B.L.D.E Association"s

VACHANA PITAMAHA DR.P.G.HALAKATTI

COLLEGE OF ENGINEERING AND TECHNOLOGY ,VIJAYPUR

LIBRARY AND INFORMATION CENTER

QUESTION PAPERS

3rd ,4th ,5th ,6th 7th AND 8th SEMESTER

CIVIL

JUNE/JULY 2017

INDEX

CBCS Scheme

USN | | | | | | | | | | |

15CV/CT35

Third Semester B.E. Degree Examination, June/July 2017
Engineering Geology

Time: 3 hrs. Max. Marks: 80

Note: 1. ***Answer FIVE full questions, choosing one full question from each module.***
2. ***Write neat figures wherever necessary.***

Module-1

1 a. Enumerate importance and applications of Geology in Civil Engineering practices. **(06 Marks)**
b. Write a note on cleavage and fracture properties in minerals. **(05 Marks)**
c. Write the physical properties, composition and uses of Quartz and Calcite. **(05 Marks)**

OR

2 a. Describe the Internal structure and Composition of the Earth. **(06 Marks)**
b. Define a Mineral. Describe hardness property in minerals. **(05 Marks)**
c. Distinguish between Rock forming and Ore forming minerals with examples. **(05 Marks)**

Module-2

3 a. What are Igneous rocks? Describe different types of igneous rocks. **(06 Marks)**
b. Explain Rock as a construction material. **(05 Marks)**
c. Define a Fault. Describe different parts of fault, with neat figure. **(05 Marks)**

OR

4 a. What is Metamorphism? Give a note on types of metamorphism. **(06 Marks)**
b. Write a short note on Granite and Sandstone, giving their mineralogical composition and uses. **(05 Marks)**
c. What are Joints? Comment on their Engineering Importance. **(05 Marks)**

Module-3

5 a. Explain Rock Weathering and its types with examples. **(06 Marks)**
b. What is an Earthquake? Give its causes and effects. **(06 Marks)**
c. Write a note on Floods and their control. **(04 Marks)**

OR

6 a. Comment on Geomorphological aspects in selection of sites for dams and reservoirs. **(06 Marks)**
b. What are Landslides? Give a note on their control. **(05 Marks)**
c. Describe different drainage patterns. **(05 Marks)**

Module-4

7 a. What is an Aquifer? Give a note on its types with examples. **(06 Marks)**
b. Explain Electrical Resistivity method for Ground water Exploration. **(06 Marks)**
c. Write a note on Hydrological cycle. **(04 Marks)**

OR

8 a. Write a note on occurrence of Ground water in different terrains. **(06 Marks)**
b. Describe artificial recharge of Ground water. **(05 Marks)**
c. Explain Sea water intrusion and its remedies. **(05 Marks)**

Module-5

9 a. What are Topographic and Contour maps? **(06 Marks)**
b. Explain concept and applications of Remote sensing. **(05 Marks)**
c. Comment on Impact of mining and quarrying on environment. **(05 Marks)**

OR

10 a. Write a note on Global Positioning System (GPS). **(06 Marks)**
b. What is LANDSAT Imagery? Write its uses. **(05 Marks)**
c. Write a note on the Impact of reservoirs on Environment. **(05 Marks)**

* * * * *

CBCS Scheme

USN | | | | | | | | | | |

15CV34

Third Semester B.E. Degree Examination, June/July 2017
Basic Surveying

Time: 3 hrs. Max. Marks: 80

Note: ***Answer FIVE full questions, choosing one full question from each module.***

Module-1

1 a. Compare Plane Surveying and Geodetic Surveying (any two points). **(04 Marks)**

b. Explain Indirect method of ranging, with a sketch. **(06 Marks)**

c. Explain the basic principles of Surveying with sketches. **(06 Marks)**

OR

2 a. Discuss the classification of surveying. **(08 Marks)**

b. A big pond obstructs the chain line AB. A line AL was measured on the left of the line AB for circumventing the obstacle. The length of AL was 901m. Similarly, the line AM was measured on the right of the line AB whose length was 1100m. Points M, B, L are in the same straight line. Lengths of the links BL and BM are 502m and 548m, respectively. Find the distance AB. **(08 Marks)**

Module-2

3 a. Compare the following : i) Fore bearing and Back bearing ii) Whole circle bearing and Quandrantal bearing iii) Meridian and Bearing. **(06 Marks)**

b. List the fundamental lines of a theodolite. Summarize the desired relationship between them. **(06 Marks)**

c. The magnetic bearing of a line was found to be N 60^0 30' W in 2002, when the declination was 5^0 10' E. Find its present magnetic bearing, if declination is 3^0 W. **(04 Marks)**

OR

4 a. Explain the following terms with reference to a theodolite :
i) Transiting ii) Swinging iii) Trunnion axis. **(03 Marks)**

b. Explain the measurement of a horizontal angle by repetition method. Draw a typical tabular column. List the errors eliminated by this method. **(08 Marks)**

c. The following bearings were observed in a closed compass traverse :

Line	FB	BB
AB	S 45^0 30' E	N 45^0 30' W
BC	S 60^0 00' E	N 60^0 40' W
CD	S 5^0 30' E	N 3^0 20' W
DA	N 54^0 30' W	S 56^0 00' E

Determine the stations affected by local attraction, apply the corrections and find the corrected bearings. **(05 Marks)**

Module-3

5 a. Compare the following : i) Latitude and Departure ii) Dependent coordinates and independent coordinates. **(04 Marks)**

b. Describe the closing error in a compass traverse. Explain how the closing error is adjusted by transit rule. **(05 Marks)**

c. A tachometer, fitted with an analectic lens and having the multiplying constant 100, was set up at station C to determine the gradient between two points A and B and the following observations were taken, keeping the staff vertical.

Staff at	Vertical angle	Stadia readings
A	$+4^0\ 20'\ 0"$	1.300, 1.610, 1.920
B	$+0^0\ 10'\ 40"$	1.100, 1.410, 1.720

If the horizontal angle ACB is $35^0\ 20'$, determine the gradient between A and B. **(07 Marks)**

OR

6 a. Summarize the different systems of tachometric measurements. **(03 Marks)**

b. Find the expressions for distance and elevation when the staff is held vertical and line of sight is inclined. **(08 Marks)**

c. The bearings of PQ and QR are $18^0\ 36'$ and $60^0\ 24'$ respectively. The coordinates of the ends P and R are :

Point	North co-ordinates	East co-ordinates
P	300.0	400.0
R	1432.8	1257.2

Find the lengths of PQ and QR. **(05 Marks)**

Module-4

7 a. Compare the following terms used in leveling :
i) Back sight and Fore sight ii) Bench mark and Reduced level. **(04 Marks)**

b. Explain the effects of curvature and refraction in levelling. **(04 Marks)**

c. The following observations were made on a hilltop to ascertain its elevation. The height of the target F was 5m.

Instrument station	Staff reading on BM	Vertical angle	Remarks
O_1	2.550	$18^0\ 6'$	RL of BM
O_2	1.670	$28^0\ 42'$	= 345.580

The instrument stations were 100m apart and were in line with F. **(08 Marks)**

OR

8 a. Derive the expressions for the horizontal distance, vertical distance and the elevation of an elevated object, when the base is inaccessible and instrument stations are not in the same vertical plane with the object. **(08 Marks)**

b. The following consecutive readings were taken along AB with a 4m levelling staff on a continuously sloping ground at intervals of 20 meters.
0.345 on A , 1.450 , 2.630 , 3.875 , 0.655 , 1.745 , 2.965 , 3.945 , 1.125 , 2.475 , 3.865 on B.
The elevation of A was 60.350. Enter the above readings in a level – book form and work out the RL's by rise and fall method. Also find the gradient of line AB. **(08 Marks)**

Module-5

9 a. List the various methods to calculate the area with their formula. **(06 Marks)**

b. Explain the following terms : i) Contour interval ii) Horizontal equivalent. **(04 Marks)**

c. The following offsets were taken from a chain line to an irregular boundary line at an interval of 10m. Compute the area by trapezoidal and Simpson's rule.
Offsets : 0 , 2.5 , 3.5 , 5.0 , 4.6 , 3.2 and 0 m. **(06 Marks)**

OR

10 a. Explain the characteristics of contours, with sketches (any five). **(05 Marks)**

b. Explain the interpolation of contours. List the methods of contouring. **(05 Marks)**

c. A road embankment is 30m wide at the top with side slopes of 2:1. The ground levels at 100m intervals along a line AB are as under :
A 170.30 , 169.10 , 168.50 , 168.10 , 166.50 B. The formation level at 'A' is 178.70m with uniform falling ground of 1 in 50 from 'A' to 'B'. Determine the volume of earthwork by Prismoidal formula. Assume the ground to be in cross – section. **(06 Marks)**

* * * * *

CBCS Scheme

USN | | | | | | | | | | |

15CV36

Third Semester B.E. Degree Examination, June/July 2017
Building Materials and Construction

Time: 3 hrs. Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. What are the requirements for a good quality building stone? Hence define : backing, corbel and coping of stones. **(06 Marks)**

b. Briefly explain the advantages of cement concrete blocks. **(04 Marks)**

c. List the different tests conducted on bricks. Explain briefly any two of them. **(06 Marks)**

OR

2 a. What are the requirements of good mortar? List the typical proportions used for cement mortar in construction industry. **(04 Marks)**

b. Briefly explain the following tests on fine aggregates :
i) bulking ii) specific gravity test. **(06 Marks)**

c. Differentiate natural and manufactured coarse aggregate. Briefly explain use and procedure of impact and abrasion test on coarse aggregates. **(06 Marks)**

Module-2

3 a. What do you understand by "bearing capacity" of soil. Define : ultimate bearing capacity and safe bearing capacity of soil. **(04 Marks)**

b. Sketch and explain following types of foundations :
i)Isolated footing ii) combined footing iii) strap beam footing. **(06 Marks)**

c. With a neat sketch, explain the features of English bond and Flemish bond with respect to brick masonry. List their merits and demerits. **(06 Marks)**

OR

4 a. Define : i) Bevelled closer ii) Mitred closer iii) King closer and iv) Queen closer. **(04 Marks)**

b. Explain different classification of stone masonry with neat sketches, wherever necessary. **(06 Marks)**

c. Compare and contrast brick work to stone work. **(06 Marks)**

Module-3

5 a. Define lintel. What are the different types of lintels used? **(04 Marks)**

b. With a neat sketch, explain the components of a segmental arch. **(06 Marks)**

c. Write short notes on : Cement flooring and Mosaic flooring. **(06 Marks)**

OR

6 a. What are the factors to be considered while selecting a roof covering? **(04 Marks)**

b. Enumerate the advantages and disadvantages of flat roofs over a pitched roof. **(06 Marks)**

c. With neat sketches, write an explanatory note on different types of roof trusses. **(06 Marks)**

Module-4

7 a. List the guide lines to be followed while locating doors and windows. **(04 Marks)**

b. Draw a neat sketch showing all the components of following types of door :
i) Fully paneled door ii) revolving door. **(06 Marks)**

c. With neat sketches, differentiate :
i) fixed window and pivoted window
ii) corner window and bay window. **(06 Marks)**

OR

8 a. Define a stair. With a neat sketch explain the following terms : i) Thread and Riser ii) Flight and landing. **(04 Marks)**

b. Plan a doglegged stair for a building in which vertical distance between the floors is 3.6m. The stair hall measures 3m × 5m (internal dimensions). **(06 Marks)**

c. Write explanatory note on : shoring and underpinning formwork. **(06 Marks)**

Module-5

9 a. What are the objectives of plastering? Explain the requirement of a good plaster. **(04 Marks)**

b. Explain the method of applying : Stucco plastering and Lathe plastering. **(06 Marks)**

c. Discuss the defects in plastering. **(06 Marks)**

OR

10 a. What are the causes of dampness in building? Hence what do you understand by damp proof course. **(06 Marks)**

b. Mention the objectives of painting and point out the characteristics of an ideal paint. **(06 Marks)**

c. Explain the method of varnishing wood works. **(04 Marks)**

* * * * *

USN | | | | | | | | | | |

10CV45

Fourth Semester B.E. Degree Examination, Dec.2016/Jan.2017
Hydraulics and Hydraulic Machines

Time: 3 hrs. Max. Marks:100

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

PART – A

1 a. What is meant by dimensional homogenity of an equation? Explain with an example. **(05 Marks)**

b. Define and give expressions for,
i) Reynolds number
ii) Froude number
iii) Euler's number
iv) Weber number and
v) Mach number. **(05 Marks)**

c. A spill way model is to be built to a geometrically similar scale of 1/50 across a flume of 600mm width. The prototype is 15m high and maximum head on it is expected to be 1.5m. i) What height of the model and what head on the model should be used? ii) If the flow over the model at a particular head is 12 litre/s, what flow per metre length of the prototype is expected? iii) If the negative pressure in the model is 200mm, what is the negative pressure in prototype? Is it practicable? **(10 Marks)**

2 a. Derive an expression for discharge through open channel by Chezy's formula and obtain an expression for conveyance. **(10 Marks)**

b. A trapezoidal channel carries water of $25 m^3/s$ which has a side slope of 60°. Find the most economical channel cross section if C = 50 and slope of bed is 1 in 1000. [C = Chezy's constant]. **(10 Marks)**

3 a. Draw a typical plot of depth of flow v/s specific energy for a non-uniform flow and label the curves of energy. Further indicate point of critical depth, region of supercritical flow and subcritical flow. **(10 Marks)**

b. A rectangular channel of 8m wide discharges water through a sluice gate with a depth of flow of 0.4m, and velocity 6 m/s. Find whether hydraulic jump will occur and if so, find the height of hydraulic jump and loss of energy per kg of water. Also find the power lost in hydraulic jump. **(10 Marks)**

4 a. Using impulse-momentum principle, derive an expression for force normal to plate by the impact of jet at the centre of a stationary inclined plate. Further derive expressions for force in the direction of jet and normal to jet. The profile of plate is flat. **(10 Marks)**

b. A jet of water 150mm diameter strikes a series of flat plate normally with a velocity of 12m/s. The plate is moving with a velocity of 6m/s in the direction of jet. Find: i) the force exerted by the jet on the plate; ii) Work done by the jet on the plate per second; ii) Power of the jet; iv) Efficiency of moving plate. **(10 Marks)**

PART – B

5 a. Show that for a moving symmetrical curved vane impinged by a jet of water at the centre, the maximum hydraulic efficiency is given by, $\frac{8}{27}(1+\cos\theta)$, where θ = angle of deflection of water from the vane. **(10 Marks)**

b. A jet of water having velocity of 45 m/s impinges without shock on a series of vanes moving at 15m/s, the direction of motion of vanes being inclined at 20° to that of jet. The relative velocity at the outlet is 0.9 times of that at inlet. Absolute velocity of water at exit is to be normal to the motion of vanes. Find: i) Vane angles at entrance and exit; ii) Hydraulic efficiency. **(10 Marks)**

6 a. Draw energy block diagram of a Pelton wheel arrangement showing nozzle, Pelton wheel, shaft and give expressions for i) Power at the nozzle; ii) Kinetic energy of jet outside the nozzle; iii) Hydraulic power after the Pelton wheel; iv) Shaft power; v) Nozzle efficiency; vi) Hydraulic efficiency; vii) Mechanical efficiency and viii) Overall efficiency. **(10 Marks)**

b. Design a Pelton wheel turbine required to develop 1475 kW of power under a head of 160m at 410 rpm. Take overall efficiency as 85% and coefficient of velocity in the nozzle as 0.98 and speed ratio as 0.48, jet ratio = 12. **(10 Marks)**

7 a. Draw a neat diagram of cross section of a Kaplan turbine and explain its working principle. **(10 Marks)**

b. The hub diameter of a Kaplan turbine, working under a head of 12m, is 0.35 times the diameter of the runner. The turbine is running at 100rpm. If the vane angle of the extreme edge of the runner at outlet is 15°, and flow ratio = 0.6, find: i) Diameter of the runner; ii) Diameter of the boss and iii) Discharge through the runner. Assume velocity of whirl at outlet as zero. **(10 Marks)**

8 a. For a centrifugal pump, write the definition and expression for i) Manometric efficiency; ii) Mechanical efficiency; iii) Overall efficiency in terms of manometric head, blade speed at outlet and velocity of whirl at outlet. **(10 Marks)**

b. A four stage centrifugal pump has four identical impellers, keyed to same shaft. The shaft is running at 400rpm and the total manometric head developed by the multistage pump is 40m. The discharge through pump is 0.2 m^3/s. The vanes of each impeller are having outlet angle as 45°. If the width and diameter of each impeller at outlet is 5cm and 60cm respectively. Find the manometric efficiency. **(10 Marks)**

* * * * *

USN | | | | | | | | | | |

10CV45

Fourth Semester B.E. Degree Examination, Dec.2016/Jan.2017
Hydraulics and Hydraulic Machines

