civil

Roll No. .....
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33097

BT-3 / D-17

STRUCTURAL ANALYSIS-I

Paper–CE-201 N

Time allowed : 3 hours] *[Maximum marks : 75*

Note : Attempt any five questions, selecting at least one question from each unit.

Unit–I

1. (a) Define the following: 8

   (i) Stress

   (ii) Principle stresses

   (iii) Hooke's Law

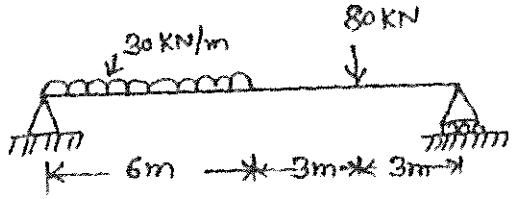
   (iv) Bulk-Modulus

   (b) Explain the theory of simple bending with assumptions? 7

2. What do you understand by the effective length of column? Give the effective length of column under four different end conditions. Also derive the equation for crippling load if both the ends are fixed. 15

Unit–II

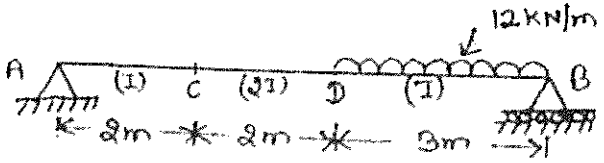
3. Draw the S.F.D. and B.M.D. for the given beam also find point of contraflexure. 15



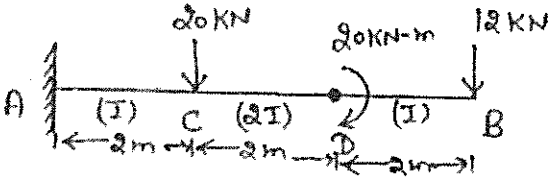
4. A three hinged circular arch has a span of 42m and rise of 10m. It carries a udl 25ICN/m over the left half of the span together with a point load of 80ICN at the right quarter span point. Find the reactions at the supports, normal thrust and shear at a section 10m from left support. 15

Unit–III

5. Calculate Δ_c by the unit lead methfod. 15

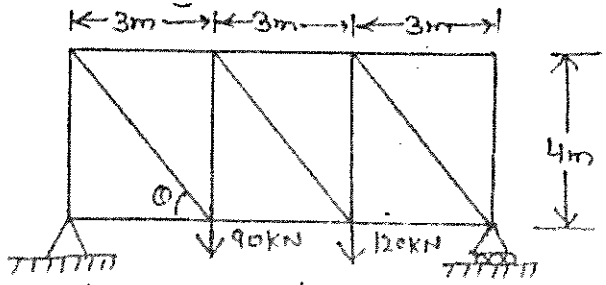


6. Calculate θ_c and Δ_B by conjugate beam method. 15



Unit–IV

7. Analyse the given truss: 15



8. (a) Explain determinate and indeterminate structures. With examples explain stable and unstable structures. 9

(b) (i) Principle of virtual work. 6

(ii) Betti's law

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BT-3 / D-17

BUILDING CONSTRUCTION MATERIALS & DRAWINGS

Paper–CE-203 N

Time allowed : 3 hours] *[Maximum marks : 75*

Note : (i) Attempt total five questions, selecting at least one question from each unit.

(ii) All questions carry equal marks.

Unit–I

1. (a) List the various types of stone masonry. Explain any two with sketches. 8

   (b) List the various types of bonds in brick Masonry. Draw the plan and elevation of any one and explain the key points. 7

2. (a) What is the function of Cavity Wall? Draw the sketch and level it. 8

   (b) What are the various functions of shallow and deep foundations. List the various types of each and draw the sketch of one of each type. 7

Unit–II

3. What are the main causes of Dampness? How will you prevent it? List the various material used for Damp-Proofing. 15

4. (a) List the various types of Roofs commonly used in Buildings. Explain in brief the difference between King post & Queen post truss. 10

(b) List the various fixtures and fastners used for doors and windows. 5

Unit–III

5. (a) Give the classification of Bricks. List the various test performed on the bricks. 8

(b) What do you understand by Terra Cotta? List the various types and uses of Terra-Cotta. 7

6. (a) Give the classification of Lime. Explain in brief the storage process of Lime. 8

(b) What are the various tests performed on cement? Explain any one in detail. 7

Unit–IV

7. (a) Discuss the requirements of Good structural stone. Discuss also the process of seasoning of stone. 5

(b) Explain in brief:- Quarrying, Blasting, Sorting and Dressing of stones. 7

8. (a) List the various defects in Timber. Explain any two with sketches. 8

(b) Discuss the characteristics and the types of Varnishes. 7

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33099

BT-3 / D-17

FLUID MECHANICS-I

Paper–CE–205N

Time allowed : 3 hours] *[Maximum marks : 75*

Note : Attempt five questions, selecting at least one question from each unit.

Unit–I

1. (a) Define : Compressibility, specific gravity, specific weight and specific volume. 8

   (b) Explain Surface Tension. Derive an expression for capillary rise in a tube. 7

2. (a) Differentiate between:

   (i) Uniform and Non-Uniform flows.

   (ii) Stream and Equipotential lines. 8

   (b) The stream function for a two dimensional flow is given by $\psi = 2xy$. Calculate the velocity at a point P (2,3) 7

Unit–II

3. (a) A 4 m diameter pipeline contains a gate valve. The pressure at the centre of pipe is 19.62 n/cm^2. If the pipe is filled with oil of specific gravity 0.89, calculate the force exerted by the oil upon the gate and the position of the centre of pressure. 10

   (b) Discuss briefly the conditions of stable and unstable equilibrium of floating bodies, giving an example for each. 5

4. (a) A block of wood of specific gravity 0.7 floats in water. Determine the meta-centric height of the block if its size is 2m x 1m x 0.8 m. 7

(b) Prove that the pressure intensity is same at all points having equal elevation in a static fluid. 8

Unit–III

5. (a) The inlet and throat diameters of a horizontal venturimeter are 30 cm and 10 cm respectively. The liquid flowing through the meter is water. The pressure intensity at inlet is 13.734 N/cm^2 while the vacuum pressure head at the throat is 37 cm of mercury. Find the rate of flow. Assume that 4% of differential head is lost between the inlet and throat. Find also the value of Cd for the venturimeter. 8

(b) Explain Bernoulli's Theorem giving its various limitations. 7

6. (a) A pipe, 100 mm in diameter has a nozzle attached to it at the discharge end, the diameter of the nozzle is 50 mm. The rate of discharge of water through the nozzle is 20 liters/sec and the pressure at the base of the nozzle is 5.886 N/cm^2. Calculate the coefficient of discharge. Assume that the base of the nozzle and outlet of nozzle are at the same elevation. 10

