and preventive measures.	[8M]
6	a)	Write the importance of seismic refraction methods in civil engineering.	[8M]
	b)	Explain the principles used in the electrical resistivity and electrical SP methods of geophysical exploration.	[8M]
7	a)	Discuss the geological investigations that are carried out for Dam site selection.	[8M]
	b)	What are Dams and Reservoirs? Discuss the different types of dams giving geological reasons.	[8M]

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Code No: RT31014 **R13** SET - 4

III B. Tech I Semester Regular Examinations, November - 2015
ENGINEERING GEOLOGY
(Civil Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answering the question in **Part-A** is compulsory
3. Answer any **THREE** Questions from **Part-B**

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PART –A

1	a)	Distinguish between weathering and erosion.	[3M]
	b)	What is the difference between a batholiths and a stock? Explain with neat diagrams.	[4M]
	c)	Explain the following terms with neat sketches: i) Foot wall and Hanging wall and ii) Throw and Heave	[4M]
	d)	Discuss the following terms: (i) Focus and Epicentre, (ii) P- waves and S-waves.	[3M]
	e)	Describe seismic refraction survey to de conducted for determining the depth of bed rock.	[4M]
	f)	Explain silting of reservoir and its control.	[4M]

PART -B

2	a)	Explain the Branches of Geology?	[4M]
	b)	Describe in detail, the process of weathering of rocks. Add a note on the effect of weathering on the strength of rocks.	[8M]
	c)	Explain the role of geology in the field of civil engineering.	[4M]
3	a)	Bring out the differences between muscovite and biotite.	[3M]
	b)	Explain the engineering properties and description of Granite, Shale, Marble and Slate.	[8M]
	c)	Give a detailed account of the chemical composition, physical properties, origin, and uses of Feldspar group minerals.	[5M]
4	a)	Explain the following with neat sketches: (i) Open and closed folds, (ii) Graded Bedding, (iii) Current Bedding and (iv) Anticline and syncline.	[8M]
	b)	What are the reasons for folding? Discuss how a recumbent fold differs from a monocline fold and illustrate your answers with the help of neat sketches.	[8M]
5	a)	Enumerate the classification and causes of earthquakes and give their safety measures for construction of building in earthquakes prone areas.	[8M]
	b)	Classify landslides and discuss about the causative factors of landslides. Also, add a note on the measures for mitigation of landslides.	[8M]
6	a)	Give a detailed account of seismic surveys and interpretation of seismic data for subsurface investigation.	[8M]
	b)	Elaborate on the electrical methods used for sub-surface investigations.	[8M]
7	a)	Explain how faults and folds affect the choice of locations for dams and tunnels.	[8M]
	b)	Explain in detail about the role of geology on the design and construction of Reservoirs.	[8M]

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Code No: RT31011 **R13** SET - 1

III B. Tech I Semester Regular Examinations, November- 2015
GEOTECHNICAL ENGINEERING – I
(Civil Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answering the question in **Part-A** is compulsory
3. Answer any **THREE** Questions from **Part-B**
******

PART –A

1 a) Explain different types of soil structures with neat figures. [3M]
b) What is a flow curve? Explain with a neat sketch. [4M]
c) What are the factors affecting permeability? [4M]
d) What are differences between Bossiness's and Westergaard's theories? [4M]
e) Define over consolidated, under consolidated and normally consolidated clays. [3M]
f) Explain the basic mechanism of shear strength of soils. [4M]

PART -B

2 a) What is compaction and how it is different from consolidation? [4M]
b) Explain in detail about three clay minerals. [8M]
c) One cubic metre of wet soil weighs 19.80 kN. If the specific gravity of soil particles is 2.70 and water content is 11%, find the void ratio, dry density and degree of saturation. [4M]

3 a) Define three consistency limits. [3M]
b) Explain IS soil classification. [8M]
c) What are the different hydrometer corrections? Explain. [5M]

4 a) Derive expression for calculating average permeability of layered soil systems. [8M]
b) What are the uses of flow nets? [4M]
c) In order to compute the seepage loss through the foundation of a cofferdam, flownets were constructed. The result of the flownet study gave Nf= 6, Nd = 16. The head of water lost during seepage was 19.68m. If the hydraulic conductivity of the soil is k = 13.12 x 10^{-5} m/s, compute the seepage loss per metre length of dam per day. [4M]