Time: 3 hrs. Max. Marks:100

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

PART – A

1 a. What is meant by dimensional homogenity of an equation? Explain with an example. **(05 Marks)**

b. Define and give expressions for,
i) Reynolds number
ii) Froude number
iii) Euler's number
iv) Weber number and
v) Mach number. **(05 Marks)**

c. A spill way model is to be built to a geometrically similar scale of 1/50 across a flume of 600mm width. The prototype is 15m high and maximum head on it is expected to be 1.5m. i) What height of the model and what head on the model should be used? ii) If the flow over the model at a particular head is 12 litre/s, what flow per metre length of the prototype is expected? iii) If the negative pressure in the model is 200mm, what is the negative pressure in prototype? Is it practicable? **(10 Marks)**

2 a. Derive an expression for discharge through open channel by Chezy's formula and obtain an expression for conveyance. **(10 Marks)**

b. A trapezoidal channel carries water of $25 m^3/s$ which has a side slope of 60°. Find the most economical channel cross section if C = 50 and slope of bed is 1 in 1000. [C = Chezy's constant]. **(10 Marks)**

3 a. Draw a typical plot of depth of flow v/s specific energy for a non-uniform flow and label the curves of energy. Further indicate point of critical depth, region of supercritical flow and subcritical flow. **(10 Marks)**

b. A rectangular channel of 8m wide discharges water through a sluice gate with a depth of flow of 0.4m, and velocity 6 m/s. Find whether hydraulic jump will occur and if so, find the height of hydraulic jump and loss of energy per kg of water. Also find the power lost in hydraulic jump. **(10 Marks)**

4 a. Using impulse-momentum principle, derive an expression for force normal to plate by the impact of jet at the centre of a stationary inclined plate. Further derive expressions for force in the direction of jet and normal to jet. The profile of plate is flat. **(10 Marks)**

b. A jet of water 150mm diameter strikes a series of flat plate normally with a velocity of 12m/s. The plate is moving with a velocity of 6m/s in the direction of jet. Find: i) the force exerted by the jet on the plate; ii) Work done by the jet on the plate per second; ii) Power of the jet; iv) Efficiency of moving plate. **(10 Marks)**

PART – B

5 a. Show that for a moving symmetrical curved vane impinged by a jet of water at the centre, the maximum hydraulic efficiency is given by, $\frac{8}{27}(1+\cos\theta)$, where θ = angle of deflection of water from the vane. **(10 Marks)**

b. A jet of water having velocity of 45 m/s impinges without shock on a series of vanes moving at 15m/s, the direction of motion of vanes being inclined at 20° to that of jet. The relative velocity at the outlet is 0.9 times of that at inlet. Absolute velocity of water at exit is to be normal to the motion of vanes. Find: i) Vane angles at entrance and exit; ii) Hydraulic efficiency. **(10 Marks)**

6 a. Draw energy block diagram of a Pelton wheel arrangement showing nozzle, Pelton wheel, shaft and give expressions for i) Power at the nozzle; ii) Kinetic energy of jet outside the nozzle; iii) Hydraulic power after the Pelton wheel; iv) Shaft power; v) Nozzle efficiency; vi) Hydraulic efficiency; vii) Mechanical efficiency and viii) Overall efficiency. **(10 Marks)**

b. Design a Pelton wheel turbine required to develop 1475 kW of power under a head of 160m at 410 rpm. Take overall efficiency as 85% and coefficient of velocity in the nozzle as 0.98 and speed ratio as 0.48, jet ratio = 12. **(10 Marks)**

7 a. Draw a neat diagram of cross section of a Kaplan turbine and explain its working principle. **(10 Marks)**

b. The hub diameter of a Kaplan turbine, working under a head of 12m, is 0.35 times the diameter of the runner. The turbine is running at 100rpm. If the vane angle of the extreme edge of the runner at outlet is 15°, and flow ratio = 0.6, find: i) Diameter of the runner; ii) Diameter of the boss and iii) Discharge through the runner.
Assume velocity of whirl at outlet as zero. **(10 Marks)**

8 a. For a centrifugal pump, write the definition and expression for i) Manometric efficiency; ii) Mechanical efficiency; iii) Overall efficiency in terms of manometric head, blade speed at outlet and velocity of whirl at outlet. **(10 Marks)**

b. A four stage centrifugal pump has four identical impellers, keyed to same shaft. The shaft is running at 400rpm and the total manometric head developed by the multistage pump is 40m. The discharge through pump is 0.2 m^3/s. The vanes of each impeller are having outlet angle as 45°. If the width and diameter of each impeller at outlet is 5cm and 60cm respectively. Find the manometric efficiency. **(10 Marks)**

* * * * *

CBCS Scheme

USN | | | | | | | | | | |

15CV/CT44

Fourth Semester B.E. Degree Examination, June/July 2017
Concrete Technology

Time: 3 hrs. Max. Marks: 80

Note: 1. ***Answer FIVE full questions, choosing one full question from each module.***
2. Use of IS – 10262 – 2009 is permitted.

Module-1

1 a. Write the chemical composition of cement. Write the flow chart for dry process. **(08 Marks)**
b. Explain the importance of size, shape and texture of aggregate. **(08 Marks)**

OR

2 a. Explain the role of Admixtures in Concrete Technology. **(08 Marks)**
b. Name any four types of cement. State the properties and applications of any two types of cement. **(08 Marks)**

Module-2

3 a. Define Workability. Explain the factors influencing workability of concrete. **(08 Marks)**
b. Write note on Segregation and Bleeding. **(08 Marks)**

OR

4 a. Why curing is needed to concrete? Explain curing methods. **(08 Marks)**
b. Why compaction is required to concrete? Explain Compaction methods by vibration. **(08 Marks)**

Module-3

5 a. Explain the factors influencing the strength of concrete. **(08 Marks)**
b. Write note on : i) Creep ii) Shrinkage of concrete. **(08 Marks)**

OR

6 a. Explain Maturing concept of concrete. **(08 Marks)**
b. The strength of a sample of fully matured concrete is found to be 40MPa. Find the strength of identical concrete at the age of 7 days when cured at an average temperature during day time at 20^0C and night time at 10^0C. Take A = 32 , B = 54.Use % strength of concrete at maturity = $A + B \log_{10}\left(\frac{\text{maturity}}{1000}\right)$. **(08 Marks)**

Module-4

7 Design a concrete mix for M_{20} grade of concrete with the following design stipulation as per IS 10262 – 2009 guide lines.
a. Grade designation: M20.
b. Type of cement : Ultra Tech PPC.
c. Maximum size of Aggregate [MSA] : 20mm
d. Minimum cement content : 320 kg/m^3.
e. Maximum W/C ratio : 0.55.
f. Workability : 50 – 75mm (slump)

g. Exposure condition : Mild
h. Degree of supervision : Good.
i. Type of Aggregate : Crushed angular aggregate.
j. Max. cement content : 450 kg/m^3.
k. Chemical Admixture : Not recommended.
l. Specific gravity of cement : 3.05.
m. Specific gravity of Coarse Aggregate : 2.68.
n. Specific gravity of Fine Aggregate : 2.66.
o. Water absorption of Coarse Aggregate : 0.85%.
p. Water absorption of Fine Aggregate : 1.15%.
q. Free (surface) moisture of Coarse Aggregate : NIL.
r. Free moisture of Fine Aggregate : NIL.
s. Sieve Analysis of Coarse Aggregate : Conforming to table 2 of IS : 383.
t. Sieve Analysis of Fine Aggregate : Conforming to zone – II of IS : 383. **(16 Marks)**

OR

8 What is meant by concrete mix design? Write the steps involved in the method of mix design (IS -10262 - 2009). **(16 Marks)**

Module-5

9 a. Explain the materials used for self – compacting concrete. **(08 Marks)**
b. State the advantages and disadvantages of RMC. **(08 Marks)**

OR

10 a. Explain the fiber types used in Fiber Reinforced Concrete. **(08 Marks)**
b. State the advantages of Light Weight Concrete. **(08 Marks)**

* * * * *

CBCS Scheme

USN | | | | | | | | | | |

15CV42

Fourth Semester B.E. Degree Examination, June/July 2017
Analysis of Determinate Structure

Time: 3 hrs. Max. Marks: 80

Note: **1.** ***Answer FIVE full questions, choosing one full question from each module.***
2. ***Assume any missing data, if any.***

Module-1

1 a. Briefly explain different forms of structures. **(03 Marks)**

b. State the assumptions made in the analysis of truss. **(04 Marks)**

c. Find the forces in the numbered members of the loaded truss shown Fig.Q1(c) using method of sections.

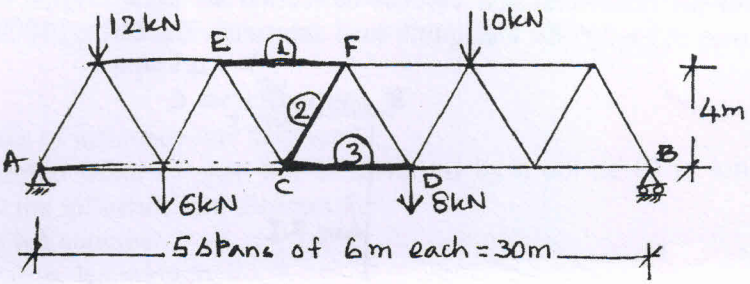

Fig.Q1(c) **(09 Marks)**

OR

2 a. Explain statically determinate and indeterminate structures with examples. **(04 Marks)**

b. Analyze the loaded truss shown in Fig.Q2(b) by method of joints and tabulate the results neatly.

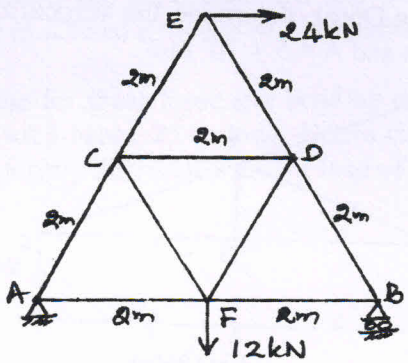

Fig.Q2(b) **(12 Marks)**

Module-2

3 a. Derive the differential equation of deflected curve for the beam. **(04 Marks)**

b. Determine the maximum deflection at the free end of a cantilever beam subjected point load W at free end of span 'L' with constant EI. Use Macaulay's method. **(06 Marks)**

c. Using conjugate beam method, find the deflection at end of a cantilever beam of span 'L' subjected udl of ω/mt run over entire span. EI constant. **(06 Marks)**

OR

4 a. State first and second moment area theorems. **(04 Marks)**

b. Find the ratio of deflection at C and D for the simply supported beam shown in Fig.Q4(b). Take E = 200 GPa, I = 6×10^7 mm^4. Use Macaulay's method.

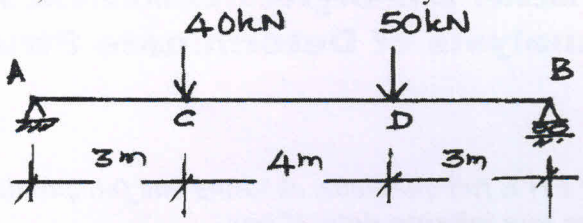

Fig.Q4(b) and Fig.Q4(c) **(05 Marks)**

c. Find the maximum deflection for the simply supported beam loaded as shown in Fig.Q4(c). Use moment-area method. **(07 Marks)**

Module-3

5 a. Derive the expression for the strain energy stored in a beam due to flexure. **(04 Marks)**

b. Find the horizontal and vertical deflection at the free end 'c' of a bent frame loaded as shown in Fig.Q5(b). Using unit load approach. Take EI = 15000 kN-m^2.

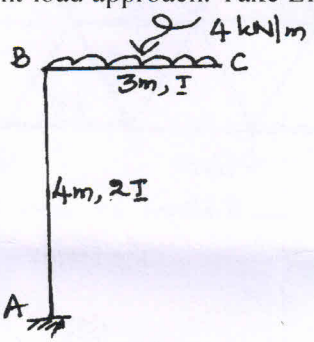

Fig.Q5(b) **(12 Marks)**

OR

6 a. For the truss shown in Fig.Q6(a), determine the vertical deflection at C by strain energy method. Take E = 210 GPa and A = 5×10^4 mm^2.

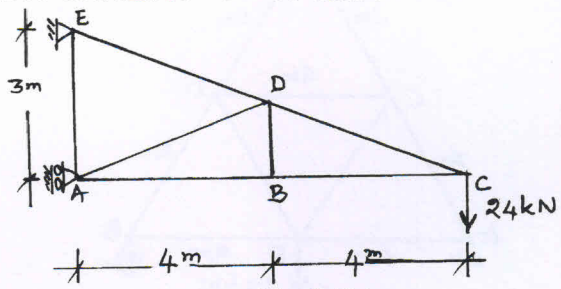

Fig.Q6(a) **(09 Marks)**

b. A cantilever beam is loaded as shown in Fig.Q6(b). Compute the deflection at point C by unit load approach. Take E = 200 GPa, I = 8×10^7 mm^4.

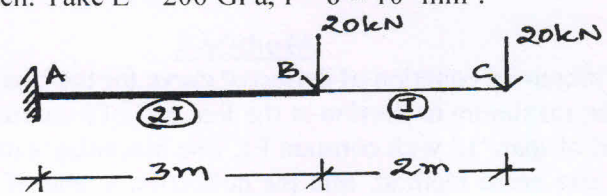

Fig.Q6(b) **(07 Marks)**

Module-4

7 a. A three hinged parabolic arch of span 30 m, rise 5m is subjected to uniformly distributed load of 20 kN/m for left half of the span. Determine support reactions at the springing levels. Also determine normal thrust, radial shear and bending moment at a section 8 m from left support. **(09 Marks)**

b. A suspension cable of span 100 m and slip 10 m carries a udl of 8 kN/m of horizontal span over the entire span. Find the maximum and minimum tension in the cable and where they occur in the cable. Find the length of cable. **(07 Marks)**

OR

8 a. A flexible suspension cable of weight 12 kN/m hangs between two vertical walls 60 mt apart, left being at a point 10 m below the right point. A point load of 200 kN is attached to cable in such a manner that the point of attachment of load is 20 m horizontally from left end wall and 5 m below the left hand support. Find the maximum and minimum tension in the cable. **(08 Marks)**

b. A parabolic arch of span 24 m with a central rise of 4 m is subjected to a point load of 30 kN at 6 m from left support and a udl of 15 kN/m over the right half of the span. Sketch BMD, also find normal thrust and radial shear at 10 m from right support. **(08 Marks)**

Module-5

9 a. What are the uses of influence line diagram? **(03 Marks)**

b. A simply supported beam of span 8m in traversed by a udl of 10 m long with intensity 20 kN/m. Draw the influence line diagram for:

i) Reaction at left support
ii) S.F at 3 mt from left support
iii) BM at 3 mt from left support.

Find the maximum values of above quantities. **(13 Marks)**

OR

10 a. A beam has a span of 20 m. Draw influence line for BM and SF at a section 8m from the left support and determine the maximum BM and SF for this section due to two point loads 80 kN and 40 kN at a fixed distance of 2m apart rolling from left to right with 80 kN load leading. **(06 Marks)**

b. Draw influence line for shear force and bending moment at a section 5 m from left support of a simply supported beam, 25 m long. Hence calculate the maximum SF and BM at this section due to uniformly distributed rolling load of 8m long with intensity 5 kN/m. **(10 Marks)**

* * * * *

CBCS Scheme

USN | | | | | | | | | | |

15CV43

Fourth Semester B.E. Degree Examination, June/July 2017
Applied Hydraulics

Time: 3 hrs. Max. Marks: 80

Note: Answer any FIVE full questions, choosing one full question from each module.