(b) Discuss the advantages of a triangular notch over rectangular notch when used as a gauging device in open channel. 5

Unit–IV

7. (a) Find the displacement thickness and momentum thickness for the velocity distribution in the boundary layer given by

$$\frac{u}{v} = {}^{2}\left(\frac{y}{\delta}\right) - \left(\frac{y}{\delta}\right)^{2}$$ 10

(b) Explain the methods of preventing separation of a boundary layer. 5

8. (a) Explain Buckingham's pi theorem of obtaining relation between a given set of variables influencing a phenomenon. 10

(b) Explain Distorted Models and its advantages. 5

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33100

BT-3 / D-17

SURVEYING-I

Paper–EE-207 N

Time allowed : 3 hours] *[Maximum marks : 75*

Note : *Attempt **five** questions in all, selecting at least **one** question from each unit. Assume any missing data. All questions carry equal marks.*

Unit–I

1. (a) A Survey line ABC cuts the Banks of a river at B and C. To determine BC, a line BE, 60 m long was set out roughly parallel to the river. A point D was then found in CE produced and middle point F of DB determined. EF was then produced to G, making FG equal to EF, and DG produced to cut the survey line in H. GH = 40m and BH = 60m. Find out the distance B to C. 10

   (b) Definition of surveying and discuss its principle. 5

2. (a) Explain Local attraction and its examples. 8

   (b) A Survey line BAC crosses a river, A and C being on the near and distant banks. Standing at D, a point of 60m perpendicular to AB from A, the bearing of C and B are 320° and 230°. AB = 20m. Find width of river. 7

Unit–II

3. (a) Explain following terms with neat diagrams. 7

   Reduced level, Bench mark, Curvature and refraction. 7

   (b) The following reading were taken with a level and a 4m staff. Find out the R.L By Rise and tall method. 8

0.683, 1.109, 1.838, 3.399, 3.877, 0.451, 1.405, 1.896, 2.676, 3.478, 3.999, 1.834, 0.649, 1.706

4. Explain 3 point problem and two point problem in detail. 15

Unit–III

5. (a) Discuss the temporary adjustment of theodolite. 5

   (b) The Co-ordinates of two point A & b are as follows. 10

Points	Co-ordinates	
	Northing	Easting
A	500.25	640.75
B	840.78	315.60

6. Stadia readings were taken with a theodolite on a vertical staff with the telescope inclined at an angle of depression of 3°30'. The staff readings were 2.990 & 2.055 & 1.120. The R.L of the staff is 100m. and H.I is 1.40m. What is the R.L of the ground at the instrument. Take the constants 100 & 0. 15

Unit–IV

7. Explain the various methods of setting out the simple curves with neat diagrams. 15

8. (a) Discuss the transition curves and what are the requirements of transition curves. 8

   (b) Calculate the ordinates at 10m intervals for a circular curve. The long chord is 60m and the radius is 150m. 7

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33101

BT-3 / D-17

ENGINEERING GEOLOGY

Paper–CE-209 N

Time allowed : 3 hours] *[Maximum marks : 75*

Note : *The candidate is required to attempt **five** questions in all, taking atleast **one** from each Unit.*

Unit–I

1. (a) Explain the sub division of Geology. 8

   (b) Discuss about the interior of the earth with neat sketches. 7

2. Explain the 'Work of Water' with special references to Weathering and erosion with neat sketches. 15

Unit–II

3. (a) Define the mineral and rock. Explain the physical properties of Mineral. 7

   (b) Explain the texture and structure of Igneous rocks, with example of Igneous rocks. 8

4. Give the elementary ideas about: 15

   (i) Bedding Plane

   (ii) Fold

   (iii) Fault

   (iv) Unconformity

   (v) Components of fold.

Unit–III

5. Explain the following with neat sketches: 15

   (i) Interpretation of data on the base of Geological Map.

   (ii) Artificial Recharge of ground water.

   (iii) Remote sensing technique.

6. Explain the 'DAM' with special reference to geological conditions and stability of foundation sites of the following points:

   (i) Geological condition and their influence.

   (ii) Location of DAM

   (iii) Type and Design of DAM 15

Unit–IV

7. Write notes on the following :

   (a) Water table 3

   (b) Essay on Global Warming and its effect. 12

8. (a) Describe the precaution and treatment against "faults" for improvement of foundation Rocks. 12

   (b) Write any two important features of Retaining Walls. 3

Date – 08/12/2017

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35148

BT-5 / D-17

DESIGN OF CONCRETE STRUCTURE-I

Paper–CE-303 N

Time allowed : 4 hours] *[Maximum marks : 75*

Note : *Attempt any **five** questions selecting at least **one** from each unit. Assume other data suitably. IS 456:2000 is allowed.*

Unit–I

1. (a) Write short notes on : Normal distribution curve, Partial safety factor and factored load.
   (b) Define creep, durability and shrinkage.

2. (a) Why is grading of aggregate important with regard to the properties of hardened concrete ?
   (b) Discuss the beneficial and harmful effects of creep concrete.
   (c) Enumerate the stepss involved in the Indian standard method of mix design.

Unit–II

3. Design a rectangular beam which carries a max. limiting bending moment of 65 kNm. Use M20 concrete and Fe 415 as reinforcement.

4. A reinforced concrete beam is simply supported over a span of 5m and it carries a uniformly distributed load of 36 KN/m including its own weight. If the size of the beam is restricted to 400×550 mm, determine the areas of tension and compression steel if required. Given M25 concrete and HYSD bars.

Unit–III

5. Calculate the shear reinforcement in a simply supported beam 280 mm wide, 400 mm effective depth carrying a uniformly distributed load of 55KN/m. The span of the beam is 3m. The beam has main tension steel of 6 Nos. bars 16mm dia. Concrete used is M15.

6. A rectangular beam 400mm wide is subjected to the following at a section : B.M of 45 KNM, S.F of 35 KN and Torsional Moment of 25KNM. Design the section for TORSION. $f_y = 250N/mm_2$ and M20 Concrete.

Unit–IV

7. (a) Explain the design step for one way slab with example.
   (b) Explain the concept of curtailment of bar in the beam and slab.

8. Design a R.C. Slab for interior room having size 6m × 5.5m. The width of supporting beams is 200 mm. The slab carries superimposed load of 4 KN/mm^2. Use M-25 grade of concrete and steel grade Fe-415.