5 a) Explain Newmark's influence chart preparation and usage. [8M]
b) Explain 2:1 stress distribution method. [3M]
c) A ring footing of external diameter 8 m and internal diameter 4 m rests at a depth 2 m below the ground surface. It carries a load intensity 150 kN/m^2. Find the vertical stress at depths of 2, 4 and 8 m along the axis of the footing below the footing base. Neglect the effect of the excavation on the stress. [5M]

6 a) Explain concept of consolidation using Spring Analogy. [5M]

b) Explain the procedure for determining pre consolidated pressure. [5M]

c) An oedometer test is performed on a 2 cm thick clay sample. After 5 minutes, 50% consolidation is reached. After how long time would the same degree of consolidation is achieved in the field where the clay layer is 3.70 m thick? Assume the sample and the clay layers have the same drainage boundary conditions (double drainage). [6M]

7 a) Explain Mohr Coulomb's shear failure theory. [4M]

b) Explain three drainage conditions for conducting shear testing of soils. [4M]

c) Given the following data from a consolidated undrained test with pore water pressure measurement, determine the total and effective stress parameters: [8M]

$\sigma 3$	100 kN/m^2	200 kN/m^2
$(\sigma 1 - \sigma 3)$	150 kN/m^2	192 kN/m^2
uf	60 kN/m^2	140 kN/m^2.

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Code No: RT31011 **R13** SET - 2

III B. Tech I Semester Regular Examinations, November- 2015
GEOTECHNICAL ENGINEERING – I
(Civil Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answering the question in **Part-A** is compulsory
3. Answer any **THREE** Questions from **Part-B**
******

PART –A

1	a)	What are the effects of compaction on soil properties?	[3M]
	b)	Explain with neat figure about plasticity chart and label it clearly.	[4M]
	c)	What quick sand condition?	[4M]
	d)	What is the use of New mark's influence chart?	[3M]
	e)	Define initial, primary and secondary consolidation of soils.	[4M]
	f)	How soils attain their shear strength?	[4M]

PART -B

2	a)	What is compactive effort?	[4M]
	b)	Write a relationship between void ratio, degree of saturation, unit weight of soil, unit weight of water and specific gravity of soil solids.	[6M]
	c)	The soil in a borrow pit has a void ratio of 0.90. A fill-in-place volume of 20,000 m^3 is to be constructed with an in-place dry density 18.84 kN/m^3. If the owner of borrow area is to be compensated at Rs. 1.50 per cubic metre of the excavation, determine the cost of compensation.	[6M]
3	a)	Draw a grain size distribution curves for different grades of soils and name them.	[6M]
	b)	What are the different Atterberg limts? Explain them.	[6M]
	c)	The natural moisture content of an excavated soil is 32%. Its liquid limit is 60% and plastic limit is 27%. Determine the plasticity index of the soil and comment about the nature of the soil.	[4M]
4	a)	Derive an equation, for determining soil permeability using variable head permeability test.	[8M]
	b)	A concrete dam is constructed across a river over a permeable stratum of soil of limited thickness. The water heads are upstream side 16m and 2m on the downstream side. The flow net constructed under the dam gives Nf= 4 and Nd=l2. Calculate the seepage loss through the subsoil if the average value of the hydraulic conductivity is 6 x 10^{-3} cm/sec horizontally and 3 x 10^{-4} cm/ sec vertically. Calculate the exit gradient if the average length of the last field is 0.9 m. Assuming e = 0.56, and Gs = 2.65, determine the critical gradient. Comment on the stability of the river bed on the downstream side.	[8M]

5 a) Derive an equation for determining the stress intensity at a given on the axis of loading due to the uniformly loaded circular area. [8M]

b) What is an isobar? What is a pressure bulb? [3M]

c) A ring footing of external diameter 8 m and internal diameter 4 m rests at a depth 2 m below the ground surface. It carries a load intensity 200 kN/m^2. Find the vertical stress at depths of 2, 4 and 8 m along the axis of the footing below the footing base. Neglect the effect of the excavation on the stress. [5M]

6 a) Explain coefficient of volume compressibility, coefficient of consolidation. [6M]

b) How do you determine the consolidated settlement of a foundation? [4M]

c) An oedometer test is performed on a 4 cm thick clay sample. After 5 minutes, 50% consolidation is reached. After how long a time would the same degree of consolidation is achieved in the field where the clay layer is 8 m thick? Assume the sample and the clay layer has the same drainage boundary conditions (double drainage). [6M]

7 a) Explain the limitations of shear box test. [4M]

b) Name different lab shear tests on soils. [4M]

c) Given the following data from a consolidated undrained test with pore water pressure measurement, determine the total and effective stress parameters: [8M]

$\sigma 3$	100 kN/m^2	200 kN/m^2
$(\sigma 1 - \sigma 3)$	157 kN/m^2	199 kN/m^2
uf	57 kN/m^2	136 kN/m^2.