Module-1

1 a. What is meant by dimensionally homogeneous equation? Explain with an example. **(04 Marks)**

b. Define i) Center of buoyancy ii) Metacenter. How these are used to identify the equilibrium condition of floating bodies? **(06 Marks)**

c. In a 1:30 model of spillway, the velocity and discharge are 1.5m/s and $2m^3/s$. Find the corresponding velocity and discharge in prototype. **(06 Marks)**

OR

2 a. Using Buckingham π-theorem, derive the following relationship

$$R = \rho V^2 D^2 . \phi\left[\frac{\mu}{\rho VD}, \frac{H}{D}\right]$$

Where R = Resistance, ρ = density, V = Velocity of flow, D = diameter, μ = Viscosity, H = hight. **(07 Marks)**

b. Define :
i) Geometric similarity ii) Kinematic similarity and iii) Dynamic similarity. **(06 Marks)**

c. A body of cross-sectional area $2m^2$ and depth 5m has specific gravity 0.8. Determine the depth of immersion of the body. **(03 Marks)**

Module-2

3 a. Derive Chezy's equation for discharge through uniform flow in open channel. **(08 Marks)**

b. A 3m wide rectangular channel carries $2.4m^3/s$ discharge at a depth of 0.7m. Determine:
i) Specific energy at 0.7m depth
ii) Critical depth
iii) Alternate depth to 0.7. **(08 Marks)**

OR

4 a. For the most economical trapezoidal section show that half of top width is equal to side slope length. **(08 Marks)**

b. A rectangular channel 6m wide and 1m depth of water has a bed slope of 1 in 900 and is having n = 0.012. Determine the discharge. What will be the dimensions of the channel for maximum discharge with amount of lining being kept constant? Also compute percentage increase in discharge. **(08 Marks)**

Module-3

5 a. Derive the relationship between conjugate depths in case of hydraulic jump on a horizontal floor. **(08 Marks)**

b. A rectangular channel with bottom width 4m and bed slope 0.0008 has a discharge of $1.5m^3/s$. In a GVF in this channel the depth at a certain section is 0.3m. If n = 0.016, determine the type of profile. **(08 Marks)**

OR

6 a. Explain the classification of surface profiles in an open channel with neat sketches. **(10 Marks)**

b. A rectangular channel 8m wide discharges water with a depth of 0.4m and 6m/s velocity. Find the formation of hydraulic jump and if so, determine jump height and energy loss in meters. **(06 Marks)**

Module-4

7 a. Show that the maximum efficiency of jet striking at the center of a symmetrical single curved vane is $\left(\frac{16}{27}\right)$. vane is semicircular. **(08 Marks)**

b. A Pelton wheel turbine has to be designed for the following :
Data: Power = 6000kW, Net head = 300m, Speed = 550rpm, Jet ratio = 1/10, Overall efficiency = 85%, C_v = 0.98, Speed ratio is 0.46. Determine diameter of runner and jet, discharge and number of jets required. **(08 Marks)**

OR

8 a. Draw a neat sketch of a layout of hydroelectric power plant and explain the functions of each component. Also define different heads. **(08 Marks)**

b. A jet of water moving at 30m/s impinges on a series of curved vanes moving with a velocity of 15m/s. The jet makes an angle of 30° to the direction of motion of vane when entering and leaves at an angle of 120° to the direction of motion of vanes. Draw the velocity triangles at inlet and outlet and find :
i) The vane angle at inlet and outlet
ii) Workdone per N of water
iii) Hydraulic efficiency. **(08 Marks)**

Module-5

9 a. Define :
i) Unit head ii) Unit discharge iii) Unit power. **(03 Marks)**

b. Derive the expression for minimum starting speed of a centrifugal pump. **(06 Marks)**

c. A Kaplan turbine runner is to be designed to develop 7350kW power under a head of 5.5m with $\eta_0 = 85\%$. Boss diameter = $\frac{1}{3}$ diameter of runner, speed ratio = 2.1, Flow ratio = 0.7. Determine :
i) Diameter of runner and boss, ii) Speed. **(07 Marks)**

OR

10 a. Define draft tube. Explain its function. Draw the neat sketches of types of draft tubes. **(06 Marks)**

b. Define: i) Manometric head ii) Static head iii) Suction head iv) Delivery head. **(04 Marks)**

c. A centrifugal pump runs at 1000rpm and delvers water against a head of 15m. The impeller diameter and width at the outlet are 0.3m and 0.05m respectively. The vanes are curved back at 30° $\eta_{man} = 92\%$. Find discharge. **(06 Marks)**

* * * * *

CBCS Scheme

USN | | | | | | | | | | |

15CV45

Fourth Semester B.E. Degree Examination, June/July 2017

Basic Geotechnical Engineering

Time: 3 hrs. Max. Marks: 80

Note: **1.** ***Answer FIVE full questions, choosing one full question from each module.***
2. ***Assume missing data, if any, suitably.***

Module-1

1 a. With the help of phase diagram of sol, define the terms:
i) Void ratio ii) Water content
iii) Degree of saturation iv) Unit weight of soil **(08 Marks)**

b. Following results were obtained from liquid limit test on a clay sample, whose plastic limit is 13% and natural water content is 18%. Determine the following:
i) Liquid limit ii) Flow index iii) Consistency index

Number of blows	5	16	23	42
Water content %	32	27.8	25.5	23.3

(08 Marks)

OR

2 a. Sketch a typical grain-size curve for (i) Well graded soil, (ii) Uniformly graded soil. Calculate uniformity coefficient and coefficient of curvature from the curve. **(04 Marks)**

b. Explain the salient features of I.S. plasticity chart for classification of fine grained soils. **(06 Marks)**

c. A partially saturated sample from a borrow pit has a natural water content of 14% and bulk unit weight of 19 kN/m^3. The specific gravity of solids is 2.70. Determine the void ratio, and degree of saturation. What will be the unit weight of the sample on saturation? **(06 Marks)**

Module-2

3 a. Distinguish between:
i) Primary and secondary valence bonds
ii) Dispersed and flocculent structures
iii) Structure of Kaolinite and Montmorillonite
iv) Isomorphism substitution and base exchange capacity **(10 Marks)**

b. Differentiate between standard and modified proctor tests. **(06 Marks)**

OR

4 a. Explain the factors affecting the degree of compaction. **(04 Marks)**

b. List the differences between compaction and consolidation. **(04 Marks)**

c. In a standard proctor test. Following results were obtained:

Mass of compacted soil in grams	1700	1890	2003	1960
Water content %	7.7	11.5	14.6	19.7

i) Draw the compaction curve showing OMC and maximum dry density.
ii) Determine the void ratio and degree of saturation.
Given, volume of mould = 950 cc and G = 2.65. **(08 Marks)**

Module-3

5 a. Define Darcy's law. Derive an expression to relate discharge velocity and seepage velocity. **(06 Marks)**

b. Explain the following terms:
i) Total stress ii) Neutral stress
iii) Effective stress iv) Quick sand condition **(06 Marks)**

c. An earthen dam is built on a impervious foundation with a horizontal filter under the downstream slope. The horizontal and vertical permeability of the soil material in the dam are respectively 4×10^{-5} m/sec and 1×10^{-5} m/sec. Full reservoir level is 20m above downstream filter. Flow net consists of 4 flow channels and 15 equipotential drops. Estimate the seepage loss per meter length of the dam. **(04 Marks)**

OR

6 a. List the properties and use of flow nets. **(04 Marks)**

b. In a falling head permeameter test, the initial head is 300 m it drops by 1 cm in 3 minutes. How much longer should the test to be continued, if the head is to drop to 180 m? **(04 Marks)**

c. Explain with neat sketch the method of locating the phreatic line in a homogenous earth dam with horizontal filter. **(08 Marks)**

Module-4

7 a. Explain mass-spring analogy of consolidation of soils. **(08 Marks)**

b. In a consolidation test, the void ratio of soil sample decreases from 1.20 to 1.10 when the pressure increases from 160 to 320 kN/m^2. Determine the coefficient of consolidation, if the coefficient of permeability is 8×10^{-7} mm/sec. **(08 Marks)**

OR

8 a. Explain under consolidated, normally consolidated and over consolidated soil. **(06 Marks)**

b. How preconsolidation pressure is determined by Casagrande's method? **(06 Marks)**

c. A soil sample 2 cm thickness take 20 minutes to reach 20% consolidation. Find the time for a clay layer 6 cm thick to reach 40% consolidation. Assume double drainage in both cases. **(04 Marks)**

Module-5

9 a. Briefly explain Mohr-Coulomb's shear strength theory. **(06 Marks)**

b. In a direct shear test on sand, sample failed at a shear strength of 70 kN/m^2 when normal stress was 100 kN/m^2. Determine angle of internal friction. Draw Mohr circle at failure. Mark major and minor principal planes. What are the values of major and minor principal stresses? **(10 Marks)**

OR

10 a. Mention the advantages and disadvantages of direct shear test. **(04 Marks)**

b. Classify shear tests based on drainage conditions. **(03 Marks)**

c. A soil has unconfined compression strength of 120 kN/m^2. In triaxial compression test, specimen of same soil (under similar conditions) when subjected to cell pressure of 40 kN/m^2, failed at an additional stress of 160 kN/m^2. Determine:
i) Shear strength parameters
ii) Angle made by failure plane with axial stress direction in case of triaxial test. **(09 Marks)**

* * * * *

CBCS Scheme

USN | | | | | | | | | | |

15CV46

Fourth Semester B.E. Degree Examination, June/July 2017
Advanced Surveying

Time: 3 hrs. Max. Marks: 80

Note: ***Answer FIVE full questions, choosing one full question from each module.***

Module-1

1 a. Explain the following along with a neat sketch : **(08 Marks)**
i) Forward tangent ii) Point of curve iii) Deflection angle iv) Apex distance.

b. Two tangents intersect at a chainage of 1190m, the deflection angle 36^0. Compute all the data necessary to set out a curve of radius 300m by deflection angle method. The peg interval is 30m. Tabulate the results. **(08 Marks)**

OR

2 a. A reverse curve is to be set out to connect two parallel railway line 30m apart. The distance between the tangent points is 150m. Both the arcs have the same radius. The curve is set out by method of ordinates from long chord taking a peg interval of 10m. Calculate the necessary data for setting the curve. **(08 Marks)**

b. List the requirements of a transition curve (any four). **(04 Marks)**

c. With a neat sketch, list any four vertical curves. **(04 Marks)**

Module-2

3 a. Mention the points to be considered in the selection of triangular station. **(06 Marks)**

b. Triangulation station B was used in measuring angles and the instrument was necessary to shift to a satellite station S due south of main station B at a distance of 12.2m from it. The line BS bisects the exterior angle A, B, C and the angles ASB and BSC were observed to be 30^0 20' 30" and 29^0 45' 6". When the station B was observed angles CAB and ACB were observed to be 59^0 18' 26" and 60^0 26' 12". The side AC computed to be 4248.5m from the adjacent triangle. Determine the correct value of the angle ABC. **(10 Marks)**

OR

4 a. Explain the three kinds of errors. **(03 Marks)**

b. The observed values of P, Q and R at a station the angles being subjected to the condition that P + Q = R.
$P = 30^0\ 12'\ 28.2"$; $Q = 35^0\ 48^0\ 12.6"$; $R = 66^0\ 0'\ 44.4"$ **(08 Marks)**
Find the most probable value of P, Q and R.

c. Explain the probability curve. **(05 Marks)**

Module-3

5 a. Define the following terms :
i) Zenith and Nadir ii) Prime vertical iii) Hour angle. **(03 Marks)**

b. Mention the properties of a spherical triangle. **(05 Marks)**

c. Find the shortest distance between two points A & B, given
A latitude – 18^0 24' N longitude 36^0 18 E
B latitude – 68^0 32' N longitude 126^0 34 E. **(08 Marks)**

OR

6 a. Define the following : i) Vertical circle ii) Azimuth iii) Altitude. **(03 Marks)**

b. Explain Ecliptic and Solstices. **(05 Marks)**

c. Find the shortest distance between two places A & B given that the longitudes of A and B are 15^0 0' N and 12^0 6' N and longitudes are 50^0 12' E and 54^0 0' E respectively. **(08 Marks)**

Module-4

7 a. Define the following terminologies :
i) Exposure station ii) Picture plane iii) Perspective centre. **(03 Marks)**

b. Mention the general features of Photographic images. **(07 Marks)**

c. Find the number of photographers (size 250 × 250mm) required to cover over a area of 20km × 16km of the longitudinal overlap is 60% and the side overlap is 30% scale the photograph is 1cm = 150m. **(06 Marks)**

OR

8 a. Derive an expression for relief displacement on a vertical photograph. **(05 Marks)**

b. Explain the procedure for aerial survey. **(05 Marks)**

c. A vertical photograph was taken at a altitude of 1200 meters above mean sea level. Determine the scale of the photograph for a terrain lying at elevations of 80 meters and 300 meters if the focal length of the camera is 15cm. **(06 Marks)**

Module-5

9 a. Mention the advantages of total station and also discuss the working principles of the same. **(08 Marks)**

b. Define Remote sensing. Explain the stages of idealized remote sensing system. **(08 Marks)**

OR

10 a. What is GIS? Enumerate on GIS applications in civil engineering. **(08 Marks)**

b. Explain the basic principles of GPS and its application in surveying. **(08 Marks)**

* * * * *

CBCS Scheme

USN | | | | | | | | | | |

15MAT41

Fourth Semester B.E. Degree Examination, June/July 2017
Engineering Mathematics–IV

Time: 3 hrs. Max. Marks: 80

Note: 1. ***Answer FIVE full questions, choosing one full question from each module.***
2. ***Use of statistical tables are permitted.***

Module-1

1 a. Find by Taylor's series method the value of y at x = 0.1 from $\frac{dy}{dx} = x^2y - 1$, $y(0) = 1$ (upto 4th degree term). **(05 Marks)**

b. The following table gives the solution of $5xy' + y^2 - 2 = 0$. Find the value of y at x = 4.5 using Milne's predictor and corrector formulae. **(05 Marks)**

x	4	4.1	4.2	4.3	4.4
y	1	1.0049	1.0097	1.0143	1.0187

c. Using Euler's modified method. Obtain a solution of the equation $\frac{dy}{dx} = x + |\sqrt{y}|$, with initial conditions y = 1 at x = 0, for the range $0 \le x \le 0.4$ in steps of 0.2. **(06 Marks)**

OR

2 a. Using modified Euler's method find y(20.2) and y(20.4) given that $\frac{dy}{dx} = \log_{10}\left(\frac{x}{y}\right)$ with $y(20) = 5$ taking h = 0.2. **(05 Marks)**

b. Given $\frac{dy}{dx} = x^2(1+y)$ and y(1) = 1, y(1.1) = 1.233, y(1.2) =1.548, y(1.3) = 1.979. Evaluate y(1.4) by Adams-Bashforth method. **(05 Marks)**

c. Using Runge-Kutta method of fourth order, solve $\frac{dy}{dx} = \frac{y^2 - x^2}{y^2 + x^2}$ with $y(0) = 1$ at x = 0.2 by taking h = 0.2 **(06 Marks)**

Module-2

3 a. Obtain the solution of the equation $2\frac{d^2y}{dx^2} = ux + \frac{dy}{dx}$ by computing the value of the dependent variable corresponding to the value 1.4 of the independent variable by applying Milne's method using the following data: **(05 Marks)**

x	1	1.1	1.2	1.3
y	2	2.2156	2.4649	2.7514
y′	2	2.3178	2.6725	3.0657

b. Express $f(x) = 3x^3 - x^2 + 5x - 2$ in terms of Legendre polynomials. **(05 Marks)**

c. Obtain the series solution of Bessel's differential equation $x^2y'' + xy' + (x^2 + n^2)y = 0$ **(06 Marks)**

OR

4 a. By Runge-Kutta method solve $\frac{d^2y}{dx^2} = x\left(\frac{dy}{dx}\right)^2 - y^2$ for x = 0.2. Correct to four decimal places using the initial conditions y = 1 and $y' = 0$ at x = 0, h = 0.2. **(05 Marks)**

b. Prove that $J_{+\frac{1}{2}}(x) = \sqrt{\frac{2}{\pi x}}\sin x$ **(05 Marks)**

c. Prove the Rodrigues formula,

$$\rho_n(x) = \frac{1}{2^n n!}\frac{d^n(x^2-1)^n}{dx^n}$$ **(06 Marks)**

Module-3

5 a. State and prove Cauchy's-Riemann equation in polar form. **(05 Marks)**

b. Discuss the transformation $W = e^z$. **(05 Marks)**

c. Evaluate $\int_C \left\{\frac{\sin(\pi z^2)+\cos(\pi z^2)}{(z-1)^2(z-2)}\right\}dz$

using Cauchy's residue theorem where 'C' is the circle $|z| = 3$ **(06 Marks)**

OR

6 a. Find the analytic function whose real part is, $\frac{\sin 2x}{\cosh 2y - \cos 2x}$. **(05 Marks)**

b. State and prove Cauchy's integral formula. **(05 Marks)**

c. Find the bilinear transformation which maps z = ∞, i, 0 into ω = -1, -i, 1. Also find the fixed points of the transformation. **(06 Marks)**

Module-4

7 a. Find the mean and standard deviation of Poisson distribution. **(05 Marks)**

b. In a test on 2000 electric bulbs, it was found that the life of a particular make was normally distributed with an average life of 2040 hours and S.D of 60 hours. Estimate the number of bulbs likely to burn for,

(i) more than 2150 hours.
(ii) less than 1950 hours
(iii) more than 1920 hours and less than 2160 hours.