Date – 12/12/2017

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35149

BT-5 / D-17
HYDROLOGY
Paper–CE–305 N

Time allowed : 3 hours] *[Maximum marks : 75*

Note :- *Attempt any five questions selecting at least one question from each unit. All questions carry equal marks/ Assume any missing data.*

Unit–I

1. (a) What do you mean by "hydrologic cycle". Explain its parts with a neat diagram. 7.5

   (b) The normal annual rainfall at stations P, Q, R and S are 81, 66, 76 and 91cm respectively. In one of the year, the station S was not working, The stations P, Q and R recorded annual rainfall as 91, 72 and 80cm respectively. Estimate rainfall at station S. 7.5

2. (a) What do you mean by precipitation? Describe Thiessen polygon method of computing average rainfall. 7.5

   (b) One day maximum rainfall at a station is 300mm with a return period of 50 years. Determine the probability of a one day rainfall depth equaled or greater than 300mm occurring once in 20 years, two times in 15 successive years and at least once in 20 successive years. 7.5

Unit–II

3. (a) Write down Penman's equation with its meaning used in Evapotranspiration along with data needed. 7.5

(b) Describe energy budget method of evaporation estimation. 7.5

4. (a) Explain briefly phi index, W-index and infiltration capacity. 7.5

(b) Describe procedures for determining infiltration characteristics of a soil of a plot of land. Explain clearly relative advantages and disadvantages of the methods. 7.5

Unit–III

5. (a) A 500g/ℓ solution of sodium dichromate was used as chemical tracer. It was dosed as a constant rate of 41/s at a downstream section. The equilibrium concentration was measured as 4 ppm. Estimate discharge in the stream. 7.5

(b) Explain stepwise procedure of Gumbel's method of flood estimation in a catchment. 7.5

6. Ordinates of 4-h Unit hygrograph are given, using this data, derive 2-h unit hygrograph. 15

Time (h)	0	4	8	12	16	20	24	28	32	36	40	44
Ordinate of 4-h UH(m^3/sec)	0	20	80	130	150	130	90	52	27	15	05	0

Unit–IV

7. (a) What is the difference between porosity and water content? Define the volumetric and gravitational water contents. 7.5

(b) Differentiate between confined, unconfined aquifer and perched aquifer with a suitable diagram. 7.5

8. (a) How do you determine EC of ground water sample? Explain it. 7.5

(b) What are the possible sources of pollution of ground water? Also mention remedial measures. 7.5

Date- 15/12/2017 (M)

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35150

BT-5 / D-17

GEOTECHNOLOGY-I

Paper–CE–307 N

Time allowed : 3 hours] *[Maximum marks : 75*

Note :- *Attempt **five** questions in all, selecting at least **one** question from each unit. Assume missing data, if any, suitably.*

Unit–I

1. (a) What is the purpose of soil exploration? How is the depth and lateral extent of exploration decided for various types of structures? 9

(b) What do you understand by

(i) Representative disturbed samples.

(ii) Non-representative disturbed samples. 6

(iii) Undisturbed samples?

2. (a) What do you understand by Geophysical methods of soil exploration? Describe Seismic Method. 9

(b) Describe, deep well drainage and vacuum methods of Drainage and Dewatering. 6

Unit–II

3. (a) What are the various design criteria for the structural safety of foundation? Discuss shear failure criterion and settlement criterion. 9

(b) Using Terzaghi Equation for Ultimate Bearing capacity,

differentiate between:

Gross ultimate Bearing capacity and Net ultimate Bearing Capacity.

What do you understand by Allowable bearing pressure? 6

4. Discuss briefly the following:

   (a) Bearing capacity from Penetration Tests.

   (b) Bearing capacity of Rafts in sands and clays.

   (c) Situations suitable for shallow foundations. 5,5,5.

Unit–III

5. (a) Describe Static Method of analysis for determining the Pile load capacity of a single pile in clay. 9

   (b) Determine the allowable load for a Pile 8 m long 60 cm in dia in stiff clay, using the following data:

   Unit wt of soil = 1.8 g / cm^3, Cu = 0.8 kg/ cm^2, $\phi_u = 0$, Nc = 9 Adhesion coefficient $\alpha = 0.5$ 6

6. Discuss briefly the following:

   (a) Group Action in Piles.

   (b) Dynamic methods of analysing single piles.

   (c) Negative Skin friction in Piles. 5,5,5

Unit–IV

7. Describe the following:

   (a) How is the depth of a well foundation decided? 6

   (b) Causes and rectification of Tilts and Shifts in well. 9

8. (a) Discuss the various types of Caissons with sketches. 9

   (b) How is lateral stability of a well foundation determined? 6

Date – 19/12/2017 (M)

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35151

BT-5 / D-17

PROJECT PLANNING & MANAGEMENT

Paper–CE-309 N

Time allowed : 3 hours] *[Maximum marks : 75*

Note : *Attempt any **five** questions. Select at least **one** question from each unit.*

Unit–I

1. Explain the significance, objectives and functions of Construction management. 15

2. (a) Describe the main features of the arbitration clause in a construction contract. 10

(b) Discuss the main conditions of Construction Contract. 5

Unit–II

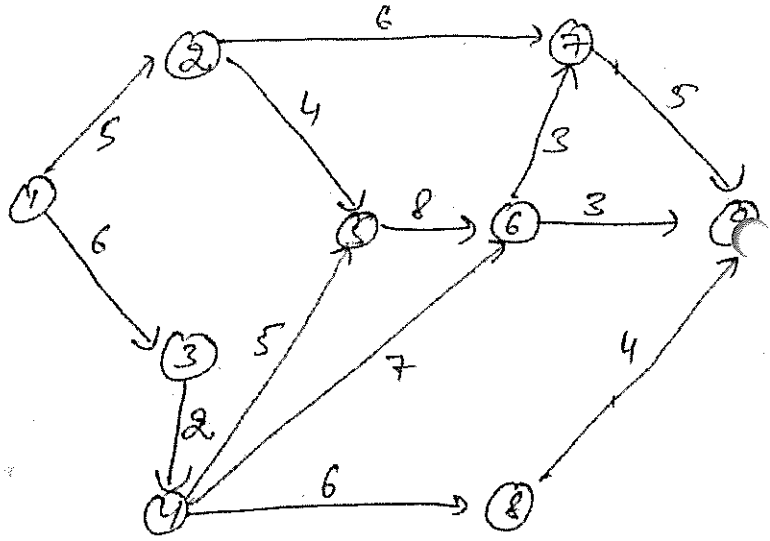
3. (a) Write a short note of milestone chart. 8

(b) Discuss the purpose of scheduling. 7

4. Explain the principles of organisation. 15

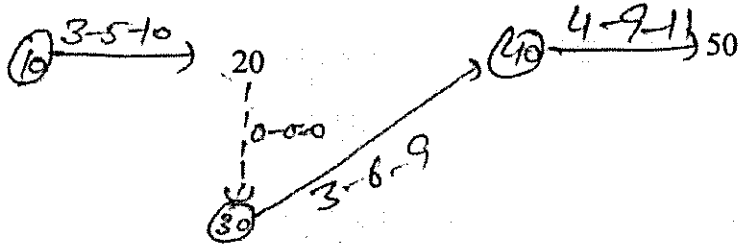
Unit-III

5. A N/W is shown in fig. with the expected time of completion of each activity. Determine the earliest expected time and latest occurance time for each event. 15