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Code No: RT31011 **R13** SET - 3

III B. Tech I Semester Regular Examinations, November- 2015
GEOTECHNICAL ENGINEERING – I
(Civil Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answering the question in **Part-A** is compulsory
3. Answer any **THREE** Questions from **Part-B**

******

PART –A

1	a)	What is compaction control? Explain.	[4M]
	b)	Explain $C_{U,}$ C_C.	[4M]
	c)	What is Capillarity? Derive an equation to find its rise in soils.	[4M]
	d)	What is the use of New mark's influence chart?	[3M]
	e)	What is degree of consolidation and what is it's relation with time factor?	[3M]
	f)	Explain different drainage conditions for shear testing of soils.	[4M]

PART -B

2	a)	Explain the difference between IS light and heavy compactions.	[6M]
	b)	Write a relationship between water content, void ration, degree of saturation and specific gravity of soil solids.	[4M]
	c)	A dry soil has a void ratio of 0.65 and its grain specific gravity is = 2.80. (i) What is its unit weight? (ii) Water is added to the sample so that its degree of saturation is 60% without any change in void ratio. Determine the water content and unit weight. (iii) The sample is next placed below water. Determine the true unit weight (not considering buoyancy) if the degree of saturation is 95% and 100% respectively.	[6M]
3	a)	Show IS soil classification based on grain size.	[4M]
	b)	Explain Total, neutral and effective stresses.	[6M]
	c)	The laboratory tests on a sample of soil gave the following results: *wn* - 24%, w, = 62%, *wp* = 28%, percentage of particles less than 2 microns is-23%. Determine: (i) The liquidity index, (ii) activity, (iii) consistency and nature of soil.	[6M]
4	a)	Derive an equation for quicksand condition.	[6M]
	b)	Explain Total, Neutral and Effective Stresses.	[6M]
	c)	In order to compute the seepage loss through the foundation of a cofferdam, flownets were constructed. The result of the flownet study gave $N,$= 6, Nd = 16. The head of water lost during seepage was 19.68m. If the hydraulic conductivity of the soil is k = 13.12 x 10^{-5} m/s, compute the seepage loss per metre length of dam per day.	[4M]

5 a) Explain New mark's influence chart preparation and usage. [8M]
b) What is an isobar? What is a pressure bulb? [3M]
c) A ring footing of external diameter 8 m and internal diameter 4 m rests at a depth 2 m below the ground surface. It carries a load intensity 250 kN/m^2. Find the vertical stress at depths of 2, 4 and 8 m along the axis of the footing below the footing base. Neglect the effect of the excavation on the stress. [5M]

6 a) What are the assumptions in Terzaghi's 1-D Consolidation theory? [6M]
b) Explain consolidation concept. [4M]
c) An oedometer test is performed on a 3 cm thick clay sample. After 5 minutes, 50% consolidation is reached. After how long a time would the same degree of consolidation is achieved in the field where the clay layer is 6 m thick? Assume the sample and the clay layers have the same drainage boundary conditions (double drainage). [6M]

7 a) How soils attain their shear strength? [4M]
b) Explain soil strength envelop. [4M]
c) Given the following data from a consolidated undrained test with pore water pressure measurement, determine the total and effective stress parameters: [8M]

$\sigma 3$	99 kN/m^2	201 kN/m^2
$(\sigma 1 - \sigma 3)$	155 kN/m^2	197 kN/m^2
uf	58 kN/m^2	138 kN/m^2.