[A(1.833) = 0.4664, A(1.5) = 0.4332, A(2) = 0.4772] **(05 Marks)**

c. The joint probability distribution of two random variables x and y is as follows:

x/y	-4	2	7
1	1/8	1/4	1/8
5	1/4	1/8	1/8

Determine:

(i) Marginal distribution of x and y.
(ii) Covariance of x and y
(iii) Correlaiton of x and y. **(06 Marks)**

OR

8 a. The probability that a pen manufactured by a factory be defective is $\frac{1}{10}$. If 12 such pens are manufactured what is the probability that, (i) Exactly 2 are defective (ii) at least 2 are defective (iii) none of them are defective. **(05 Marks)**

b. Derive the expressions for mean and variance of binomial distribution. **(05 Marks)**

c. A random variable X take the values -3, -2, -1, 0, 1, 2, 3 such that $P(x = 0) = P(x < 0)$ and $P(x = -3) = P(x = -2) = P(x = -1) = P(x = 1) = P(x = 2) = P(x = 3)$. Find the probability distribution. **(06 Marks)**

Module-5

9 a. In 324 throws of a six faced 'die' an odd number turned up 181 times. Is it reasonable to think that the 'die' is an unbiased one? **(05 Marks)**

b. Two horses A and B were tested according to the time (in seconds) to run a particular race with the following results:

Horse A:	28	30	32	33	33	29	34
Horse B:	29	30	30	24	27	29	

Test whether you can discriminate between the two horses.($t_{0.05}$=2.2 and $t_{0.02}$=2.72 for 11 d.f) **(05 Marks)**

c. Find the unique fixed probability vector for the regular stochastic matrix, $A = \begin{bmatrix} 0 & 1 & 0 \\ 1/6 & 1/2 & 1/3 \\ 0 & 2/3 & 1/3 \end{bmatrix}$ **(06 Marks)**

OR

10 a. Define the terms: (i) Null hypothesis (ii) Type–I and Type–II error (iii) Confidence limits. **(05 Marks)**

b. Prove that the Markov chain whose t.p.m $P = \begin{bmatrix} 0 & 2/3 & 1/3 \\ 1/2 & 0 & 1/2 \\ 1/2 & 1/2 & 0 \end{bmatrix}$ is irreducible. Find the corresponding stationary probability vector. **(05 Marks)**

c. Three boys A, B, C are throwing ball to each other. A always throws the ball to B and B always throws the ball to C. C is just as likely to throw the ball to B as to A. If C was the first person to throw the ball find the probabilities that after three throws (i) A has the ball. (ii) B has the ball. (iii) C has the ball. **(06 Marks)**

* * * * *

USN | | | | | | | | | | |

10AL51

Fifth Semester B.E. Degree Examination, May 2017
Management and Entrepreneurship

Time: 3 hrs. Max. Marks:100

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

PART – A (Management)

1 a. Define Management. Explain functional areas of management. **(12 Marks)**
b. Distinguish between 'Management' and 'Administration' highlighting the differences. **(08 Marks)**

2 a. Define Planning. Explain importance of planning. **(10 Marks)**
b. Briefly describe planning premises and hierarchy of plans. **(10 Marks)**

3 a. Describe principles of Organization. **(10 Marks)**
b. Discuss nature and importance of staffing. **(10 Marks)**

4 a. Briefly describe different types of Leadership styles. **(12 Marks)**
b. Name the different methods of establishing control. Explain any two of these in brief. **(08 Marks)**

PART – B (Entrepreneurship)

5 a. Explain the concept and characteristics of an Entrepreneur. **(10 Marks)**
b. Describe Evolution and development of Entrepreneurship. **(10 Marks)**

6 a. Explain objective and scope for Small Enterprises (SSI). **(10 Marks)**
b. Briefly describe the following :
i) Impact of Liberalization , Privatisation and Globalisation on Small Enterprises.
ii) Effect of GATT and WTO on Small Enterprises. **(10 Marks)**

7 a. Explain briefly aims and objectives of TECSOK and KIADB. **(10 Marks)**
b. Describe functions of SIDBI. **(10 Marks)**

8 a. Explain Project Identification. **(05 Marks)**
b. What is Project Report? Describe need and significance of Project report. **(07 Marks)**
c. List out the 'Guidelines by Planning Commission of India for Project Report'. Explain any two of these. **(08 Marks)**

*****

USN | | | | | | | | | | |

10CV52

Fifth Semester B.E. Degree Examination, May 2017
Design of RCC Structural Elements

Time: 3 hrs. Max. Marks:100

Note: *1. Answer any FIVE full questions, selecting atleast TWO questions from each part.*
2. Use of IS 456 and SP – 16 are permitted.

PART – A

1 a. Discuss the significance of characteristic strength and characteristic loads in RC design. **(06 Marks)**

b. Find the moment of resistance of a rectangular beam of size 200mm width and 400 mm effective depth for the following reinforcements.
i) 3 – 16mm dia bars ii) 4 – 16mm dia bars.
Resize the beam if necessary use Fe415 grade steel and M20 grade concrete. **(14 Marks)**

2 a. List the circumstance under which doubly reinforced beam are recommended. **(04 Marks)**

b. A simply supported beam 300 mm wide and 600 mm depth (effective) carries 74 kN/m including self weight of beam over a span of 6 m (effective). The flexural reinforcement consists of 5 bars of 25mm out of which 2 are cranked at support with an inclination of 45°. Design shear reinforcement for beam. use M20 grade concrete and Fe 415 grade steel. **(16 Marks)**

3 A T – beam floor slab consists of beams spaced at 3.2m c/c. Thickness of slab = 120mm. LL on slab is 4.6 kN/m^2. The beam has a clear span of 7m wall support is of thickness 300mm. Design an intermediate T –beam for flexure and shear. Sketch reinforcement detail at mid span and support. **(20 Marks)**

4 a. List the factors influencing deflection of RC beam. **(04 Marks)**

b. A simply supported beam of rectangular section 250 mm × 450mm (overall) is used to carry a service load of 10 kN/m over on effective span of 4m. Self weight of beam together with DL on beam is 4 kN/m. The beam is reinforced with 3 bars of 20 mm dia at an effective depth of 400 mm. Find the short term deflection at mid span. Use M20 grade concrete and Fe415 grade steel. **(16 Marks)**

PART – B

5 a. Distinguish between one way and two way slab. **(04 Marks)**

b. A simply supported slab (all edges discontinuous) on a room of inner size 4m × 6m. The slab carries LL of 3 kN/m^2 besides finishing load of 0.9 kN/m^2. Thickness of wall around the room = 230mm. Corners of the slab are held down. Design the slab and sketch reinforcement details. **(16 Marks)**

USN | | | | | | | | | | |

10CV53

Fifth Semester B.E. Degree Examination, May 2017
Structural Analysis – II

Time: 3 hrs. Max. Marks:100

Note: 1. ***Answer FIVE full questions, selecting at least TWO questions from each part.***
2. ***Assume any missing data suitably.***

PART – A

1 A simply supported beam shown in Fig Q(1) is subjected to a set of four concentrated loads which move from left to right. Determine
i) Maximum Bending moment and shear force at 6m from left support
ii) Absolute shear force and absolute maximum bending moment
use influence line principle. **(20 Marks)**

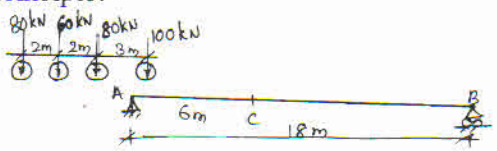

Fig Q1

2 Analyse a continuous beam shown in Fig Q2. Using scope deflection method. The support 'C' sinks by 10mm. Take EI = 3000 kN – m^2. Draw BMD and elastic curve. **(20 Marks)**

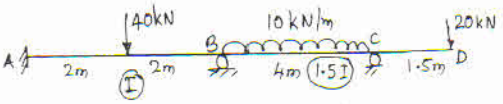

Fig Q2

3 Analyse the frame shown in Fig Q3. Using moment distribution method sketch BMD. Take EI constant throughout. **(20 Marks)**

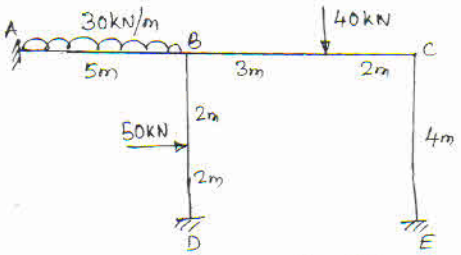

Fig Q3

4 Analyse the frame shown in Fig Q4 using moment distribution method. Sketch BMD. **(20 Marks)**

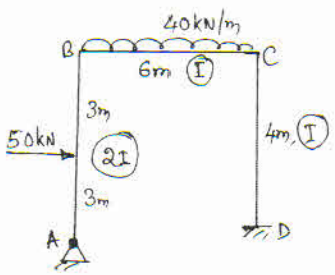

Fig Q4

USN | | | | | | | | | | |

10CV53

Fifth Semester B.E. Degree Examination, May 2017
Structural Analysis – II

Time: 3 hrs. Max. Marks:100

Note: 1. ***Answer FIVE full questions, selecting at least TWO questions from each part.***
2. ***Assume any missing data suitably.***

PART – A

1 A simply supported beam shown in Fig Q(1) is subjected to a set of four concentrated loads which move from left to right. Determine
i) Maximum Bending moment and shear force at 6m from left support
ii) Absolute shear force and absolute maximum bending moment
use influence line principle. **(20 Marks)**

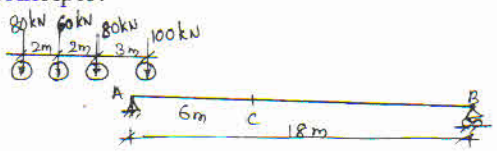

Fig Q1

2 Analyse a continuous beam shown in Fig Q2. Using scope deflection method. The support 'C' sinks by 10mm. Take EI = 3000 kN – m^2. Draw BMD and elastic curve. **(20 Marks)**

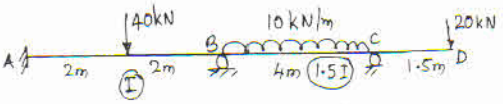

Fig Q2

3 Analyse the frame shown in Fig Q3. Using moment distribution method sketch BMD. Take EI constant throughout. **(20 Marks)**

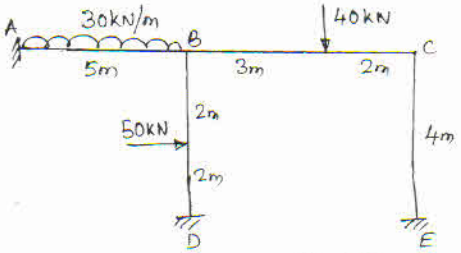

Fig Q3

4 Analyse the frame shown in Fig Q4 using moment distribution method. Sketch BMD. **(20 Marks)**

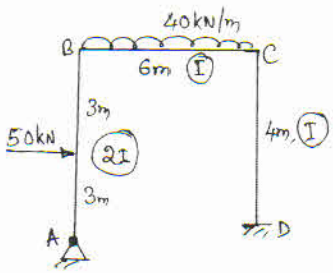

Fig Q4

PART – B

5 Analyse the frame shown in Fig Q5 using Kani's method. Sketch BMD. **(20 Marks)**

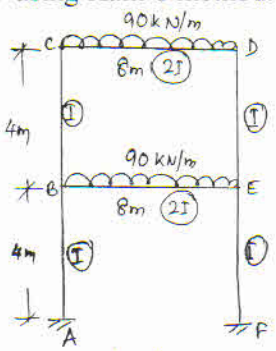

Fig Q5

6 Analyse the continuous beam shown in Fig Q6. Using flexibility matrix method. Sketch BMD. **(20 Marks)**

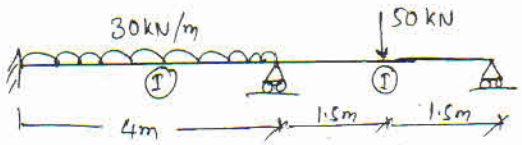

Fig Q6

7 Analyse the continuous beam shown in Fig Q7 using stiffness matrix method. Sketch BMD. **(20 Marks)**

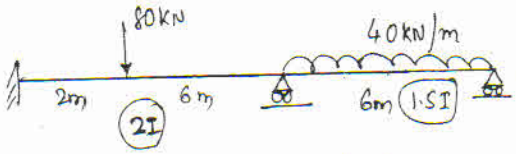

Fig Q7

8 a. Explain :
i) Degree of freedom ii) Damping iii) Free and Forced vibration iv) Natural frequency. **(08 Marks)**

b. In a free vibration test, a pull of 73kN is applied to a elevated tank to give an initial displacement of 50mm. At the end of 4 cycles with time 2sec, the amplitude is 25mm. From these compute the following :
i) Damping ratio
ii) Undamped natural frequency
iii) Damping coefficient
iv) Number of cycles to reach amplitude of 5mm. **(12 Marks)**

* * * * *

USN | | | | | | | | | | |

10CV54

Fifth Semester B.E. Degree Examination, May 2017
Geotechnical Engineering – I

Time: 3 hrs. Max. Marks:100

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

PART – A

1 a. With the help of a three phase diagram, define
(i) Voids ratio (ii) Water content (iii) Degree of saturation of a soil mass
Give the relationship for each. **(06 Marks)**

b. With usual notations prove that
$\gamma = \gamma_d + S_r (\gamma_{sat} - \gamma_d)$ **(08 Marks)**

c. A compacted sample of soil with a bulk density of 20 kN/m^3 has a water content of 15%. What are its dry density and degree of saturation? If the sample is allowed to get fully saturated without any increase in volume, what would be its bulk density? Assume G = 2.65. **(06 Marks)**

2 a. 500 gram of dry soil was subjected to a sieve analysis. The weight of soil retained on each sieve is as follows:

IS sieve size	Wt. of soil, grams	IS sieve size	Wt of soil, gram
4.75mm	10	212 μ	40
2.00mm	165	150 μ	30
1.00mm	100	75 μ	50
425 μ	85		

Plot the grain size distribution curve and determine the following :
(i) Effective size (ii) Uniformity coefficient (iii) Coefficient of curvature. **(08 Marks)**

b. Explain the corrections to hydrometer reading in sedimentation analysis of soil. **(06 Marks)**

c. Derive an expression to find shrinkage limit of soil from dry soil pat, when specific gravity G of soil is known. **(06 Marks)**

3 a. Explain any 4 tests on field identification of soil. **(08 Marks)**

b. Give a detailed description on three clay minerals with neat diagram. **(06 Marks)**

c. Draw a neat plasticity chart and explain its use to classify the soil. **(06 Marks)**

4 a. List and explain the factors affecting coefficient of permeability of soils. **(06 Marks)**

b. Derive expressions for determining the average permeability through stratified soil deposit when the flow is
(i) Parallel to bedding plane
(ii) Perpendicular to bedding plane. **(06 Marks)**

c. A soil sample of height 6 cm and area of C/S 600 cm^2 was subjected to a falling head permeability test. In a time interval of 5 min, the head dropped from 60 cm to 20 cm. If the cross-sectional area of stand pipe is 2 cm^2, compute the coefficient of permeability of the soil sample. If the same sample is subjected to a constant head of 18 cm, calculate the total quantity of water that will be collected after flowing through the sample, during the same time interval. **(08 Marks)**

PART – B

5 a. Explain the sensitivity and thixotrophy of clay. **(06 Marks)**

b. List the factors affecting shear strength of soils. **(06 Marks)**

c. In a deposit of fine sand the water table is 3 m below the ground surface, but sand upto a height of 1 m above water table is saturated by capillary water. The sand above this height may be considered dry. For the sand G = 2.68 and n = 40%. Calculate the effective stress at depth of 8m. **(08 Marks)**

6 a. List and explain the factors affecting compaction. **(06 Marks)**

b. Explain field compaction control and how it is done. **(06 Marks)**

c. The following are the results of standard compaction test performed on a soil.