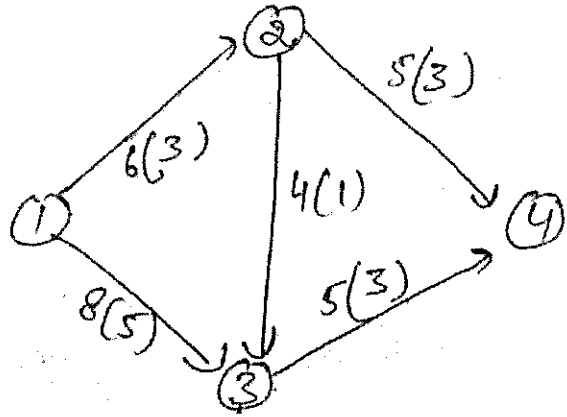


6. (a) Discuss central limit theorm. 5

(b) A Path of certain N/W is shown in fig. with the time estimates for its activities as mentioned. Determine the expected time for the path and also find out the standard deviation. 10



Unit-IV

7. 

15

Activity	Normal duration (Weeks)	Normal Cost (Rs)	Crash duration (Weeks)	Crash cost (Rs.)
1–2	6	7000	3	14500
1–3	8	4000	5	8500
2–3	4	6000	1	9000
2–4	5	8000	3	15000
3–4	5	5000	3	11000

Indirect cost of the Project is 3000 Rs./Week. Determine the optimum duration and min. cost. 15

8. List the non-destructive test for conc. structure and explain any of two test in detail. 15

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35152

BT-5 / D-17

CONCRETE TECHNOLOGY

Paper–CE–311N

Time allowed : 3 hours] *[Maximum marks : 75*

Note :- *Attempt **five** questions in all selecting at least **one** question from each unit.*

Unit–I

1. (a) List the various advantages of concrete. How will you have quality control of concrete? 8

(b) Name the constituent materials in concrete and also classify the aggregates according to its shape and size. 7

2. List the various types of cement and explain any three types of cements in brief. 15

Unit–II

3. (a) Define workability and what are the factors affecting the workability of concrete. 10

(b) Define segregation and bleeding. 5

4. List the various properties of hardened concrete. How will you find the flexural strength of concrete? Explain. 15

Unit–III

5. Discuss the non-destructive tests of concrete and explain any two tests in detail. 15

6. What are the causes of deterioration of Concrete? How the deterioration of Concrete can be prevented? 15

Unit–IV

7. (a) List the various types of repairs and the common types of repairs. 8

   (b) Discuss Light weight concrete and its properties. 7

8. Write short notes on: 15

   (a) Polymer concrete.

   (b) Prestressed concrete.

   (c) Fibre reinforced concrete.

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33017

BT-3 / D-17

STRUCTURAL ANALYSIS - I

Paper–CE–201 E

Time allowed : 3 hours] *[Maximum marks : 100*

Note :- *Attempt five questions, selecting at least one question from each unit.*

Unit–I

1. (a) Explain theory of simple bending. 5

(b) Define the following terms's 10

(i) Stress

(ii) Poisson's Ratio

(iii) Torsion

(iv) Modulus of Rigidity.

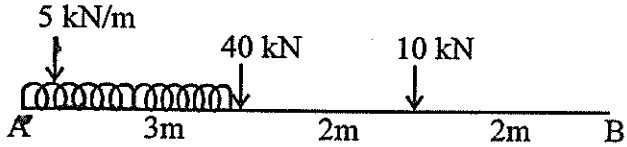
(v) Principal stresses.

(c) Explain the Mohr's circle in brief. 5

2. Explain the Classification of columns based on their Slenerness ratios. Derive the Euler's critical buckling load for a column fixed at one end and free at the other. 20

Unit–II

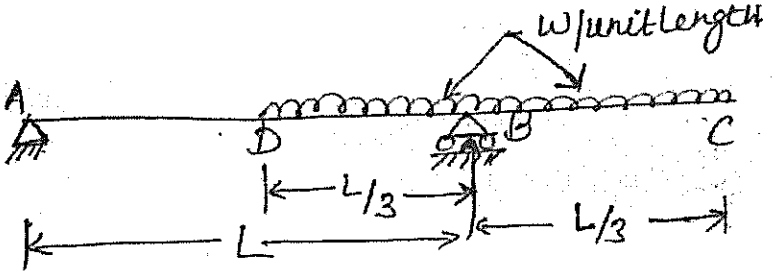
3. Draw S.F.D. and B.M.D. of a simply supported given beam: 20



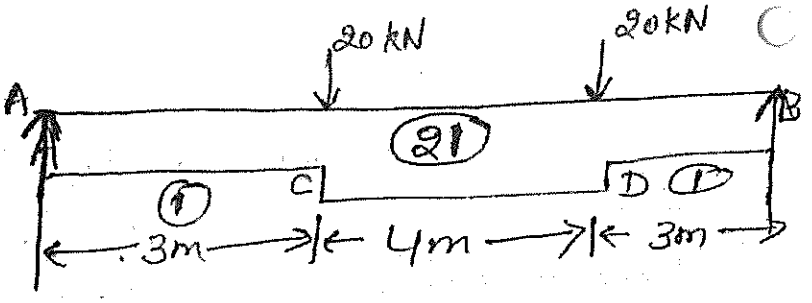
4. A parabolic 3-hinged arch carries a udL of 30kN/m on the left half of the span. It has a Span of 16m and Central rise of 3m. Determine the resultant reaction at supports. Find the bending moment, normal thrust and radial shear at XX, and 2m from left support. 20

Unit–III

5. Determine the rotation and deflection at the free end in the overhanging beam as shown in fig. 20

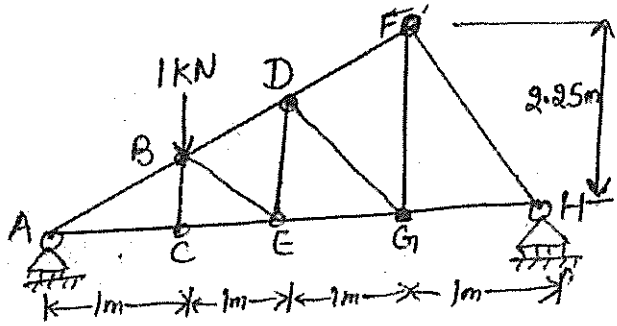


6. Determine the rotation at A and deflections under concentrated load at mid span in the beam shown in fig, by moment area method. 20



Unit–IV

7. A truss is loaded and supported as shown in fig. Find the axial forces in the members BD, DE and EG. 20



By using method of Section.