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Code No: RT31011 **R13** SET - 4

III B. Tech I Semester Regular Examinations, November- 2015
GEOTECHNICAL ENGINEERING – I
(Civil Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answering the question in **Part-A** is compulsory
3. Answer any **THREE** Questions from **Part-B**
******

PART –A

1	a)	What are factors that affect compaction?	[4M]
	b)	Explain $C_{U,}$ C_C.	[4M]
	c)	What is quick sand condition?	[3M]
	d)	What is 2:1 stress distribution method?	[4M]
	e)	Define coefficient of consolidation and give its relations with other soil parameters.	[3M]
	f)	Explain different drainage conditions for shear testing of soils.	[4M]

PART -B

2	a)	What are various field compaction methods?	[4M]
	b)	Write a relationship between void ratio, degree of saturation, unit weight of soil, unit weight of water and specific gravity of soil solids.	[6M]
	c)	A soil has bulk density of 20.1 kN/m^3 and water content of 15%. Calculate the water content if the soil partially dries to a density of 19.4 kN/m^3 and the void ratio remains unchanged.	[6M]
3	a)	Draw a grain size distribution curves for different grades of soils and name them.	[5M]
	b)	What are the corrections required in hydrometer analysis?	[5M]
	c)	The laboratory tests on a sample of soil gave the following results: *wn* - 24%, w, = 62%, *wp* = 28%, percentage of particles less than 2 microns is-23%. Determine: (i) The liquidity index, (ii) activity (iii) consistency and nature of soil.	[6M]
4	a)	What is capillarity? Derive an equation to find its rise in soils.	[4M]
	b)	Explain Flow nets, their Characteristics and Uses.	[6M]
	c)	A concrete dam is constructed across a river over a permeable stratum of soil of limited thickness. The water heads are upstream side 16m and 2 m on the downstream side. The flow net constructed under the dam gives Nf= 4 and Nd=l2. Calculate the seepage loss through the subsoil if the average value of the hydraulic conductivity is 6 x 10^{-3} cm/sec horizontally and 3 x 10^{-4} cm/ sec vertically. Calculate the exit gradient if the average length of the last field is 0.9 m. Assuming e = 0.56, and G = 2.65.	[6M]

5 a) Explain Newmark's influence chart. [8M]

b) What is an isobar? What is a pressure bulb? [3M]

c) A ring footing of external diameter 8 m and internal diameter 4 m rests at a depth 2 m below the ground surface. It carries a load intensity 300 kN/m^2. Find the vertical stress at depths of 2, 4 and 8 m along the axis of the footing below the footing base. Neglect the effect of the excavation on the stress. [5M]

6 a) Explain Compression Index and Swelling Index. [6M]

b) How do you determine the consolidation settlement of a foundation [4M]

c) An oedometer test is performed on a 3 cm thick clay sample. After 5 minutes, 50% consolidation is reached. After how long a time would the same degree of consolidation is achieved in the field where the clay layer is 5 m thick? Assume the sample and the clay layers have the same drainage boundary conditions (double drainage). [6M]

7 a) Explain shear box test with neat figure. [8M]

b) Given the following data from a consolidated undrained test with pore water pressure measurement, determine the total and effective stress parameters: [8M]

$\sigma 3$	100 kN/m^2	200 kN/m^2
$(\sigma 1 - \sigma 3)$	156 kN/m^2	198 kN/m^2
uf	58 kN/m^2	138 kN/m^2.

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Code No: RT31012 **R13** SET - 1

III B. Tech I Semester Regular Examinations November - 2015
STRUCTURAL ANALYSIS – II
(Civil Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answering the question in **Part-A** is compulsory
3. Answer any **THREE** Questions from **Part-B**
******

PART –A

1	a)	What is the effect of temperature on three hinged arch?	[3M]
	b)	What are the steps involved in portal frame method?	[4M]
	c)	What is a suspension bridge? What is its limitation of span over a waterway?	[3M]
	d)	Define and explain stiffness, carry over factor and distribution factor.	[5M]
	e)	What is Kani's method and what is the terminology used in Kani's method?	[4M]
	f)	Write the steps involved in flexibility matrix method.	[3M]

PART -B

2	a)	A three hinged parabolic arch rib has a span of 84m and a rise 18m to the central pin at the crown. The rib carries load of intensity 2kN/m uniformly distributed horizontally over a length of 1/3 of the span from the left hand. Calculate the bending moments in the rib at the quarter span points.	[12M]
	b)	What is the difference between three hinge arch and two hinge arch?	[4M]
3	a)	Explain the portal method for analyzing a building frame subjected to horizontal forces.	[12M]
	b)	What do you understand by substitute frame method?	[4M]
4	a)	What is a general cable theorem? Deduce an expression.	[12M]
	b)	What are stiffening girders? Discuss their types.	[4M]
5		A simply supported beam ABC is continuous over two spans AB and BC of 6m and 5m respectively. Span AB is carrying a uniformly distributed load of 2kN/m and span BC carries point load of 5kN at a distance of 2m from B. Find the support moment at B if EI of the beam is constant. Use moment distribution method.	[16M]