Water content%	5	10	14	20	25
Bulk unit wt. kN/m^3	17.70	19.80	21.00	21.80	21.60

Find the optimum moisture content and maximum dry density by plotting compaction curve. If G = 2.65, Plot zero air voids line. **(08 Marks)**

7 a. Define the following terms with respect to one dimensional consolidation and give the expression for each using standard notations:
(i) Compression index (ii) Coefficient of compressibility
(iii) Coefficient of volume change. **(06 Marks)**

b. State any 6 assumptions made in Terzaghi's one dimensional consolidation theory. **(06 Marks)**

c. A compressible layer is expected to have total settlement of 15 cm under a given loading. It settles by 3 cm at the end of two months after the application of load increment. How many months will be required to reach a settlement of 7.5 cm? What is the settlement in 18 months? The layer has double drainage. **(08 Marks)**

8 a. Explain briefly how triaxial shear tests are classified based on drainage conditions. **(06 Marks)**

b. An confined compression test was conducted on an undisturbed sample of clay. The sample has a diameter of 38 mm and was 76 mm long. The load at failure measured by proving ring was 28 N and the axial deformation of the sample at failure was 13 mm. Determine the unconfined compressive strength and the undrained shear strength of the clay. **(06 Marks)**

c. Two identical soil specimen were tested in a triaxial apparatus. First specimen failed at a deviator stress of 770 kN/m^2 when the cell pressure was 200 kN/m^2. Second specimen failed at a deviator stress of 1370 kN/m^2 when the cell pressure was 400 kN/m^2. Determine the value of shear parameters. If the same soil is tested in a direct shear apparatus with a normal stress of 600 kN/m^2, estimate the shear stress at failure. **(08 Marks)**

* * * * *

USN | | | | | | | | | | |

10CV55

Fifth Semester B.E. Degree Examination, May 2017
Hydrology & Irrigation Engineering

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. Explain different types of precipitation. **(08 Marks)**

b. Describe double mass curve technique used to check consistency of rainfall data and adjust rainfall records. **(06 Marks)**

c. A catchment has five raingauge stations. In a year, the annual rainfall recorded by gauges are 78.8 cm, 90.2 cm, 98.6 cm, 102.4 cm and 70.4 cm. For a 6% error in the estimation of the mean rainfall, determine the additional number of raingauges needed. **(06 Marks)**

2 a. Explain the terms : (i) Evaporation (ii) Evapotranspiration (iii) ϕ-index (iv) W-index **(06 Marks)**

b. With the help of neat sketches, explain,
(i) IMD land pan.
(ii) Double ring infiltrometer. **(08 Marks)**

c. A catchment has an area 2.26 km^2, find the ϕ-index for a given rainfall event according to the table given below:

Time (hr)	0 – 2	2 – 5	5 – 7	7 – 10	10 – 12
Rainfall intensity (mm/hr)	7.1	11.7	5.6	3.6	1.5

Given the direct runoff volume is 5.6×10^4 m^3. **(06 Marks)**

3 a. Define hydrograph. Draw a single peaked hydrograph indicate its various components and explain. **(08 Marks)**

b. What are the propositions and limitations of unit hydrograph? **(06 Marks)**

c. The successive three hourly ordinates of a 6-hr unit hydrograph for a particular basin are 0, 15, 36, 30, 17.5, 8.5, 3, 0 cumec, respectively. The flood peak observed due to 6-hr storm was 150 cumec. Assuming a constant base flow of 6 cumec and an average storm loss of 6 mm/hr, determine the depth of storm rainfall and stream flow at successive three hour interval. **(06 Marks)**

4 a. Explain the terms: (i) Standard project flood (ii) Maximum probable flood (iii) Probable maximum precipitation (iv) Design flood. **(06 Marks)**

b. Distinguish between:
(i) Channel routing and reservoir routing.
(ii) Prism storage and wedge storage. **(06 Marks)**

c. Explain in detail the Muskingum method of flood routing. **(08 Marks)**

PART – B

5 a. Define the term irrigation. Explain the necessity of irrigation in India. **(06 Marks)**

b. Distinguish between : (i) Gravity irrigation and lift irrigation (ii) Direct irrigation and storage irrigation. **(06 Marks)**

c. With the help of a neat sketch, explain drip irrigation. Explain its advantages. **(08 Marks)**

6 a. Explain the terms : (i) Hygroscopic water (ii) Capillary water (iii) Field capacity (iv) Wilting point. **(08 Marks)**

b. Explain different types of Indian soils. **(06 Marks)**

c. After how many days will you supply water to soil in order to ensure efficient irrigations if field capacity of soil = 28%, Permanent wilting point = 15%,
Dry density of soil = 15 kN/m^3, Effective depth of root zone = 0.75 m,
Daily consumptive use of water for the given crop = 10 mm. **(06 Marks)**

7 a. Explain (i) Kharif and rabi crops (ii) Crop period and base period
(iii) Duty and Delta (iv) Time factor and capacity factor. **(08 Marks)**

b. Explain different methods of assessment of irrigation water. **(06 Marks)**

c. Table below gives the necessary data about different crops commanded by a canal taking of from a storage tank. Taking the time factor for canal to be $\frac{13}{20}$, calculate the discharge required at the head to the canal. If the capacity factor is 0.8, determine the design discharge. **(06 Marks)**

Crop	Base period (days)	Area (hectares)	Delta at the head of the canal (ha/cumecs)
Sugar cane	320	850	580
Overlap for sugar cane in hot weather	90	120	580
Wheat (Rabi)	120	600	1600
Bajri (Monsoon)	120	500	2000
Vegetable (Hot weather)	120	360	600

8 a. Explain different types of canal based on alignment. **(08 Marks)**

b. Bringout the differences between Kennedy's and Lacey's theory. **(06 Marks)**

c. The slope of a channel in alluvial soil is $\frac{1}{5900}$. Find the channel section and maximum discharge which can be allowed to flow in it. Take Lacey's silt factor f = 1. The channel is of trapezoidal section having side slopes $\frac{1}{2}$H : 1V **(06 Marks)**

* * * * *

USN | | | | | | | | | | |

10CV56

Fifth Semester B.E. Degree Examination, May 2017
Transportation Engineering - I

Time: 3 hrs. Max. Marks:100

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

PART – A

1 a. What are the advantages and disadvantages of different modes of transportation? **(08 Marks)**

b. Explain briefly the contributions of Indian Road Congress and Central Road Institute in the road development of India. **(06 Marks)**

c. Discuss the role of transportation in the development of a country. **(06 Marks)**

2 a. Write a note on road pattern. **(06 Marks)**

b. Outline the essential features of Road development plan vision – 2021. **(04 Marks)**

c. There are five alternate proposals of road plans for a backward district. The details are given below. Justify with reasons which proposal is the best, assuming, utility units of 0.5, 1.0, 2, 4 and 8 for the five population ranges and utility units of 1.0 and 5 per 1000t of agricultural and industrial products served. **(10 Marks)**

Proposal	Total road length KM	No. of towns and villages served with population range					Productivity in thousand tonnes	
		<2000	2001-5000	5001-10000	10001-20000	>20000	Agri.	Industrial
P	500	100	150	40	20	3	150	20
Q	600	200	250	68	28	3	220	25
R	700	270	350	82	36	4	300	35
S	800	280	410	91	41	4	400	42
T	900	290	430	96	44	4	430	45

3 a. Explain briefly the various factors governing the highway alignment. **(08 Marks)**

b. Explain the various factors governing geometric design of a highway. **(06 Marks)**

c. The speeds of overtaking and overtaken vehicles on a two way traffic road are 90 kmph and 65 kmph respectively. The acceleration of overtaking vehicle is 3.25 kmph/sec, calculate the safe overtaking sight distance. **(06 Marks)**

4 a. List the objects of providing super elevation and extra widening of pavement on horizontal curves. **(06 Marks)**

b. A NH passing through a flat terrain has a horizontal curve of radius equal to the ruling minimum radius. If the design speed is 100 kmph, calculate the (i) Design super elevation (ii) Extra widening (iii) Length of transition curve by making suitable assumptions. **(08 Marks)**

c. A valley curve is formed by a descending grade of 1 in 25 meeting an ascending grade of 1 in 30. Design the length of valley curve to fulfill both comfort condition and head light sight distance requirements for a design speed of 80 kmph. Assume allowable rate of change of centrifugal acceleration C = 0.6 m/sec^2. **(06 Marks)**

PART – B

5 a. What are the desirable properties of subgrade soil? Explain. **(06 Marks)**

b. Explain CBR test conducted on soil specimen in laboratory. **(08 Marks)**

c. A plate load was conducted on a soaked subgrade during monsoon season using a plate dia of 30 cm. The load values corresponding to the mean settlement dial readings are given. Determine the modulus of subgrade reaction for the standard plate.

Mean settlement value, mm	0.0	0.24	0.52	0.76	1.02	1.23	1.53	1.76
Load values, kg	0.0	460	900	1180	1360	1480	1590	1640

(06 Marks)

6 a. What is ESWL? Explain its significance in pavement design. **(06 Marks)**

b. Explain the steps involved in the design of flexible pavement as per IRC:37-2001. **(06 Marks)**

c. Determine the warping stresses at interior, edge and corner of a 25 cm thick cement concrete pavement with transverse joints at 5.0 m interval and longitudinal joints at 3.6 m intervals. The modulus of subgrade reaction, k is 6.9 kg/cm^3 and the radius of loaded area is 15 cm. Assume max. temperature differential during day to be 0.6°C per cm slab thickness (for warping stresses at interior and edge) and max. temperature differential of 0.4°C per cm slab thickness during the night (for warping stress at the corner). Additional data are as under: e $= 10\times10^{-6}$ per °C, E $= 3\times10^5$ kg/cm^2, $\mu = 0.15$, $C_X = 0.88$, $C_Y = 0.54$. **(08 Marks)**

7 a. Explain procedure for construction of wet mix macadam and bituminous concrete. **(10 Marks)**

b. Explain with neat sketch any two methods of surface drainage. **(05 Marks)**

c. Explain with sketches how the subsurface drainage system is provided to lower the water table and control the seepage flow. **(05 Marks)**

8 a. What are the factors which affect the vehicle operation cost? **(06 Marks)**

b. What are the various tangible and intangible benefits of highway improvements? **(06 Marks)**

c. Calculate the annual cost of stretch of highway from the following particulars:

Item	Total cost ₹ in lakhs	Estimated life, years	Rate of Internet %
Land	35.0	100	6
Earthwork	40.0	40	8
Bridges, Culverts and Drainage	50.0	60	8
Pavement	100.0	15	10
Traffic signs and road app.	15.0	5	10

The average cost of maintenance of the road is 1.5 lakh per year. **(05 Marks)**

* * * * *

USN | | | | | | | | | | |

10CV61

Sixth Semester B.E. Degree Examination, June/July 2017
Environmental Engineering - I

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 need for protected water supply system for a city or town. **(04 Marks)**

b. What is rate of demand? Explain any six factors affecting the rate of demand. **(08 Marks)**

c. What is Population forecasting? List any six methods of population forecasting. Explain the graphical method in detail, with a sketch. **(08 Marks)**

2 a. Define design period and explain any four factors governing the design period. **(06 Marks)**

b. Forecast the population of a city by 2030 whose sensus record is as follows using i) Geometrical increase method and ii) Incremental increase method. **(14 Marks)**

Year :	1970	1980	1990	2000
Population in thousands	160	169	180	195

3 a. Explain the following sources of water with respect to quantity and quality : i) Open well ii) River. **(06 Marks)**

b. What are Intake structures? List the different types of intakes and explain any one, with a neat sketch. **(08 Marks)**

c. Define Optimum dosage of co-agulant and explain the Jar test in detail. **(06 Marks)**

4 a. Give the permissible limit and effects of following impurities in drinking water : i) Fluorides ii) Chlorides iii) Nitrites iv) Iron. **(08 Marks)**

b. Give the four objectives of water analysis. **(04 Marks)**

c. What is Aeration of water? What are its objectives? List the different types of aerators. **(08 Marks)**

PART – B

5 a. Explain with a neat sketch the working of a horizontal type pressure filter. **(06 Marks)**

b. Compare Slow Sand Filter (SSF) with Rapid Sand Filter (RSF) for the following parameters i) Rate of filteration ii) Method of cleaning iii) Maximum size of each unit iv) Bacterial removal efficiency v) Filter media sand. **(10 Marks)**

c. Explain i) Uniformity co-efficient (UC) ii) Air binding. **(04 Marks)**

6 a. Give any three i) Mechanism of disinfection and ii) Requirements of good disinfectant. **(06 Marks)**

b. Explain i) Pre chlorination and Plain chlorination ii) Super chlorination and Dechlorination. **(04 Marks)**

c. What is Softening of water? Explain in detail lime – soda method of softening with advantages and disadvantages. **(10 Marks)**

7 a. How do you arrive the capacity required for a service reservoir? Explain. **(04 Marks)**

b. What is Defluoridation? Explain any two methods of defluoridation. **(08 Marks)**

c. List the different methods of layout of distribution system. Explain any one method with its merits and demerits. **(08 Marks)**

8 a. What are Pipe appurtenances? List them. **(04 Marks)**

b. With a neat sketch, explain i) Post type fire hydrant ii) Reflux valve. **(10 Marks)**

c. Explain the use of following chemicals in water treatment : i) Activated carbon ii) Copper sulphate iii) Bleaching powder iv) Alum v) Zeolites vi) Sodium hypo chlorite. **(06 Marks)**

*****

USN | | | | | | | | | | |

10CV63

Sixth Semester B.E. Degree Examination, June/July 2017

Transportation Engineering – II

Time: 3 hrs. Max. Marks:100

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

PART – A

1 a. Mention the different gauges that are used in Indian railways. Discuss the factors affecting adoption of a particular gauge. **(06 Marks)**

b. With neat sketches, explain coning of wheels and tilting of rails. **(06 Marks)**

c. What is meant by wear of rails? How do you classify the wear? Discuss the various causes of wear. **(08 Marks)**

2 a. List the different fixtures used in railway track and give the dimensional sketch of fish plate. **(06 Marks)**

b. Determine the quantity of materials required to construct a 800 m long BG railway track, assuming a sleeper density of (n + 5). **(06 Marks)**

c. Calculate the maximum permissible train load that a B.G. locomotive can haul with 3 pairs of driving wheels with axle load of 22 kN each on a straight level track at a speed of 80 kmph. Calculate the reduction in speed, if the train has to run on a rising gradient of 1 in 200. What would be the further reduction in speed if the train has to negotiate a 4° curve on the rising gradient? Assume coefficient of friction as 0.2. **(08 Marks)**

3 a. Define: i) Super elevation ii) Negative cant
iii) Cant deficiency iv) Grade compensation on curves **(06 Marks)**

b. An 8° curve branches off from 4° main curve in B.G. layout. If the speed on branch line is 28 kmph, find the speed on main line. Cant deficiency is 7.61 cm. **(06 Marks)**

c. Calculate the maximum permissible speed on a curve of highspeed B.G. track having the following particulars:
Degree of curve = 1°
Amount of super elevation = 8 cm
Length of transition curve = 130 m
Max. speed of the section likely to be sanctioned = 153 kmph. **(08 Marks)**

4 a. Calculate the elements of a BG turnout, if feel divergence is 11.43 cm. Number of crossing is 16 and angle of switch is 1°8′0″. Straight arm distance = 0.9 m. **(06 Marks)**

b. With a neat sketch show the details of acute angle crossing. Indicate: i) actual, ii) theoretical rose of crossing. **(06 Marks)**

c. What is signaling? What are the objectives of signaling? List the types of signals. **(08 Marks)**

PART – B

5 a. Write a note on aircraft characteristics. **(08 Marks)**

b. Define wind rose diagram. With a neat sketch, explain the method of locating the best orientation of runway. **(06 Marks)**

c. Write a note on airport classification. **(06 Marks)**

6 a. A taxiway is to be designed for operating a Boeing aircraft, which has the following characteristics. Determine the turning radius of the taxiway.
Wheel base W = 17.70 m
Tread of main gear = 6.62 m
Width of taxiway, T = 22.5 m
Turn-off speed = 40 kmph
Coefficient of friction = 0.3 **(06 Marks)**

b. Explain the various types of airport markings. **(06 Marks)**

c. An airport is planned at an elevation of 380 m above MSL. The monthly mean of maximum and average daily temperatures for the hottest month at the site are 40°C and 28°C respectively. The effective gradient is 0.18 percent. Determine the length of runway required at the proposed site if the basic runway length is 1900 m. **(08 Marks)**

7 a. Write short notes on:
i) Tunnel lining
ii) Tunnel drainage **(08 Marks)**

b. Explain various shapes of tunnel with neat sketches. **(06 Marks)**

c. With a neat sketch, explain the needle beam method of tunneling in soft soils. **(06 Marks)**

8 a. Explain the functions of :
i) Wharfs and quays
ii) Wet and dry docks **(08 Marks)**

b. Draw a neat sketch of artificial harbor, explain the various components. **(06 Marks)**

c. Define breakwater. Explain any one type of breakwater. **(06 Marks)**

* * * * *

6 a. A taxiway is to be designed for operating a Boeing aircraft, which has the following characteristics. Determine the turning radius of the taxiway.
Wheel base W = 17.70 m
Tread of main gear = 6.62 m
Width of taxiway, T = 22.5 m
Turn-off speed = 40 kmph
Coefficient of friction = 0.3 **(06 Marks)**

b. Explain the various types of airport markings. **(06 Marks)**

c. An airport is planned at an elevation of 380 m above MSL. The monthly mean of maximum and average daily temperatures for the hottest month at the site are 40°C and 28°C respectively. The effective gradient is 0.18 percent. Determine the length of runway required at the proposed site if the basic runway length is 1900 m. **(08 Marks)**

7 a. Write short notes on:
i) Tunnel lining
ii) Tunnel drainage **(08 Marks)**

b. Explain various shapes of tunnel with neat sketches. **(06 Marks)**

c. With a neat sketch, explain the needle beam method of tunneling in soft soils. **(06 Marks)**

8 a. Explain the functions of :
i) Wharfs and quays
ii) Wet and dry docks **(08 Marks)**

b. Draw a neat sketch of artificial harbor, explain the various components. **(06 Marks)**

c. Define breakwater. Explain any one type of breakwater. **(06 Marks)**

* * * * *

USN | | | | | | | | | | |

10CV64

Sixth Semester B.E. Degree Examination, June/July 2017
Geotechnical Engineering - II