8. (a) Explain the two methods of structural analysis giving suitable examples. 8

(b) Explain types of indeterminacies with suitable examples. 8

(c) Explain the various kinds of supports with examples and the reaction they provide. 4

Date- 18/12/2017 (E)

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33018

BT-3 / D-17

BUILDING CONSTRUCTION MATERIALS AND DRAWING

Paper–CE–203E

Time allowed : 3 hours] *[Maximum marks : 100*

Note : *(i) Attempt total five questions selecting at least one question from each unit.*

(ii) All questions carry equal marks.

Unit–I

1. (a) Draw the plan and elevation of Double Flemish band used in brick masonry. 12

   (b) Discuss the various terms used in store masonry. Explain the dressing of store. 8

2. (a) List the advantages of the Cavity wall. Write the various steps for construction of Cavity Wall. 10

   (b) List the types of foundation used in water-logged area. Explain in brief about deep foundation. 10

Unit–II

3. (a) What are the materials used for the water - proofing treatment of roofs? Discuss. 10

   (b) Discuss the various types of flooring commonly used. 10

4. Discuss along with the sketches the various types of doors and windows along with fixtures and fasteners. 20

Unit–III

5. (a) Explain the following

   (i) Quarrying of stone

   (ii) Sorting out of stones

   (iii) Dressing, sawing and polishing. 12

   (b) List the special types of cement. Explain in brief the process of storage of cement. 8

6. (a) Discuss the various types of Terra – Cotta along with their uses. 10

   (b) Give the classification of Lime. Lest the test performed on lime. 10

Unit–IV

7. Give and discuss the classification of Timber. Lest the various defects in timber. Explain any three with sketches. 20

8. (a) What are the constituents of varnish? Discuss its types and characteristics. 12

   (b) Discuss the special varieties of plastics. 8

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33019

BT-3 / D-17

FLUID MECHANICS-I

Paper–CE–205E

Time allowed : 3 hours] *[Maximum marks : 100*

Note : *Attempt five questions in all, selecting at least one question from each unit.*

Unit–I

1. (a) Distinguish between:
   (i) Compressibility and Bulk Modulus.
   (ii) Real and Ideal Fluids
   (iii) Stream line and Stream tube
   (iv) Newtonian and Non-Newtonian Fluids.
   (v) Dynamic and Kinematic Viscosity

   (b) If velocity distribution of a liquid of viscosity 40 N 5/m^2 over a flat plate is given by:
   $u = 2y - y^2$
   In which u is velocity in m/sec at a distance y meter above the plate. Calculate the shear stress at y = 0 and y = 0.15 m. 10

2. (a) Differentiate between Rotational and Irrotational Flow. The velocity components in a two- dimensional flow are :
   $u = y^3/3 + 2x - x^2y$ and
   $V = xy^2 - 2y - x^3/3$ 15
   Show that the components represent irrotational flow.

   (b) Differentiate between Laminar and Turbulent Flow. 5

Unit–II

3. (a) Determine the total pressure on a circular plate of diameter 1.5 m which is placed vertically in water in such a way that the centre of the plate is 3m below the free surface of water. Find position of centre of pressure also. 10

   (b) Find the volume of water displaced and position of centre of buoyancy for a wooden block of width 2.5 m and depth 1.5 m, when it floats horizontally in water. The density of wooden block is 650 kg/ m^3 and its length is 6m. 10

4. (a) Show that the metacentre, M, of a floating body always lies above its centre of gravity ,G, for stable equilibrium. 10

   (b) A solid cylinder of diameter 4m has a height of 3m. Find the meta centric height of the cylinder when it is floating in water with its axis vertical. The specific gravity of the cylinder is 0.6. 10

Unit–III

5. (a) A 0.3m diameter pipe carries water at a velocity of 15 m/s at points A and B, pressure and elevations at two sections A and B along the pipe were observed as 350 KN/m^2 and 260 KN/ m^2 and 30 m and 35m respectively. Assuming steady flow, calculate the loss of head between sections A and B. 10

   (b) Derive Euler's Equation of motion and hence deduce Bernoulli's Equation. State limitations of Bernoulli's Equation. 10

6. (a) Explain the following. 10

(i) Effect of end contraction in rectangular notches.

(ii) Aeration of nappe in suppressed weirs.

(b) A discharge of 100 L/S is to be measured by a triangular notch of vertex angle 45°. What would be the head over the vertex of notch. If the accuracy of reading the head is 1mm, what error in discharge can be expected at this level. 10

Unit–IV

7. (a) Discuss the phenomenon of separation of boundary layer in a diverging flow and explain why it should be avoided. 10

(b) Explain displacement thickness, momentum thickness and energy thickness of boundary layer. 10

8. (a) Explain Buckinghams pi -theorem of obtaining relation between given set of variables influencing a phenomenon. 10

(b) Explain the geometric kinematic and dynamic similarity with reference to physical modelling. 10

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33020

BT-3 / D-17

SURVEYING-I

Paper–CE–207E

Time allowed : 3 hours] *[Maximum marks : 100*

Note : *Attempt **five** questions in all, selecting at least **one** question from each part.*

Part–I

1. (a) What factors should be considered in deciding the stations of a chain survey? 10

(b) Explain how will you continue chaining past the following obstacles.

(i) a pond (ii) a river (iii) a hill

(iv) a tall building (v) a railway line 10

2. (a) The following bearings were observed while traversing with a compass. 10

Line	F.B	B.B	Line	F.B	B.B
AB	45°45'	226°10'	CD	29°45'	209°10'
BC	96°55'	277°5'	DE	324°48'	144°48'

Mention which stations were affected by local attraction and determine the corrected bearings.

(b) A Survey line BAC crosses a river A and C being on the near and distant banks. Standing at I, a point 50 metres measured perpendicularly to AB from A, the bearings of C and B are 320° and 230°, AB being 25 metres. Find the width of the river. 10

Part–II

3. (a) The following staff readings were observed successively with a level, the instrument having been moved often the third, sixth and eight readings: 10

2.228; 1.606; 0.988; 2.090; 2.864; 1.262; 0.602; 1.982; 1.044; 2.684 metres. Enter the above readings in a page of a level book and calculate the R.L of points if the first reading was taken with a staff held on a bench mark of 432.384 m.

(b) What is two - point problem? How is it solved? 10

4. (a) Discuss the relative merits and applications of the following methods: 10

(i) Radiation, (ii) Intersection (iii) Resection

(b) What are different sources of errors in levelling? How are they eliminated? 10

Part–III

5. (a) Derive suitable equations for distance calculation using tangential method of tacheometry. Discuss various cases. 10

(b) Derive an expression for the horizontal distance of a vertical staff from a tacheometer, if the line of sight is horizontal. 10

6. (a) Explain various methods of adjusting the traverse in brief. Provide required equation and diagram. 10

(b) Discuss briefly various systems of tacheometry. 10

Part–IV

7. (a) What are the common difficulties in setting out simple curves? Describe briefly the methods employed in overcoming them. 10

   (b) The chainage of the intersection of two straights having the deflection angle of 50° is 1680.50 m. If the radius of the curve is 450m, calculate the following:

   (i) Tangent distance

   (ii) Length of the curve

   (iii) Changes of P.C. and P.T.