6 Using the Kani's method analyse the frame shown in fig.1. [16M]

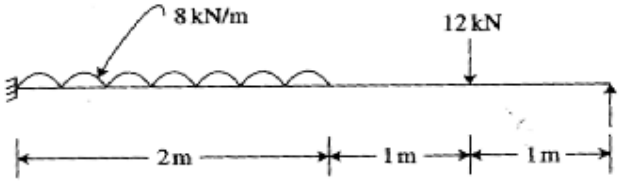

Fig.1

7 a) Write the steps involved in analyzing the stiffness method. [6M]

b) Using stiffness matrix method find the end moments at A and B for the given beam as shown in fig.2 [10M]

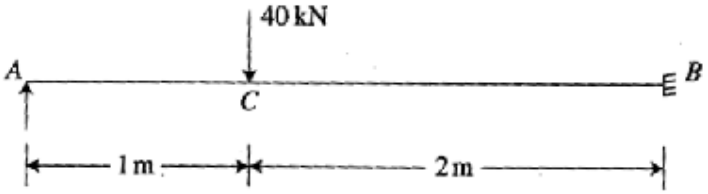

Fig.2

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Code No: RT31012 **R13** SET - 2

III B. Tech I Semester Regular Examinations November - 2015
STRUCTURAL ANALYSIS – II
(Civil Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answering the question in **Part-A** is compulsory
3. Answer any **THREE** Questions from **Part-B**
******

PART –A

1	a)	What is the effect of rib shortening on two hinged arch?	[3M]
	b)	What are the steps involved in cantilever method?	[4M]
	c)	Explain suspension cable on roller support with figures.	[3M]
	d)	What is a portal frame? Distinguish between symmetrical and unsymmetrical portal frame.	[5M]
	e)	What is Kani's method and what is the terminology used in Kani's method?	[4M]
	f)	Write the steps involved in Stiffness matrix method.	[3M]

PART -B

2	a)	A two hinged parabolic arch rib has a span of 10m has a central rise 2.5m. It is loaded with uniformly distribute load 2kN/m over a half of the span from the left support. Determine the end reactions, horizontal thrust, maximum and minimum B.M of the arch.	[12M]
	b)	Explain briefly what do you understand by an arch?	[4M]
3	a)	Explain the cantilever method for analyzing a building frame subjected to horizontal forces.	[12M]
	b)	What are the different types of substitute frames?	[3M]
4	a)	What is a general cable theorem? Deduce an expression.	[8M]
	b)	What are stiffening girders? Discuss their types.	[5M]
5		A simply supported beam ABC is continuous over two spans AB and BC of 8m and 6m respectively. Span AB is carrying a uniformly distributed load of 3kN/m and span BC carries point load of 4kN at midpoint of BC. Find the support moment at B if EI of the beam is constant. Use moment distribution method.	[16M]

6 Using the Kani's method analyse the frame shown in fig.1. [16M]

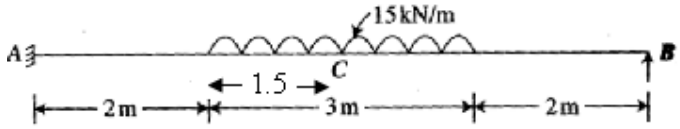

Fig.1

7 a) Write the steps involved in analyzing the flexibility matrix method. [8M]

b) Using flexibility matrix method, find the end moments at A and B for the beam shown in fig.2. [8M]

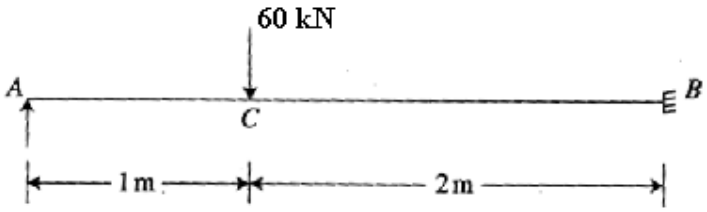

Fig.2

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Code No: RT31012 **R13** SET - 3