Time: 3 hrs. Max. Marks:100

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

PART – A

1 a. What are the objectives of Soil Exploration? **(06 Marks)**

b. List the methods of dewatering techniques used in the field. Explain any one method, with a neat sketch. **(06 Marks)**

c. A sampling tube has inner diameter of 70mm and cutting edge diameter of 68mm. Its outside diameter are 72 mm and 74 mm respectively. Determine area ratio, inside clearance, outside clearance of the sampler. This tube is pushed at the bottom of the borehole to a distance of 550mm with length of sample recorded being 530mm. Find the recovery ratio. **(08 Marks)**

2 a. List the assumptions and limitations of Boussinesq's theory of stress in soils. **(08 Marks)**

b. Explain the construction and use of Newmark's chart. **(08 Marks)**

c. A water tank is supported by a ring foundation having outer diameter of 10m and inner diameter of 7.5m. The ring foundation transmit uniform load intensity of $160kN/m^2$. Compute the vertical stress induced at a depth of 4m below the centre of ring foundation using Westergaurd's analysis. Take $\mu = 0$. **(04 Marks)**

3 a. What are Flow nets? Explain with a neat sketch. List their characteristics. **(08 Marks)**

b. Explain Graphical method of determining phreatic line in homogeneous earthen dam with horizontal drainage filter. **(08 Marks)**

c. For the earthern dam of homogeneous section with horizontal filter, the coefficients of permeability in x & y directions are 8×10^{-7} cm/sec and 3.6×10^{-7} cm/sec respectively. The flow nets constructed gave number of flow channels to be 4 with potential drops 18. Determine the discharge through the dam in m^3/day if the head during seepage was 14m. **(04 Marks)**

4 a. With a neat sketch, explain different types of earth pressures. **(06 Marks)**

b. Differentiate between Rankine's and Coloumb's theory. **(04 Marks)**

c. A retaining wall of 8m height retains sandy material. The properties of sand are e = 0.6 , $Q = 30^0$ and G = 2.65. The water table is at a depth of 2.5m from the ground surface. Draw the earth pressure diagram and determine the magnitude and point of application of the total active earth pressure. **(10 Marks)**

PART – B

5 a. With neat sketches, explain types of slope failures and its causes. **(08 Marks)**

b. Explain Friction circle method of stability analysis to slopes. **(08 Marks)**

c. An embankment is inclined at an angle of 35^0 and its height is 15m. The angle of shearing resistance is 15^0 and cohesion intercept is $40kN/m^2$. The unit weight of soil is $18kN/m^3$. Find the factor of safety with respect to cohesion. Consider Taylor's stability number as 0.06. **(04 Marks)**

6 a. With a neat sketch, explain the effect of eccentric loading on footing. **(04 Marks)**

b. With a neat sketch, explain plate load test. **(06 Marks)**

c. Determine the safe bearing capacity of square footing of 2.1m width placed at a depth of 1.5m in a soil with a moist unit weight of $17kN/m^3$, C = $15kN/m^2$ and Q = 30^0. Take $N_c = 11.8$, $N_q = 3.9$ and $N_r = 1.7$. What is the change in bearing capacity if the water table raises to 0.5m above the base of the footing? Assume F = 3. **(10 Marks)**

7 a. Explain the terms Immediate settlement, Consolidation settlement , Secondary settlement and Differential settlement. **(08 Marks)**

b. Estimate the immediate settlement of a footing of size (2 × 3)m resting at a depth of 2m in sandy soil whose compression modulus is $10N/mm^2$ and the footing is expected to transmit a unit pressure of 160 kN/m^2. Assume $\mu = 0.28$ and $I_f = 1.06$. **(04 Marks)**

c. A square footing (1.2m × 1.2m) rests on a saturated clay layer of 4m deep. The soil properties are W_L = 30% , r_{sat} = $17.8kN/m^3$, W = 28% and G = 2.68. Determine the primary consolidation settlement if the footing carries a load of 300kN. **(08 Marks)**

8 a. Explain the factors influencing the choice of foundation. **(06 Marks)**

b. Discuss the proportioning of isolation footing. **(06 Marks)**

c. Write a note on classification of pile foundation. **(08 Marks)**

*****

USN | | | | | | | | | | |

10CV65

Sixth Semester B.E. Degree Examination, June/July 2017
Hydraulic Structures and Irrigation Design Drawing

Time: 4 hrs. Max. Marks:100

Note: ***1. Answer any TWO questions from Part-A and ONE full question from Part-B.***
2. Missing data, if any, may be suitably assumed.

PART - A

1 a. What is reservoir sedimentation? Explain with neat sketch. Also discuss various methods of reservoir sediment control. **(07 Marks)**

b. Briefly explain the procedure for determining the storage capacity and yield of a reservoir using mass curve. **(08 Marks)**

2 a. Explain the various modes of failure of gravity dam and mention their remedies. **(07 Marks)**

b. Design the practical profile of a gravity dam of stone masonry given the following data :

R.L. of base of dam	= 1450m
R.L. of F.R.L.	= 1480.5m
Specific gravity of the masonry	= 2.4
Safe compressive stress for masonry	= 1200 kN/m^2
Height of waves	= 1m.

(08 Marks)

3 a. Explain the method of plotting phreatic line for an earth dam with horizontal filter at downstream. **(07 Marks)**

b. For a homogeneous earth dam 52m high, and 2m free, board a flow net was constructed and following results were obtained.
Number of potential drops = 25
Number of flow channels = 04
The dam has a horizontal filter of 40m length at its d/s end. Calculate the discharge per meter length of the dam if the coefficient of permeability of the dam is 3×10^{-3} cm/sec. **(08 Marks)**

PART - B

4 Design the surplus work of a tank forming part of a chain of tanks.

Combined catchment area	= 25.89 sq.km
Intercepted catchment area	= 20.71 sq.km
Maximum water level	= + 12.75
Full tank level	= + 12.00
Ground level at proposed site	= + 11.00
Ground level below proposed Weir up to a reach of 6m(Fall)	= + 10.00
Top width of tank bund	= 2.00m
Tank Bund Level (TBL)	= +14.50
Side slopes of bund on either side	= 2 : 1
Design saturation gradient (HGL)	= 4 : 1
Level of hard strata	= + 9.50
Ryve's coefficient for combined catchment	= 9
Ryve's coefficient for intercepted catchment	= 1.5

Provision may be made to make kutcha regulating arrangements to store water up to MWL in times of necessity. **(25 Marks)**

Draw :

a. Half plan at foundation and half plan at ground level. **(20 Marks)**

b. Draw half longitudinal section and half longitudinal elevation. **(15 Marks)**

c. Cross section across surplus weir. **(10 Marks)**

5 Design (Hydraulic design only) a suitable cross-drainage work given the following data at the crossing of a canal and a drainage.

Canal :

Full supply discharge	= 32 cumes
Full supply level	= + 213.5
Canal bed level	= + 212.0
Canal bed width	= 20

Trapezoidal canal section with 1.5H : 1V slopes

Canal water depth	= 1.5m

Drainage :

High flood discharge	= 300 cumes
High flood level	= 210.0m
High flood depth	= 2.5m
General ground level	= 212.5m.

(25 Marks)

Draw :

a. Plan showing all details. **(20 Marks)**

b. Longitudinal section. **(15 Marks)**

c. Cross section showing all details. **(10 Marks)**

* * * * *

USN | | | | | | | | | | |

10CV666

Sixth Semester B.E. Degree Examination, June/July 2017
Rural Water Supply and Sanitation

Time: 3 hrs. Max. Marks:100

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

PART – A

1 a. Briefly explain the various sources of water being practicing in rural area. **(06 Marks)**

b. List the water borne diseases and their controlling measures. **(08 Marks)**

c. Discuss the health significance and limits of the following parameters :
i) Fluoride ii) Nitrates iii) Sulphate iv) Chloride. **(06 Marks)**

2 a. What is Defluoridation? Explain Nalagonda technique for removal of fluoride, with neat sketch. **(10 Marks)**

b. Define Disinfection. Explain the break point chlorination with graphical representation. **(10 Marks)**

3 a. Explain the following with neat sketch : i) Aqua privy ii) Two pit latrines. **(10 Marks)**

b. Design a septic tank and soak well for the following data :
i) No. of people = 100 ii) Sewage / capita / day = 120 litres
iii) Desludging period = 1 year iv) Percolation rate = 1250 ℓ/m^3/day
v) Length to width ratio of septic tank = 4 : 1 vi) Detention period = 24 hours
vii) Rate of sludge deposited = 30litres/capita/year viii) Depth of septic tank = 1.5m
ix) Depth of soak pit = 2m x) Free board = 0.3m. **(10 Marks)**

4 a. Explain the disposal of storm water and sullage disposal in rural areas. **(10 Marks)**

b. What is Rain water harvesting? Discuss briefly with sketches how the rain water is being harvested from roof top. **(10 Marks)**

PART – B

5 a. Explain the different methods of communication of communicable diseases with examples. **(10 Marks)**

b. Define Communicable diseases and explain the general methods of control of communicable diseases. **(10 Marks)**

6 Explain the following :
a. Salvaging.
b. Dumping in low lands.
c. Composting.
d. Biogas plant. **(20 Marks)**

7 a. Explain all the essentials necessary to obtain the objectives of milk sanitation. **(08 Marks)**

b. Describe the important points to be considered for planning the construction of a cow shed. **(04 Marks)**

c. Explain any two method of pasteurization. **(08 Marks)**

8 a. Explain the life cycle of a mosquito. **(08 Marks)**

b. Mention the diseases transmitted by mosquito. **(04 Marks)**

c. Explain the various fly control measures. **(08 Marks)**

*****

USN | | | | | | | | | | |

10CV71

Seventh Semester B.E. Degree Examination, May 2017
Environmental Engineering – II

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. Briefly explain the following :
(i) Infiltration and exfiltration
(ii) Time of concentration and its significance. **(10 Marks)**

b. The rate of water supply to a city having covering an area of 36 hectares having a population of 250/hectare is 225 lpcd. 80% of which flows out as sewage. Maximum rain intensity is taken as 5 cm/hr. Calculate
(i) Total runoff of the area
(ii) Peak rate of sewage flow.
The area of the city classified as follows:

Sl.No.	Nature of surface	% of total area	Run off coefficient
1	Water tight roofs	20	0.9
2	Hard pavement	20	0.85
3	Paved yard	5	0.80
4	Macadam roads	15	0.40
5	Garden and Lawn	35	0.10
6	Wooded area	5	0.05

(10 Marks)

2 a. Briefly explain the essential requirements of a good sewer material. **(10 Marks)**

b. Design a sewer to serve a population of 36000. The water supplied at a rate of 135 lpcd of which 80% finds its way into the sewer. The slope available for the sewer to be laid is 1 in 625 and sewer should be designed to carry four times the dry weather flow when running full. What would be the velocity of flow in the sewer when running full? n = 0.012 in Manning's formula. **(10 Marks)**

3 a. With neat sketch, explain the following :
(i) Inverted Siphon (ii) Different types of traps. **(10 Marks)**

b. Explain in detail drainage plan two pipe system with neat sketch and principles of house drainage. **(10 Marks)**

4 a. What is BOD? Briefly explain the stages in BOD with neat sketch. **(10 Marks)**

b. Calculate the 1st day 37°C BOD of sewage sample whose 5 day 20°C BOD is 100 mg/*l*. Assume k_D at 20°C as 0.1. **(06 Marks)**

c. What is sampling? Mention different types of sampling. **(04 Marks)**

PART – B

5 a. What is meant by self purification of streams? With neat sketch explain oxygen sag curve with different zones. **(10 Marks)**

b. A city discharges 100 cumec of sewage into a river, which is fully saturated with oxygen and flowing at a rate of 1500 cumec during its lean days with a velocity of 0.1 m/sec. The 5-days BOD of sewage at the given temperature is 280 mg/*l*. Find when and where the critical D.O. deficit will occur in the downstream portion of the river and what is its amount. Assume self purification of the stream (f) as 4.0 and coefficient of de-oxygenation (k_D) as 0.1. **(10 Marks)**

6 a. With neat sketch explain the following :
(i) Grit chamber (ii) Skimming tank **(10 Marks)**

b. Design a suitable rectangular sedimentation tank (provided with mechanical cleaning equipment) for treating the sewage from a city provided with assured public water supply system with a maximum daily demand of 12 MLD. Assume detention period of 2 hours and velocity of flow as 0.3 m/minutes and 80% of water supplied will become sewage. **(10 Marks)**

7 a. With neat sketch explain the operation of trickling filter process. **(10 Marks)**

b. Design the activated sludge unit treatment with the following data for a town of population of 65,000
(i) Average sewage flow = 210 *l*/c/day
(ii) BOD of the raw sewage = 210 mg/*l*
(iii) Suspended solid in raw sewage = 300 mg/lit
(iv) BOD removal in primary treatment = 40%
(v) Overall BOD removal desired = 90% **(10 Marks)**

8 Write short notes on :
a. Septic tank
b. Oxidation pond
c. Sludge digestion tank
d. Recycle of waste water. **(20 Marks)**

* * * * *

USN | | | | | | | | | | |

10CV72

Seventh Semester B.E. Degree Examination, May 2017
Design of Steel Structures

Time: 3 hrs. Max. Marks:100

Note: ***1. Answer any FIVE full questions, selecting atleast TWO questions from each part.***
2. Use of IS800 and Steel tables are permitted.

PART – A

1 a. State the limit state design principles. Mention the limit states. **(06 Marks)**

b. List the different types of loads to be considered in structural steel design. Explain the steps to determine wind load. **(08 Marks)**

c. What are rolled steel sections? Mention commonly used structural steel shapes used as structural elements with sketches. **(06 Marks)**

2 a. Mention the different types of bolts used to connect the steel structural elements. **(02 Marks)**

b. Explain with neat sketches working principles of HSFG bolts. **(04 Marks)**

c. A bracket plate 12 mm thick is to be bolted to the flange of column ISHB 350@710.2 N/m by means of close tolerance and turned bolts. M20 bolts of grade 4.6 are arranged in two vertical rows 100 mm apart at a pitch of 70 mm. Design a bracket connection if the bracket plate carries a load of 120 kN at a lever arm of 250 mm. **(14 Marks)**

3 a. With a neat sketch of fillet weld, explain the terms size of weld and effective throat thickness. Give relevant specification for it. **(06 Marks)**

b. A tie member consist of 2 ISA 150×115×10mm. The angles are connected to either side of a 10 mm gusset plate and the member is subjected to a load of 350 kN (Tension). Design the welded connections assuming that connections are made in workshop. **(06 Marks)**

c. For the plate bracket shown in Fig.Q3(c), determine the size of weld. **(08 Marks)**

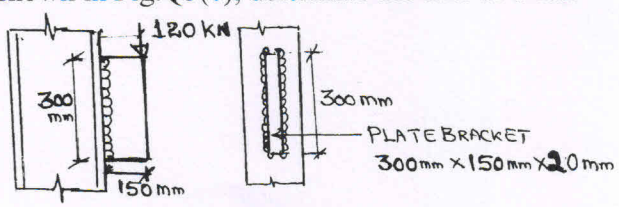

Fig.Q3(c)

4 a. Explain the following terms with reference to plastic analysis of steel structures:
(i) Shape factor (ii) Mechanism. **(03 Marks)**

b. Find the shape factor and plastic moment capacity for flat 60 F10 placed vertically as cantilever. **(05 Marks)**

c. Analyse the continuous beam shown in Fig.Q4(c). Calculate the maximum plastic moment. Take load factor as 1.50 **(12 Marks)**

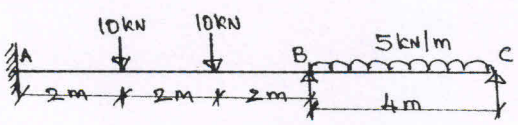

Fig.Q4(c)

USN | | | | | | | | | | |

10CV72

Seventh Semester B.E. Degree Examination, May 2017
Design of Steel Structures

Time: 3 hrs. Max. Marks:100

Note: ***1. Answer any FIVE full questions, selecting atleast TWO questions from each part.***
2. Use of IS800 and Steel tables are permitted.