   (iv) Length of the chord

   (v) Degree of curve

   (vi) Apex distance and

   (vii) Mid-ordinate

8. (a) What are the methods of determining the length of a transition curve? Explain each in brief. 10

   (b) Describe the method of setting out a compound curve in the field. 10

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Printed Pages : 2

33021

BT-3 / D-17

ENGINEERING GEOLOGY

Paper–CE-209E

Time allowed : 3 hours] *[Maximum marks : 100*

Note :- *Attempt **five** questions in all, selecting at least **one** question from each unit.*

Unit–I

1. Explain the Sub-division of geology and the interior part of the Earth. 20

2. (a) Write down the Geological work of 'winds'. 10

   (b) Explain the internal geological forces. 5

   (c) Write about 'soil profile' and its importance. 5

Unit–II

3. Explain the following:

   (a) Texture and structure of Igneous Rocks. 10

   (b) Texture of Sedimentary Rocks. 5

   (c) Hardness Scale. 5

4. Explain the Elementary ideas about Folds and Joints with suitable diagram. 20

Unit–III

5. Write short notes: 5×4=20

   (a) Landslides

(b) Dams

(c) Highways

(d) Reservoirs.

6. (a) Explain the 'Remote Sensing techniques for geological survey. 10

(b) Use of Geological Map. 5

(c) Define: Water table and Aquifers. 5

Unit–IV

7. Explain the term 'Geology' and 'Environment of Earth.' How can you correlate to each other? Which divisions of Geology affects the environments mostly? Explain. 5+10+5=20

8. Give details about precautions and treatments against faults and ground water, with special reference to improvement of foundation rocks. 20

Roll No. .....
Printed Pages : 2

35030

BT-5 / D-17

DESIGN OF CONCRETE STRUCTURE-I

Paper–CE-303 E

Time allowed : 4 hours] *[Maximum marks : 100*

Note :- *Attempt any five questions selecting at least one from each unit. Assume other data suitably. IS 456:2000 is allowed.*

Unit–I

1. (a) Define admixture and its type, reinforcement and its type in detail.

   (b) Define creep, durability and shrinkage.

2. What do you understand by balanced, under-reinforced and over-reinforced section? Which type of section is recommended for design purposes? Give reason.

Unit–II

3. A reinforced concrete beam is simply supported over a span of 6m and it carries a uniformly distributed load of 25000 N/m including its own weight. If the size of the beam is restricted to 300x500 mm, determine the areas of tension and compression steel if required. Given M20 concrete and HYSD bars?

4. Design a T-Beam section in a hall 5 m x 15 m with the position of the beam. The thickness of the slab may be assumed as 125 mm. The concrete may be taken as M 15 and reinforced as Mild steel bars. The superimposed live load on slab may be taken as

2000 N/ m^2 (200 kg /m^2) and the weight of finishes as 2500 N/ m^2 (250 kg/m^2) which includes screeding and flooring

Unit–III

5. A simply supported beam, 300 mm wide and 500 mm effective depth carries a uniformly distributed load of 50 KN/M including its own weight, over an effective span of 4m. Design the shear stirrups in the form of vertical stirrups. Use M 15 concrete. f_y = 250N/mm^2. Assume that the beam contains 0.75% reinforcement through the length.

6. (a) A rectangular beam 400mm wide is subjected to the following at a section: B.M of 45 KNM, S.F Of 30 KN and Torsional Moment of 20KNM. Design the section for TORSION. f_y = 250N/mm^2 and M20 Concrete.

Unit–IV

7. Design a R.C. Slab for a room measuring 6.5m × 5m. The slab is to cast monolithically over the beams with corners held down. The width of supporting beams is 230 mm. The slab carries superimposed load of 5 KN/mm^2 . Use M-20 grade of concrete and steel grade Fe-500.

8. Explain different type of retaining wall with example. Also Enumerate forces on the retaining wall.

22-12-17

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35032

BT-5 / D-17

GEOTECHNOLOGY-I

Paper–CE–307E

Time allowed : 3 hours] *[Maximum marks : 100*

Note : *(i) Attempt **five** questions in all, selecting at least **one** question from each unit.*

(ii) Assume missing data, if any, suitably.

Unit–I

1. (a) Discuss briefly the various boring methods of soil exploration. How can the disturbance reduced while collecting undisturbed soil samples? Answer in the light of Area ratio and Inside clearance of the sampler. 15

   (b) How is DCPT test conducted? Discuss briefly. 5

2. Explain the following methods adopted for drainage and Dewatering of Foundation Trenches. 20

   (a) Well Point System

   (b) Deep well Drainage

   (c) Vacuum Method and

   (d) Electro-osmosis method.

Unit–II

3. Discuss the three Design criteria for Structural safety of foundations. What are the assumptions made by Terzaghi in derivation of the equation for determining the Ultimate Bearing Capacity of Shallow foundations? Write Terzaghi's equation for a strip foundation. Also discuss the effect of shape of foundation, Depth and water table on the bearing capacity. 20

4. Discuss briefly the following:

   (a) Various causes of settlement of foundations.

   (b) Allowable Bearing Pressure based on Settlement.

   (c) Situations suitable for shallow foundations.

   (d) Plate load Test and its interpretation. 5,5,5,5

Unit–III

5. (a) Discuss Static Analysis method of determining bearing capacity of a pile in clay. 10

   (b) Calculate the allowable load capacity of a Pile, 50 cm diameter, 6 m long installed in coarse sand, assuming the following properties of sand:

   Unit wt = 1.8 T/m^3, $\phi = 36^\circ$ ($N_q = 56$, Nr = 38), K = 1.0 and F.O.S. = 3 10

6. (a) How is 'Pile Group Capacity' determined? Describe the various methods. 12

   (b) What do you understand by negative skin friction? Describe. 8

Unit–IV

7. Draw a sketch of a well foundation showing and labelling various components. How is the depth of a well foundation decided? 20

8. Describe the following:

   (a) Various Types of Drilled Piers

   (b) Lateral stability of a well foundation. 10,10

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35033

BT-5 / D-17

PROJECT PLANNING AND MANAGEMENT

Paper–CE–309E

Time allowed : 3 hours] *[Maximum marks : 100*

Note : *Attempt five questions in all, selecting at least one question from each unit. All questions carry equal marks.*

Unit–I

1. (a) What do you understand by Engineering drawing? Classify various Civil Engg. drawing and briefly discuss each of them. 12

   (b) Discuss function and objectives of Construction management. 8

2. (a) Discuss the various types of construction. 8

   (b) Describe the main feature of the arbitration clause in a construction contract. 12

Unit–II

3. (a) State the purpose of scheduling. 6

   (b) Differentiate between pert and CPM N/W. 6

   (c) Explain with a sketch a finance schedule showing expenditure, receipt and working capital. 8

4. (a) List the detail included in the Job Layout. 8

   (b) Explain the main principle for developing an organisation for effective and efficient working. 12

Unit–III

5. (a) Discuss the various N/W rules. 10

[Turn over

(b) Define an Event and activity. Differentiate clearly between the two. 10

6. (a) Explain the following terms: 15

(i) Latest allowable occurrence time.