III B. Tech I Semester Regular Examinations, November - 2015
STRUCTURAL ANALYSIS – II
(Civil Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answering the question in **Part-A** is compulsory
3. Answer any **THREE** Questions from **Part-B**
******

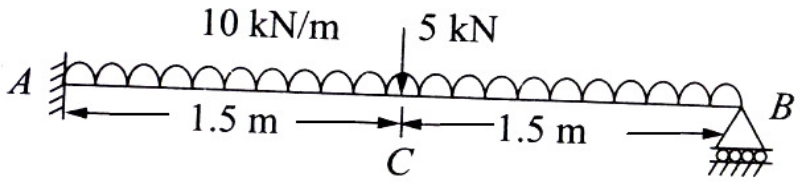
PART –A

1	a)	Find the horizontal thrust of a two hinged semi circular arch of radius R carries a concentrated load of W.	[4M]
	b)	Differentiate between portal frame method and cantilever method.	[4M]
	c)	What is a simple suspension bridge?	[3M]
	d)	Write the equations for continuous beam with and without sway.	[4M]
	e)	What is Kani's method? What are the limitations of this method?	[4M]
	f)	Differentiate between stiffness matrix method and flexibility matrix method.	[3M]

PART –B

2	a)	State and prove Eddy's theorem.	[8M]
	b)	A three hinged parabolic arch rib has a span of 20m and a rise 4m to the central pin at the crown. The rib carries load of intensity 2kN/m uniformly distributed horizontally on the left 3m. Calculate the maximum and minimum bending moments.	[8M]
3		Analyse a portal frame of two stroyed, two bay of 5m bay length each and height 5m.A horizontal force of 120kN is applied at top storey and 240kN is applied at lower storey. Use portal frame method	[16M]
4		A beam ABC 8m long is fixed at A and simply supported at B with an overhang BC 2m long. The beam carries a uniformly distributed load of 12kN/m on AB and a point load of 12kN at C. Find the support moments and the support reaction. Use moment distribution method.	[16M]

5 Analyse the beam shown below by Kani's method. [16M]



6 A three hinged suspension girder bridge has a span of 200m over the supports at same level. It has a central dip of 20m.The girder carries three point loads of 15kN, 25kN and 20kN acting at 35m, 80m and 150m respectively from the left end. Draw the B.M.D. [16M]

7 a) Using flexibility matrix method, find the end moments at A and B for a fixed beam carrying udl 4kN/m throughout. [10M]

b) Which method is advantageous among stiffness method and flexibility method? [6M]

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Code No: RT31012 **R13** SET - 4

III B. Tech I Semester Regular Examinations November - 2015
STRUCTURAL ANALYSIS – II
(Civil Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answering the question in **Part-A** is compulsory
3. Answer any **THREE** Questions from **Part-B**

*****

PART –A

1 a) What is a horizontal thrust, normal thrust and radial thrust in a three hinged arch? [3M]
b) What is a building frame? What are the different methods available for analyzing a frame? [4M]
c) What is the effect of temperature on the cables? [4M]
d) What is a carryover factor and distributor factor in a moment distribution method? [4M]
e) What are the steps involved in the Kani's method? [3M]
f) What are the steps involved in Stiffness matrix method. [4M]

PART -B

2 A three hinged parabolic arch rib has a span of 50m and a rise 20m to the central pin at the crown. The rib carries load of intensity 3kN/m uniformly distributed horizontally on the left 4m. Calculate the (i) maximum and minimum bending moments, (ii) horizontal thrust, (iii) Normal thrust and radial shear at a section 15m from A. [16M]

3 Write the steps involved in the Portal frame method and Cantilever method. [16M]

4 A fixed beam of span 6m carries a uniformly distributed load of 18kN/m. If the right support sinks by 6.5mm, find the fixing moment of the supports. Draw S.F.D and B.M.D. Take E =200kN/mm^2 and I= 5 x 10^7 mm^4. Analyse by moment distribution method [16M]

5 A cable hangs between two supports at a distance 120m apart. One end of the support is 3m above the other. The cable is loaded with a udl of 1 kN/m. The sag of the cable from higher end is 5m. Find the horizontal thrust and the maximum tension in the cable. [16M]