PART – A

1 a. State the limit state design principles. Mention the limit states. **(06 Marks)**

b. List the different types of loads to be considered in structural steel design. Explain the steps to determine wind load. **(08 Marks)**

c. What are rolled steel sections? Mention commonly used structural steel shapes used as structural elements with sketches. **(06 Marks)**

2 a. Mention the different types of bolts used to connect the steel structural elements. **(02 Marks)**

b. Explain with neat sketches working principles of HSFG bolts. **(04 Marks)**

c. A bracket plate 12 mm thick is to be bolted to the flange of column ISHB 350@710.2 N/m by means of close tolerance and turned bolts. M20 bolts of grade 4.6 are arranged in two vertical rows 100 mm apart at a pitch of 70 mm. Design a bracket connection if the bracket plate carries a load of 120 kN at a lever arm of 250 mm. **(14 Marks)**

3 a. With a neat sketch of fillet weld, explain the terms size of weld and effective throat thickness. Give relevant specification for it. **(06 Marks)**

b. A tie member consist of 2 ISA 150×115×10mm. The angles are connected to either side of a 10 mm gusset plate and the member is subjected to a load of 350 kN (Tension). Design the welded connections assuming that connections are made in workshop. **(06 Marks)**

c. For the plate bracket shown in Fig.Q3(c), determine the size of weld. **(08 Marks)**

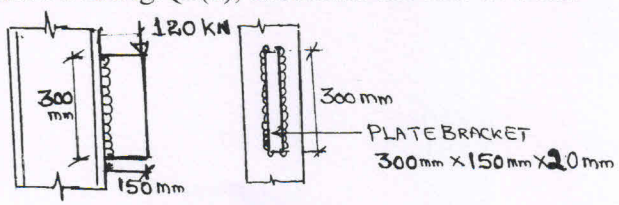

Fig.Q3(c)

4 a. Explain the following terms with reference to plastic analysis of steel structures:
(i) Shape factor (ii) Mechanism. **(03 Marks)**

b. Find the shape factor and plastic moment capacity for flat 60 F10 placed vertically as cantilever. **(05 Marks)**

c. Analyse the continuous beam shown in Fig.Q4(c). Calculate the maximum plastic moment. Take load factor as 1.50 **(12 Marks)**

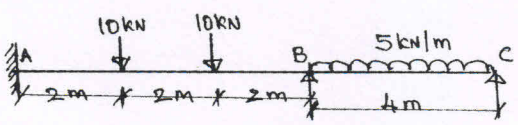

Fig.Q4(c)

PART – B

5 a. A plate 120mm × 8mm is connected to a 12 mm thick gusset plate by 6 nos. of M16 bolts of grade 4.60 distributed in two rows. Gauge and pitch distance = 60 mm. Edge distance = 30mm. Determine the design tensile strength of plate. **(08 Marks)**

b. Design a suitable unequal single angle section to carry a load of 150 kN (Tension) assuming a single row of M_{20} bolts of grade 4.6 for the end connection. Assume Fe410 grade steel. The length of the member is 2.50m. **(12 Marks)**

6 a. Determine design compressive strength of 2 angles 1SA 70×70×6 mm connected to both the sides of gusset plate using 2 bolts in a row. The angles are tack bolted along a length of 2.50m and are discontinuous members. **(05 Marks)**

b. Design a battened column consisting of 2 channel sections back to back subjected to a load of 1080 kN. Length of column is 5.5 m. The column is restrained in position but not in direction at both the ends. **(15 Marks)**

7 a. Distinguish between slab base and gusseted base. **(03 Marks)**

b. Explain briefly steps involved while designing gusseted base. **(07 Marks)**

c. Design a slab base for an ISHB 200@ 361.99 N/m. Load is transferred to base plate by welded connections. Load on column = 600 kN. Design the concrete pedestal using M_{20} grade concrete. SBC of soil = 180 kN/m^2. **(10 Marks)**

8 a. Design a laterally supported beam to carry a load of 20 kN/m. The effective span of simply supported beam is 6 m. Apply all necessary checks on design. **(15 Marks)**

b. Determine the design bending strength of ISLB 350@486 N/m, using appropriate tables of IS 800 – 2007. The beam is laterally unsupported and the unsupported length of beam is 4.3 m. Both the ends of compression flange are fully restrained against torsion and warping. **(05 Marks)**

* * * * *

USN | | | | | | | | | | |

10CV73

Seventh Semester B.E. Degree Examination, May 2017
Estimation and Valuation

Time: 3 hrs. Max. Marks:100

Note: ***1. Q. No. ONE is compulsory.***
2. Answer FOUR full questions selecting any TWO questions from Part B and Part C.

PART – A

1 The plan and part cross-section of a hexagonal room are given in Fig. Q1. Estimate any eight of the following quantities and determine the cost.

i) Earthwork excavation in hard soil at Rs. 150/-cum
ii) Bed concrete in C.C 1 : 4 : 8 at Rs. 3200/- cum
iii) U.C.R masonry for foundation and plinth at Rs. 3000/cum
iv) 2 cm thick DPC in C.C 1 : 1.5 : 3 at Rs. 500/- sqm
v) Ist class BBM for super structure in CM 1 : 6 at Rs. 4500/- per cum
vi) Plastering in cm 1 : 6 for inner and outer faces with thickness 12 mm at Rs. 450 per sqm
vii) RCC for lintels in CC 1 : 2 : 4 at Rs. 4500/- cum
viii) RCC for slab in CC 1 : 2 : 4 at Rs. 5000/- cum
ix) RCC for Chejja in 1 : 2: 4 at Rs. 1250/- sqm
x) Flooring at Rs. 1400/- sqm. **(40 Marks)**

PART – B

2 Prepare a detailed estimate of a slab culvert of 1.5m span and 4.00m roadway from the given drawing (Refer Fig. Q2). The general specifications are as follows : foundation concrete shall be of cement concrete 1 : 3 : 6 with stone ballast and coarse sand masonry shall be of first class brick work in 1 : 4 cement coarse sand mortar. Slab shall be of RCC 1 : 2 : 4 with reinforcement as per drawing. Exposed surface of brick masonry shall be cement pointed 1 : 2. Road shall be provided with 10 cm thick wearing coat of 1 : 2 : 4 cement concrete. Work out only quantities. **(15 Marks)**

3 State different types of estimates and explain in brief any five types. **(15 Marks)**

4 Write the detailed specifications of any three of the following items :

i) Earthwork excavation for foundation
ii) Bed concrete for foundation in C.C 1 : 3 : 6
iii) Ist class BBM in C.M 1 : 6
iv) Mosaic/Terrezo flooring over a bed of 7.5 cms thick 1 : 3: 6 concrete
v) I.P.S. flooring. **(15 Marks)**

PART – C

5 Analyse the rate of any three items from first principles :

i) Lime concrete in foundation with 40mm gauge brick ballast in L.C 1 : 2 : 6
ii) Cement concrete in C.C 1 : 2 : 4 for RCC works
iii) 1st class BBM in C.M 1 : 6 for super structure
iv) 20mm thick cement plastering in C.M 1 : 6. **(15 Marks)**

6 a. Explain lead and lift with reference to earth work. **(04 Marks)**

b. Estimate the quantity of earth work for the portion of a road 400m length from the following data : Formation width of road = 10 m side slopes are 2 : 1 in banking and 1.5 : 1 in cutting.

Station	25	26	27	28	29	30	31	32	33	34	35
Distance in m	1000	1040	1080	1120	1160	1200	1240	1280	1320	1360	1400
RL of ground	51.0	50.9	50.5	50.8	50.6	50.7	51.2	51.4	51.3	51.0	50.6
RL of formation	52.0	← Downward gradient of 1 in 200 →									

(11 Marks)

7 a. Explain the following terms : i) EMD ii) Security deposit. **(05 Marks)**

b. Write briefly about administrative approval and technical sanction. **(05 Marks)**

c. A building is situated by the side of a main road of Rajanukunte Bangalore. The built up portion is 20m × 15m. The building is of first class type and provided with water supply, sanitation and electric fittings, and the age of the building is 30 years. Workout the valuation of the property. Area of land on which building stands is 500 sqm. Assume plinth area rate as 20000/- per sqm, life of building 100 years and cost of land 25000/- per sqm. Rate of depreciation $r_d = 1$. **(05 Marks**

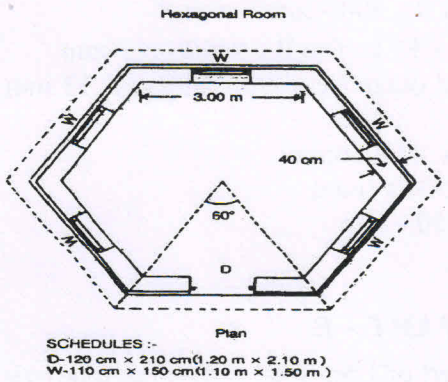

Fig.Q1

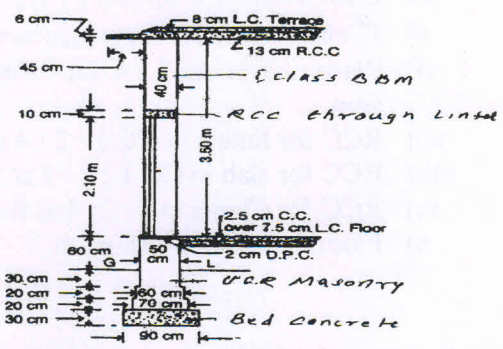

Fig.Q2

* * * * *

USN | | | | | | | | | | |

10CV74

Seventh Semester B.E. Degree Examination, May 2017
Design of Pre-Stressed Concrete Structures

Time: 3 hrs. Max. Marks:100

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

PART – A

1 a. Explain why high strength concrete and high strength steel are used in pre –stressed concrete member. **(06 Marks)**

b. A concrete beam of symmetrical 'I' section spanning 8m, the width and thickness of flanges are 220 mm and 60mm respectively, the overall depth of the beam is 410mm, the thickness of web is 80mm, the beam is pre-stressed by a straight cable with an eccentricity of 150mm with an effective force of 150 kN, the live load on the beam is 2.5 kN/m, draw the stress distribution diagram at the central section for the following condition.
i) Pre-stress + self wt ii) pre-stress + self wt + live load. **(14 Marks)**

2 a. Explain with a neat sketch "Hoyer's long line" system of pretensioning. **(06 Marks)**

b. A PSC 'T' beam is to be designed to support a superimposed load of 4.4 kN/m over a span of 5m. The stress in concrete must not exceed 15 N/mm^2 in compression and zero in tension at any stage of loading. Check for the adequacy of the section and calculate minimum pre-stressing force and corresponding eccentricity assuming 20% loss of pre-stress after transfer. **(14 Marks)**

3 a. How do you estimate the loss of pre-stress due to :
i) Elastic deformation of concrete
ii) Shrinkage of concrete
iii) Friction between cable and duct. **(06 Marks)**

b. A PSC beam of cross section 200mm × 300mm is pre-stressed with steel wires of area 320mm^2 located at a constant eccentricity of 50mm and carrying an initial stress of 1100 N/mm^2, span of the beam is 9m, calculate % loss of stress in wires if beam is : i) post tensioned ii) PRE tensioned. Given E_s = 210 GPa, E_c = 35 GPa. Relaxation of stress in steel = 4.8%, shrinkage of concrete is 300×10^{-6} for pre tensioning, 200×10^{-6} for post tensioning, creep coefficient = 1.6, slip at anchorage is 1mm, frictional coefficient for wave effect is 0.0012/m. **(14 Marks)**

4 a. Explain long term deflection and short term deflection in PSC beam. **(06 Marks)**

b. A rectangular concrete beam of cross section 150mm wide and 300mm deep is simply supported over a span of 8m and is pre-stressed by a symmetric parabolic cable at a distance of 75mm from the bottom of the beam at mid span and 125mm from the top of the beam at support section. If the force in the cable is 350 kN and E_C = 38 GPa, Calculate :
i) The deflection at mid span when the beam is supporting its own weight
ii) The concentrated load which must be applied at mid-span to restore it to the level of supports. **(14 Marks)**

PART – B

5 a. Explain the different types of flexural failures observed in a pre-stressed concrete beam. **(06 Marks)**

b. A pre-tensioned, 'T' section has a flange which is 300mm wide 200mm thick, the rib is 150mm wide and 350mm deep. The effective depth of beam is 500mm, given area of tendons is 200mm^2, f_{ck} = 50 N/mm^2 and f_p = 1600 N/mm^2 estimate the ultimate moment capacity of 'T' section using IS code 1343. **(07 Marks)**

c. A post tensioned beam with unbounded tendon is of rectangular section 400mm wide with an effective depth of 800mm. The cross sectional area of the pre-stressing steel is 2840mm^2. The effective pre-stress in the steel after all losses is 900 N/mm^2. The effective span of the beam is 16m. If f_{ck} = 40 N/mm^2, estimate the ultimate moment of resistance of the section using IS code 1343. **(07 Marks)**

6 a. A concrete beam of rectangular section 200mm wide and 650mm deep in pre-stressed by a parabolic cable located at an eccentricity of 120mm at mid span and zero at the supports. If the beam has a span of 12m and carries a uniformly distributed live load of 4.5 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/m^3. **(12 Marks)**

b. The support section of a PSC beam 150mm × 300mm is to resist a shear of 100 kN. The pre-stress at centriodal axis is 5 N/mm^2, f_{ck} = 40 N/mm^2, the cover to tension reinforcement is 45mm check the section for shear and design suitable shear reinforcement, f_t = 1.5 N/mm^2. **(08 Marks)**

7 a. Explain magnal method of end block design. **(08 Marks)**

b. A Freyssient anchorage 100mm dia carrying 12 wires of 7mm dia is embedded concentrically in the web of an 'I' section of web thickness 225mm. Using IS code method determine the tensile and bursting tensile force in the end block. Design the end block and sketch the reinforcement details. **(12 Marks)**

8 A post tensioned PSC beam 300mm wide is to be designed as a rectangular beam to support a UDL of 20 kN/m over a simply supported beam of 18m span. The stresses in concrete must not exceed 16 MPa in compression and 1.2 MPa in tension at any stage of loading. Assume average loss of pre-stress is 17%. Design the beam by calculating depth, pre-stressing force and eccentricity. **(20 Marks)**

* * * * *

USN | | | | | | | | | | |

10CV755

Seventh Semester B.E. Degree Examination, May 2017
Highway Geometric Design

Time: 3 hrs. Max. Marks:100

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

PART – A

1 a. Explain the term design vehicle. Mention IRC recommended values. **(06 Marks)**

b. Explain PCU value and factors affecting the PCU values. **(08 Marks)**

c. A one-way city street has the following traffic count per hour, during peak hour. Find the traffic in terms of equivalent passenger car units. **(06 Marks)**

SL.No	Vehicle	Traffic (Nos./hour)
1	Truck	400
2	Bus	800
3	Car	2000
4	Scooter	2000
5	Bicycle	2000

2 a. List the pavement surface characteristics and explain briefly:
i) Friction and factors affecting friction
ii) Camber and effects of providing steep camber. **(10 Marks)**

b. Write a note on the following and mention the IRC standards:
i) Width of carriageway
ii) Right-of-way **(10 Marks)**

3 a. Explain in brief, the factors affecting stopping sight distance. **(06 Marks)**

b. Derive an expression for calculating the safe overtaking sight distance on a highway. **(08 Marks)**

c. Two cars are approaching from opposite directions of a road with a gradient of 2% with speeds of 80 kmph and 65 kmph respectively. Calculate the minimum sight distance required to avoid a head on collision of both the cars. **(06 Marks)**

4 a. Explain briefly the effect of centrifugal force on horizontal curve having no super elevation. **(06 Marks)**

b. Explain the method of design of super elevation. **(06 Marks)**

c. A six lane divided highway has a curve 1000 m long and radius of 500 m. The safe SSD is 200 m. Calculate the minimum set back distance from the inner edge of the road to the edge of building to ensure safe visibility. The width of pavement per lane is 3.5 m. **(08 Marks)**

PART – B

5 a. Explain the following with IRC specification:
i) Ruling gradient
ii) Limiting gradient
iii) Exceptional gradient **(10 Marks)**

USN | | | | | | | | | | |

10CV755

Seventh Semester B.E. Degree Examination, May 2017
Highway Geometric Design

Time: 3 hrs. Max. Marks:100

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

PART – A

1 a. Explain the term design vehicle. Mention IRC recommended values. **(06 Marks)**

b. Explain PCU value and factors affecting the PCU values. **(08 Marks)**

c. A one-way city street has the following traffic count per hour, during peak hour. Find the traffic in terms of equivalent passenger car units. **(06 Marks)**

SL.No	Vehicle	Traffic (Nos./hour)
1	Truck	400
2	Bus	800
3	Car	2000
4	Scooter	2000
5	Bicycle	2000

2 a. List the pavement surface characteristics and explain briefly:
i) Friction and factors affecting friction
ii) Camber and effects of providing steep camber. **(10 Marks)**

b. Write a note on the following and mention the IRC standards:
i) Width of carriageway
ii) Right-of-way **(10 Marks)**

3 a. Explain in brief, the factors affecting stopping sight distance. **(06 Marks)**

b. Derive an expression for calculating the safe overtaking sight distance on a highway. **(08 Marks)**

c. Two cars are approaching from opposite directions of a road with a gradient of 2% with speeds of 80 kmph and 65 kmph respectively. Calculate the minimum sight distance required to avoid a head on collision of both the cars. **(06 Marks)**

4 a. Explain briefly the effect of centrifugal force on horizontal curve having no super elevation. **(06 Marks)**

b. Explain the method of design of super elevation. **(06 Marks)**

c. A six lane divided highway has a curve 1000 m long and radius of 500 m. The safe SSD is 200 m. Calculate the minimum set back distance from the inner edge of the road to the edge of building to ensure safe visibility. The width of pavement per lane is 3.5 m. **(08 Marks)**