(ii) Earliest Expected time.

(iii) Slack

(iv) Critical path

What does a negative slack indicate?

(b) Discuss Centeral limit theorem. 5

Unit–IV

7. (a) Explain the important points to be checked during inspection of R/F. 10

(b) Differentiate between standard deviation, coffi. of variances, mean value and characteristics strength.

8. For a project the Job no. and the sequence for the Jobs in a project, the normal time and cost and crash cost and time are also given. The indirect cost is 200 Rs/ day. 20

Activity	Normal Cost	Normal Time	Crash Cost	Crash Time
1–2	300	4	600	2
1–3	800	8	880	6
2–3	600	5	800	3
2–4	400	9	775	6
3–4	250	3	325	2

Roll No. ..... Total Pages : 3

BT-7/D-17 **37044**

DESIGN OF CONCRETE STRUCTURES-II

Paper : CE-401 E

Time : Four Hours] [Maximum Marks : 100

Note : Attempt *five* Questions, selecting at least *one* question from each Unit. Use of IS : 456 2000 is allowed. Use of SP-16 is not allowed. Assume any missing data appropriately. Use M25 concrete and Fe415 grade steel.

UNIT–I

1. A three span reinforced concrete beam is supported by 300 mm thick masonary walls. The centre-to-centre distance between the walls is 5 m. The beam is to be designed for imposed load of 30 kN/m. D.L. on beam including its self-weight is 15 kN/m. Design the beam using I.S. code method. The permissible bearing stress of brick masonary wall is 1.0 N/mm^2. (20)

(a) Explain various pre-stressing systems briefly. (6)

(b) A simply supported pre-stressed concrete beam of rectangular cross-section 400 mm × 600 mm is loaded with a total load of 260 kN over a span of 6 m. Sketch the distribution of stresses at mid-span and end sections if the pre-stressing force is 1920 kN and the tendon is (i) concentric, (ii) eccentric, located at 200 mm above the bottom fiber. (14)

UNIT–II

3. A flat slab is resting over columns spaced 5 m centre-to-centre in both the directions. The columns have column head of size 600 × 600 mm. The effective height of the column is 3.5 m. The slab is having finishing load of 2 kN/m^2 and live load of 4 kN/m^2. Design end panel of the flat slab. The columns end at the slab level. (20)

4. Two columns A and B as shown in Fig. 1 carry compressive load of 400 kN and 600 kN respectively. The column A is on property line and column B is at 4 m centre-to centre distance from A. Both the columns are of size 350 mm × 350 mm. Design a strap footing. Take net bearing capacity of soil as 100 kN/m^2. (20)

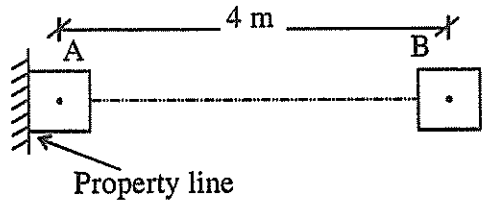

Fig. 1

UNIT–III

5. Design long walls and short walls of an underground water tank 4m × 10m × 3m deep. The sub-soil consist of sand having angle of repose of 30 degree, and saturated unit weight of 17 kN/m^3. The water table is likely to rise upto ground level. Take unit weight of water as 9.81 kN/m^3. (20)

6. Design a cylindrical silo of 4 m diameter and 16 m height. The silo is having hopper of height 1.7 m and bottom opening of 0.6 m diameter. Sides of conical hopper make 45 degree angle with the vertical plane. The silo is used to store wheat and covered at the top. Take density of wheat equal to 8.5 kN/m^3; $\mu = 0.47$ and $\mu' = 0.42$. (20)

UNIT–IV

7. A rectangular ortho-tropically reinforced concrete slab of size 8 m × 6.0 m, supports live and finish loads of 5.0 kN/m^2 and 1.5 kN/m^2, respectively. Design the slab when it is (i) simply supported at all the edges and (ii) continuous over the supports. Consider the moment in shorter span to be twice that in longer span. (20)

8. (a) What are the measures taken for improving the ductility of reinforced concrete structures. (6)

   (b) In a multi-storey RCC frame building, a typical floor beam with 120 mm thick slab carries service negative bending moment and shear force of 450 kN-m and 300 kN, respectively, at the face of beam-column joint due to gravity and seismic loads. The size of the beam web has been fixed at 300 × 450 mm from architectural considerations. Design the beam section for adequate ductility. The effective cover to tension steel is 45 mm. (14)

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38042

BT-8/D-17

BRIDGE ENGG.

Paper : CE-402(E)

Time : Three Hours] [Maximum Marks : 100

Note : Attempt *five* questions in all, selecting at least *one* question from each unit. All questions carry equal marks. Use of IS : 456-2000 and IRC Codes are allowed.

UNIT–I

1. (a) Define Bridge. Write the components of a bridge. 5

(b) What do you understand by Economical span ? Derive the expression for the same. 8

(c) Give the various classifications of bridges. 7

2. (a) Discuss the concept of Effective width. Also discuss its effect in dispersion of load. 10

(b) List the various loads and stresses considered for the design of bridges. 10

UNIT–II

3. A R.C.C. culvert is req. for an NH crossing. The clear vent way of the box culvert is 4 m by 4 m. Design Box culvert assuming a superimposed dead load of 12 kN/m^2 and a live load of 50 kN/m^2. The density of the Earth is 16 kN/m^3. Angle of repose of soil is 30°. Adopt M-20 and Fe-415. Sketch the details of R/F in the Box culvert. 20

Roll No. ..... Total Pages : 2

BT-8/D-17 **38042**

BRIDGE ENGG.

Paper : CE-402(E)

Time : Three Hours] [Maximum Marks : 100

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4. (a) How will you design various components of a balanced cantilever bridge ? Explain in brief. 10

(b) Explain any *three* types of RCC bridges in detail. 10

UNIT–III

5. (a) Write down the step by step design procedures for Plate girder bridges. 10

(b) What are the advantages and disadvantages of Steel bridges over R.C.C bridges ? 10

6. Explain in detail alongwith the advantages and disadvantages of any *three* types of Steel bridges. 20

UNIT–IV

7. Write short notes on the following :

(a) Well foundation.

(b) Joints and Articulations.

(c) Balanced Cantilever bridges.