6 a) Write the steps for analyzing a portal frame carrying a udl by Kani's method. [8M]
b) Draw S.F.D and B.M.D of the fixed beam of span 'l', carrying u.d.l for a distance of 'a' from one end. Use Kani's method. [8M]

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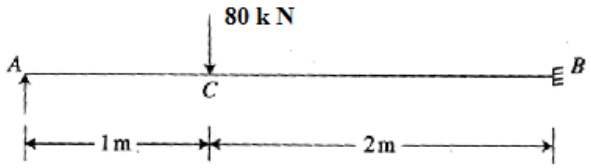
Code No: RT31012 **R13** SET - 4

7 a) Write the steps involved in analyzing the stiffness matrix method. [8M]

b) Using stiffness matrix method find the end moments at A and B for the given beam [8M]



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Code No: RT31015 **R13** SET - 1

III B. Tech I Semester Regular Examinations, November - 2015
TRANSPORTATION ENGINEERING – I
(Civil Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answering the question in **Part-A** is compulsory
3. Answer any **THREE** Questions from **Part-B**

*****

PART –A

1	a)	Explain briefly main features of Indian Road Congress.	[3M]
	b)	Write a short note on Carriageway width?	[4M]
	c)	Enumerate AADT.	[4M]
	d)	Explain briefly on Unified Soil classification system.	[3M]
	e)	Discuss about maximum wheel load	[4M]
	f)	How the excavation is done in highway construction?	[4M]

PART -B

2	a)	Discuss briefly about the objectives of highway planning.	[4M]
	b)	Write down the classification of roads by Nagpur road plan.	[8M]
	c)	What is meant by Reconnaissance?	[4M]
3	a)	Write a short note on overturning effect.	[4M]
	b)	Explain briefly the calculation of length of the transition curve.	[8M]
	c)	Derive an expression of summit curve for SSD.	[4M]
4	a)	Explain spot speed, running sped, space mean speed, time mean speed and average speed. How is spot speed studies carried out?	[8M]
	b)	Explain various types of road markings.	[8M]
5	a)	Define group index. Explain briefly group index of soil.	[4M]
	b)	Explain briefly desirable properties of road aggregates.	[12M]
6	a)	What are the variations in temperature that generally effect the pavement?	[8M]
	b)	Discuss the Westergaard's concept of temperature stresses.	[8M]
7	a)	Briefly list the method of construction of gravel road.	[6M]
	b)	Write short notes on seal coat.	[6M]
	c)	Write a descriptive note on pavement evaluation.	[4M]

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Code No: RT31015 **R13** SET - 2

III B. Tech I Semester Regular Examinations, November - 2015
TRANSPORTATION ENGINEERING – I
(Civil Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answering the question in **Part-A** is compulsory
3. Answer any **THREE** Questions from **Part-B**

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PART –A

1	a)	Explain briefly the recommendations of Jayakar Committee.	[3M]
	b)	Explain the role of kerb.	[4M]
	c)	Discuss thirtieth highest hourly volume.	[4M]
	d)	Evaluate grain size analysis on highway materials.	[3M]
	e)	Write short notes on contact pressure.	[4M]
	f)	What are the reasons to raise grade line?	[4M]

PART -B

2	a)	What are the objectives of Highway Research Board?	[4M]
	b)	Explain briefly the classification of road pattern.	[8M]
	c)	How the map study is done? Discuss.	[4M]
3	a)	Write a short note on setting out of a transition curve.	[4M]
	b)	While aligning a highway in a built up area, it was necessary to provide a horizontal circular curve of radius 446 m. The design speed is 85 Kmph, the length of wheel base is 8m and the pavement width is 12m. Design super elevation, extra widening and length of transition curve.	[8M]
	c)	What are the factors required for overturning sight distance?	[4M]
4	a)	Discuss various traffic studies and their importance.	[8M]
	b)	What are the advantages and disadvantages of traffic signs?	[8M]
5	a)	What are the strength characteristics of soil?	[4M]
	b)	Explain briefly three different tests carried out to determine the abrasion of aggregates.	[12M]
6	a)	Explain briefly Mc Load method.	[8M]
	b)	Describe Westergaard's stress equation for wheel loads.	[8M]
7	a)	Specify the materials required for construction of WBM roads. What are the uses and limitations of this type of road?	[6M]
	b)	Write short notes on Mastic asphalt.	[6M]
	c)	Explain the principles and uses of Bankleman Beam test?	[4M]