PART – B

5 a. Explain the following with IRC specification:
i) Ruling gradient
ii) Limiting gradient
iii) Exceptional gradient **(10 Marks)**

b. Design a valley curve at the junction of a downward gradient of 1 in 30 and a level stretch from head light consideration. The stopping sight distance is 180 m. Treating the curve as a square parabola, calculate the RL's at an interval of 25 m to set-out curve. 'RL' of starting point is 10.00 m. **(10 Marks)**

6 a. Explain the basic requirements of at grade intersections. **(06 Marks)**

b. With neat sketches indicate various basic forms of channelized intersections at grade. **(08 Marks)**

c. What are the advantages of grade separated in intersections? **(06 Marks)**

7 a. List the advantages and disadvantages of rotary intersections. **(10 Marks)**

b. List the various types of four-leg interchanges and explain the following with neat sketches:
   i) Diamond interchange
   ii) Clover-leaf interchange **(10 Marks)**

8 a. Explain with neat sketches, how the sub surface drainage system is provided to:
   i) Lower the water table
   ii) Control seepage flow **(10 Marks)**

b. The maximum quantity of water expected in one of the open longitudinal drains on clayey soil is 0.9 m^3/sec. Design the cross section and longitudinal slope of trapezoidal drain assuming the bottom width of trapezoidal section to be 1 m and cross-slope to be 1 vertical to 1.5 horizontal. The allowable velocity of flow in the drain is 1.2 m/sec and Manning's roughness coefficient is 0.02. **(10 Marks)**

* * * * *

USN | | | | | | | | | | |

10CV765

Seventh Semester B.E. Degree Examination, May 2017
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. Define Air Pollution. Write in brief about Point source, Arial source, Stationary source , Mobile source and Line source in brief. **(10 Marks)**

b. Write a brief note on photochemical Smog and coal induced Smog. **(10 Marks)**

2 a. Explain the effects of air pollution on :
i) Human beings and ii) Materials. **(10 Marks)**

b. Discuss in detail the London Smog and Bhopal gas tragedy. **(10 Marks)**

3 a. With neat sketches, explain plume behaviour in different atmospheric conditions. **(10 Marks)**

b. Write a note on Lapse rate and inversions. **(10 Marks)**

4 a. Briefly explain the factors considered for industrial plant location. **(10 Marks)**

b. Write a note on sources of noise pollution, effects and remedial measures to control noise pollution. **(10 Marks)**

PART – B

5 a. Explain with a neat sketch, the sampling train. **(10 Marks)**

b. Explain with neat sketches, the principle and working of the following :
i) Fabric filters ii) Gravitational settling chambers. **(10 Marks)**

6 a. Briefly explain methods to minimize the automobile exhaust emission. **(10 Marks)**

b. Explain briefly the principle emission from petrol driven vehicles. **(05 Marks)**

c. Explain the role of catalytic convertor in controlling emissions from automobiles. **(05 Marks)**

7 a. Define Indoor Air Pollution , Causes , Effects and Remedial measures. **(10 Marks)**

b. Write short notes on :
i) Ozone layer depletion ii) Global warming. **(10 Marks)**

8 Write short notes on the following :
a. Environmental policy.
b. National Ambient Air Quality standards.
c. Acid Rain.
d. Noise pollution standards. **(20 Marks)**

*****

USN | | | | | | | | | | |

10CV81

Eighth Semester B.E. Degree Examination, June/July 2017
Advanced Concrete Technology

Time: 3 hrs. Max. Marks:100

Note: ***1. Answer any FIVE full questions, selecting atleast TWO questions from each part.***
2. Use of IS10262-2009 is permitted and ACI code permitted.

PART – A

1 a. Explain the structure of hydrated cement paste, with a neat sketch. **(10 Marks)**

b. Discuss the factors that effect the strength and elasticity of concrete. **(10 Marks)**

2 a. Emphasize the function of "plasticizer" as a water reducing agent with neat sketch. **(08 Marks)**

b. How does super plasticizer influence the behaviour of concrete in fresh and hardened state? **(12 Marks)**

3 a. List the methods available for proportioning concrete mix. **(04 Marks)**

b. Design a concrete mix for a reinforced concrete structure with the following data, as per IS recommendations.

- Characteristic strength of 28 days – 25 MPa.
- Max. nominal size of agg. angular – 20 mm
- Degree of workability – Medium
- Fine aggregate – Natural river sand confirming to zone-III
- Cement – Ordinary Portland grade 43
- Sp. gravity – 3.15
- Bulk density – 1450 kg/m^3
- Aggregate properties -

	FA	CA
- Sp. gravity	2.60	2.65
- Bulk density, kg/m^3	1700	1800
- Free surface moisture, %	2.0	1.0
- Fineness modulus	2.2	6.0

(16 Marks)

4 a. State the factors influencing the permeability of concrete. Explain how size of agg. affect permeability. **(08 Marks)**

b. How does Alkali-Aggregate reaction play a role in durability of concrete? **(08 Marks)**

c. Mention the method for controlling sulphate attack. **(04 Marks)**

PART – B

5 a. Describe the three principle categories of manufacturing ready mixed concrete. **(08 Marks)**

b. State the various tests conducted to know the property of self compacting concrete. Explain any two tests with neat sketch. **(12 Marks)**

6 a. Explain the behavior of fiber reinforced concrete in tension. **(10 Marks)**

b. Calculate the increase in cracking stress of the composite uniaxial tension for a steel fiber reinforcement cement having volume fraction of fiber = 0.025. Given $E_f = 180\times10^3$ N/mm^2, $E_m = 20\times10^3$ N/mm^2. Also calculate modulus of the composite. **(10 Marks)**

7 a. What are the different aggregates that would be used in light weight concrete? Mention the demerits of light weight concrete. **(08 Marks)**

b. Design a light weight concrete mix to suit the following requirements:
(i) Specified 28 day comp. strength = 12 N/mm^2
(ii) Control factor = 0.8
(iii) Type of agg = leftag & leca
(iv) Required workability – High
(v) Relative density [air] = 1.3
Fine and coarse aggregates have 4% and 5% moisture content respectively. Use relevant codes/charts. **(12 Marks)**

8 a. List the tests conducted on Hardened concrete. Explain the tension test on concrete specimen. **(10 Marks)**

b. Mention the properties of hardened concrete that could be evaluated through N.D.T. Describe 'Rebound-Hammer' test. **(10 Marks)**

* * * * *

USN | | | | | | | | | | |

10CV82

Eighth Semester B.E. Degree Examination, June/July 2017
Design and Drawing of Steel Structures

Time: 4 hrs. Max. Marks:100

Note: ***1. Answer any ONE full question from Part-A and ONE question from Part-B.***
2. Use of IS800-2007, SP(6)(1)-1984 or steel tables is permitted.

PART – A

1 a. A beam ISLB 400@558.20 N/m is connected to the flange of a column ISHB 300@618 N/m. Another transverse beam ISLB 350@485.60 N/m is connected to the web of column by means of stiffened seated connection. Top of the beams are at the same level. M_{20} bolts of grade 4.6 are used for all connections. Details of bolted connection are as follows:

I. 2 ISA 150mm × 115mm × 12mm are used to connect ISLB 400 with the column by 3 bolts on each leg and 6 bolts in two vertical lines between beam and other leg of angle.

II. Seat angle for ISLB350 – ISA 100×100×10mm
Stiffener angle – 2 ISA 90×90×6 mm with 5 Nos of bolts on each leg connected to web of column. Adopt suitable filler late and pitch = 80 mm.

III. Top cleat angle 90×90×6mm with 2 bolts on each leg is used to connect top flange of two beams to column. Adopt suitable pitch.

Draw to a suitable scale
(i) Sectional elevation along beam ISLB 400@558.2 N/m
(ii) Sectional elevation along transverse beam
(iii) Side view across beam ISLB 400@558.20 N/m. **(20 Marks)**

b. A built up column of height 5.0m, consists of two ISMC 400@484.6 N/m placed back to back at a spacing of 260 mm and provided with single lacing system using 65 F10 flats, inclined at 45°. 6mm fillet weld of length 100mm is required to connect flat and flange of column. Two tie plates of size 400×250mm × 10mm are used at top and bottom of column and are connected to flange of column by 5mm size fillet weld alround. Draw to a suitable scale. (i) Elevation (ii) Sectional plan. **(10 Marks)**

2 a. A column splice is provided between upper story column ISHB 200@ 366 N/m and a lower storey column ISHB 200@366 N/m and a lower storey column ISHB 250@500 N/m. The columns are co-axial. At junction between face of columns a base plate of 40 mm thickness is provided. Four numbers of web cleat angle ISA 100×100×8 mm are used to connect web of column with the base plate using 2 bots along each leg of angles. Flange splice plate of 10mm thick is provided with suitable filler plate. 6 No. of bolts is provided in 2 vertical rows at each flange of column for connection. Two numbers of extra bolts are provided at each face of upper column due to filler plate. All the bolts used for the joints are M_{20} (10k) HSFG bolts. Adopt suitable pitch and edge distance for bolts.
Draw to a suitable scale;
(i) Elevation of column splice (ii) Side view. **(15 Marks)**

b. Draw to a suitable scale sectional plan, front elevation and side elevation of a column with slabbase using following data:
Column – ISHB 350@ 710.2 N/m
Base plate – 650mm × 500mm × 35mm.
Cleat angle – ISA 130×130×8 mm of length 500mm.
Concrete pedestal – 1.20m × 1.00m × 0.70m.
Anchor bolts – 4 Nos of 16mm diameter near each corner of base plate.
4 Nos of M_{20} bolts on each side of flange to connect cleat angle to the column and same nos of countersunk bolts to connect angles to base plate.
Web cleat angle – ISA 75×75×8 mm with 4 mm weld alround (2 Nos). **(15 Marks)**

PART – B

3 Line diagram of a Howe truss with tabulation of member forces are shown in Fig.Q3. Design various member of roof truss along with their end connections with gusset plate of 10 mm thick, by using M_{16} bolts of grade 4.60. The truss rests on 300mm × 500mm size column made of M_{20} grade concrete. Design the support bearing plate, base plate for a reaction of 120 kN and anchor bolts for an uplift force of 18 kN. **(40 Marks)**
Draw to a suitable scale:
(i) Elevation of truss greater than half span.
(ii) Enlarged view of support joint
(iii) Enlarged view of apex joint of truss. **(30 Marks)**

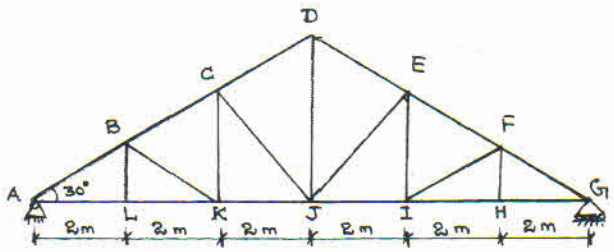

Fig.Q3

Tabulation of member forces.

Members	AB, GF	BC, FE	CD, ED	AL, GH	LK, HI	KJ, IJ	BL, FH	BK, FI	CK, EI	CJ, EJ	DJ
Force(kN)	240	210	160	208	208	182	0	30	15	66	60
Nature of force	C	C	C	T	T	T	-	C	T	C	C

C – Compression, T – Tension

4 Using post critical method design a welded plate girder of 20m span and laterally restrained throughout. It has to support a udl of 60 kN/m throughout the span, exclusive of the self weight. In addition to this girder has to support two concentrated loads of 500 kN at a distance of 5m from either supports. Design the central section, end and load bearing stiffners and their connections, inter mediate stiffeners and their connections, connection between flange and web. **(40 Marks)**
Draw to a suitable scale;
(i) Elevation of plate girder greater than half span.
(ii) Cross section at support
(iii) Cross section at midspan
(iv) Sectional plan. **(30 Marks)**

* * * * *

USN | | | | | | | | | | |

10CV834

Eighth Semester B.E. Degree Examination, June/July 2017
Earthquake Resistant Design of Structures

Time: 3 hrs. Max. Marks:100

Note: ***1. Answer any FIVE full questions, selecting atleast TWO questions from each part.***
2. Use of IS1893-2002 is permitted.

PART – A

1 a. What is plate tectonic theory of origin of earthquakes and explain associated type of movement at the plate boundaries. **(10 Marks)**

b. Explain the characteristics of different types of seismic waves. **(10 Marks)**

2 a. How are the earthquakes classified based on different aspects? **(05 Marks)**

b. Explain the different earthquake ground motion characteristics. **(08 Marks)**

c. Discuss about the response spectrum and design spectrum. **(07 Marks)**

3 a. Write a short note on following code based seismic analysis:
(i) Response spectrum method **(06 Marks)**
(ii) Equivalent static analysis **(04 Marks)**

b. Explain briefly about the seismic design philosophy. **(05 Marks)**

c. What is base isolation? Discuss briefly the principles of base isolation. **(05 Marks)**

4 a. Explain briefly about different types of vertical irregularities and their consequences. **(10 Marks)**

b. Explain /discuss about any five building configuration problems and suggest remedial measures. **(10 Marks)**

PART – B

5 Compute the seismic forces for each storey of a building situated in a seismic zone-IV by equivalent lateral force method as per IS 1893(2002) with following details:

Type of building – 0 MRF (Office building)
No. of storages – 04
Height of the building – 12 m (ht. of each floor = 3m)

Seismic weights

Roof – 2500 kN
All other floors – 3000 kN
Foundation on – Hard rock

(Assume without brick infill condition) **(20 Marks)**

6 For an RCC (SMRF) building with foundation on a soft soil, situated in zone – V as shown in Fig.Q6. Compute the seismic forces for each storey using dynamic analysis procedure.
Given, Free vibration results
Frequency : $\{ W \} = \{47.832, 120.155, 167.0\}$
Modes : $\{ \phi_1 \} = \{1, 0.759, 0.336\}$
$\{ \phi_2 \} = \{1, -0.805, -1.157\}$
$\{ \phi_3 \} = \{1, -2.427, 0.075\}$
$W_1 = W_2 = W_3 = 196.2$ kN
$K_1 = K_2 = 160 \times 10^3$ kN/m; $K_3 = 240 \times 10^3$ kN/m

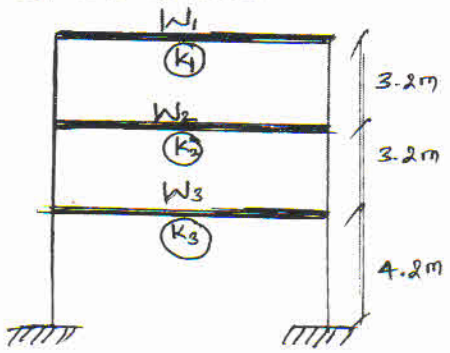

Fig.Q6 **(20 Marks)**

7 a. What are the different load combinations to be used for seismic analysis of RCC buildings as per IS1893(2002). **(04 Marks)**
b. What is ductility? Discuss different factors which are helpful in ductility of RC structures [Reinforced concrete]. **(08 Marks)**
c. Briefly describe soft storey and explain how a frame with soft storey behave under earthquake. Explain special design provisions as per IS 1893. **(08 Marks)**

8 a. Discuss the behavior of masonry buildings during earthquakes representing failure patterns. **(10 Marks)**
b. Discuss the various lateral load resting features that can be introduced in a masonry building for enhanced performance during an earthquake. **(10 Marks)**

* * * * *

USN | | | | | | | | | | |

10CV843

Eighth Semester B.E. Degree Examination, June/July 2017
Urban Transport Planning

Time: 3 hrs. Max. Marks:100

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

PART – A

1 a. Define "System Approach". Explain the system approach to transport planning with a flow diagram. **(10 Marks)**

b. Explain the Interdependence of Land use and Traffic. **(10 Marks)**

2 Define :

a. Trip Generation.
b. Trip Purpose.
c. Trip Distribution.
d. Modal Split.
e. Trip Assignment. **(20 Marks)**

3 a. Explain Zoning and Study area. **(10 Marks)**

b. Explain the surveys that are usually carried out during Urban Transport Planning. **(10 Marks)**

4 a. What are the factors Governing Trip Generation and Attraction rates? **(10 Marks)**

b. Explain Multiple Linear Regression Analysis used in Trip Generation. Give examples. **(10 Marks)**

PART – B

5 a. Explain any two growth factor methods and any one synthetic method. **(10 Marks)**

b. Estimate the future trip distribution by Furness method from the following data : **(10 Marks)**

O \ D	1	2	3	4	Future Trips
1	10	20	15	18	140
2	21	16	17	14	150
3	30	21	25	27	200
4	10	9	16	13	100
Future Trips	150	120	180	160	

6 a. What are the factors affecting modal split? **(08 Marks)**

b. Draw the flow diagram for modal split carried out between Trip Generation and Trip Distribution and explain. **(12 Marks)**

7 a. List the different Assignment Techniques and explain any one Assignment techniques. **(10 Marks)**

b. Discuss on Traffic Assignment Applications in India. **(10 Marks)**

8 a. Explain the difficulties in Transport Planning. **(10 Marks)**

b. Discuss about Recent case studies on Urban Transport Planning. **(10 Marks)**

*****