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Code No: RT31015 **R13** SET - 3

III B. Tech I Semester Regular Examinations, November - 2015
TRANSPORTATION ENGINEERING – I
(Civil Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answering the question in **Part-A** is compulsory
3. Answer any **THREE** Questions from **Part-B**
*****

PART –A

1	a)	Explain about central road fund.	[3M]
	b)	Discuss road margin with neat sketches.	[4M]
	c)	Write a short note on Mechanical counters in Traffic Volume Study.	[4M]
	d)	Describe the Mohr circle affect on unconfined compression test.	[3M]
	e)	How equivalent single wheel load influence the design of pavement?	[4M]
	f)	How settlement can be eliminated in construction of pavement?	[4M]

PART -B

2	a)	Discuss Bombay road plan neatly.	[4M]
	b)	How the preparation of master plan is done?	[8M]
	c)	What are the types of drawings used in preparation of highway project?	[4M]
3	a)	How the total reaction time of the driver is measured?	[4M]
	b)	Derive an expression for overtaking sight distance.	[8M]
	c)	While aligning a hill road with a ruling gradient of 8 percent, a horizontal curve of radius 90m is encountered. Find the compensated gradient at the curve?	[4M]
4	a)	What are the factors on which PCU values depend?	[8M]
	b)	The average normal flow of traffic on cross roads A and B during design period are 400 and 250 PCU per hour, the saturation flow values on these roads are estimated as 1850 and 1400 PCU per hour respectively. The all red time required for pedestrian crossing is 16 seconds. Design two phase traffic signal by Webster's method?	[8M]
5	a)	How the resistance of aggregates to weathering action is studied?	[4M]
	b)	What are the various tests conducted on bituminous materials?	[12M]
6	a)	Discuss the advantages and limitations of CBR method of design.	[8M]
	b)	Calculate the stresses at interior, edge and corner regions of CC pavement using Westergaard's stress equation. Use the following data: Wheel load= 5100 kg, modulus of elasticity is 3*10^5 kg/cm^2, pavement thickness =18cm, Poisson's ratio of concrete = 0.15, modulus of subgrade reaction 6 kg/cm^3 and radius of contact area is 15cm.	[8M]
7	a)	Enumerate the steps in the construction of CC pavement.	[6M]
	b)	Write short notes on bituminous Carpet.	[6M]
	c)	Discuss mud portions.	[4M]

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Code No: RT31015 **R13** SET - 4

III B. Tech I Semester Regular Examinations, November - 2015
TRANSPORTATION ENGINEERING – I
(Civil Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answering the question in **Part-A** is compulsory
3. Answer any **THREE** Questions from **Part-B**

*****

PART –A

1	a)	Explain how the National Transport policy committee connected with road development.	[3M]
	b)	What are the factors that influence Right of way?	[4M]
	c)	Write short note on manual counts in traffic volume study?	[4M]
	d)	Discuss the influence of c and Φ in triaxial test?	[3M]
	e)	What is meant by Repetition of loads?	[4M]
	f)	What are the factors considered to evaluate the foundation stability?	[4M]

PART -B

2	a)	What are the objectives of road development vision 2021?	[4M]
	b)	What are the factors affecting alignment?	[8M]
	c)	What are the steps involved in a new highway project?	[4M]
3	a)	Explain briefly about 'PIEV' theory.	[4M]
	b)	How the attainment of super elevation can be done? Describe briefly.	[8M]
	c)	Calculate the safe overturning sight distance for a design speed of 96 kmph. Assume all other data suitably.	[4M]
4	a)	Explain the level of service concept while deciding the design capacity of a road?	[8M]
	b)	Explain various measures that may be taken to prevent accidents.	[8M]
5	a)	Where do Pensky-Martens closed cup apparatus used? Explain the test procedure.	[4M]
	b)	Describe the steps involved in bituminous mix design.	[12M]
6	a)	Enumerate the various methods of flexible pavement design. Briefly indicate the basis of design in each case?	[8M]
	b)	Briefly outline IRC recommendations for determining the thickness of CC pavement.	[8M]
7	a)	What are the problems in the construction of high embankments over weak foundation soils? How are the various problems dealt with?	[6M]
	b)	Write short note on Surface dressing?	[6M]
	c)	Discuss briefly the importance of highway maintenance.	[4M]

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