(d) Estimation of Scour depth. 20

8. (a) List the various types of bearings commonly used for the bridges alongwith their functions. 10

(b) Differentiate between Piers and Abutments. List the various forces and stresses considered for the design of piers and abutments. 10

Roll No. ..... Total Pages : 3

BT-7/D-17 **37045**

IRRIGATION ENGG.–II

Paper : CE-403E

Time : Three Hours] [Maximum Marks : 100

Note : Attempt *five* questions in all, selecting at least *one* question from each unit. All questions carry equal marks. Assume any missing data. Use of Khosla's charts, Blench curves and Montague curves is permitted.

UNIT–I

1. (a) What are the roughening devices? Discuss their types used in a canal fall. 10

(b) Design a silt excluder for the diversion head works for the data given below : Full supply discharge of canal = 200 cumecs, crest level of under sluices = 200.00, crest level of head regulator = 202.00, bay width of under sluices = 16 m. 10

2. Design a cross regulator for a channel with following data:

Discharge of parent canal = 145 cumecs

Discharge of distributor = 19 cumecs

FSL of parent channel, u/s = 210.0 m

FSL of parent channel, d/s = 209.8 m

Bed width of parent channel, u/s = 52 m

Bed width of parent channel, d/s = 46 m

Depth of water in parent channel d/s and u/s = 2.5 m

FSL of distributor = 209.1 m

Silt factor = 0.9 m

Exit gradient = 1/5. 20

UNIT–II

3. Design a siphon aqueduct for the following data:

Discharge of canal = 56 cumecs

Bed width of canal = 32 m

Full supply depth of canal = 2.0 m

Bed level of canal = 267.0 m

Side slopes of canal = 1.5 H : 1 V

High flood discharge of drain = 425 cumecs

High flood level of drainage = 268.2 m

Bed level of low water cross-section of drainage = 265.50 m

Ground level = 267.20 m, silt factor = 0.9. 20

4. Explain briefly salient features of Khosla's theory and how it is used in design of permeable foundations? Numerate various corrections that are needed in this theory. 20

UNIT–III

5. The base width of a concrete gravity dam is 75 m. For the full reservoir condition, the resultant passes through a point 12 m from the centre. The slope at the downstream face is

0.7 horizontal to 1 vertical. If the total vertical load is 6850×10^4 N; find the normal stress, shear stress and the principal stress at the toe. 20

6. (a) Differentiate between an arch dam and an earth dam. Derive an equation for the most economical angle of an arch dam. 10

(b) Discuss seepage control measures to be taken in an earthen dam. 10

UNIT–IV

7. (a) What are different kinds of spillways and discuss about ogee and trough spillways with neat sketches. 10

(b) What do you mean by priming and depriming? Discuss devices used for priming in the spillways. 10

8. (a) Describe with neat sketches various types of bucket type energy dissipators used in spillways. 10

(b) Why stilling basins are provided in a spillway? Draw a neat sketch of any *one* of IS type stilling basin. 10

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BT-8/D-17 **38043**

RAILWAY AND AIRPORT ENGINEERING

Paper : CE-404E

Time : Three Hours] [Maximum Marks : 100

Note : Attempt *five* questions in all, selecting at least *one* question from each unit.

UNIT–I

1. (a) Discuss the various types of Rail sections with sketches. Also discuss their mutual advantages and disadvantages. 10

(b) Discuss the following :

(i) Advantage of Long Welded Rails.

(ii) Various defects in rails. 10

2. What do you understand by 'Creep' in Rails ? Discuss its various causes and remedial measures. 20

UNIT–II

3. (a) Discuss the various types of switches with sketches. 10

(b) What do you understand by Heel divergence, switch angle and Throw of a Switch ? 10

4. (a) How can signals classified leased on their location ? Discuss the various Reception Signals and Departure Signals. 10

(b) Explain Automatic Block System method of controlling Train movement. 10

UNIT–III

5. (a) Where is Super-elevation provided on Railways ? How is it calculated ? What is Cant Deficiency ? 12

(b) Write a short note on Hauling Capacity of a locomotive. 8

6. What are Station Yards ? Describe Marshalling Yards and Loco yards with sketches. 20

UNIT–IV

7. (a) Describe the various factors, which should be kept in mind, while selecting the site of an Airport. 15

(b) Write a short note on classification of Airports. 5

8. (a) What do you understand by 'Basic Runway Length' ? How is Basic Runway length determined from the performance characteristics of the Aircraft using the Airport. 12

(b) Discuss the differences between highway and Runway Pavement affecting their design. 8

Date – 09/12/2017

Roll No. ..... Total Pages : 2

BT-7/D-17 **37046**

TRANSPORTATION ENGINEERING–II

Paper–CE-405E

Time : Three Hours] [Maximum Marks : 100

Note : Attempt *five* question in all, selecting at least *one* question from each Unit.

UNIT–I

1. (a) Draw cross-sections of a Flexible Pavement and a Rigid Pavement showing the various components of the two pavements. Discuss the functions of the various components. 10

(b) Describe Burmister's two layer theory for the design of Flexible pavement. How is surface deflection due to a loaded circular plate calculated by this theory ? 10

2. (a) What do you understand by, Radius of relative stiffness and Radius of resisting section ? Discuss briefly. 10

(b) Discuss IRC guidelines to calculate the spacings of expansion and construction joints. 10

UNIT–II

3. Discuss briefly the construction of a cement concrete pavement. Describe the basic concepts on the use of Geosynthetics on Pavements, Reinforced concrete pavements and the pre-stress concrete pavements. 20

4. List the various types of Bituminous flexible pavements. Discuss briefly the construction of BUSG, Pre-mix carpet and B.M. Pavements. 10

UNIT–III

5. (a) Discuss briefly the various flexible pavement failures. 10

   (b) How are WBM and Bituminous surfaces maintained ? 10

6. Describe the following :

   (a) Various types of surface and sub-surface drainage systems. 10

   (b) Various types of overlays. 10

UNIT–IV

7. Discuss the following methods of Eeconomic Evaluation of Highways and their relative advantages and disadvantages.

   (a) Benefit-cost ratio method,

   (b) Net present value method,

   (c) Annual cost method, and

   (d) Rate of return method. 20

8. (a) Describe the shield method of Tunnelling in soft ground. 10

   (b) Discuss various tunnel cross-sections with sketches and discuss their relative advantages and disadvantages. 10

Roll No. ..... Total Pages : 3

BT-8/D-17 **38044**

INDUSTRIAL WASTEWATER TREATMENT

Paper : CE-406E

Time : Three Hours] [Maximum Marks : 100

Note : Attempt *five* questions selecting at least *one* question from each unit. Assume appropriate data wherever necessary.

UNIT–I

1. (a) Explain effects of industrial waste water discharge on municipal sewage treatment plant with reference to (i) BOD (ii) Solids and (iii) Volume of waste water. 10

(b) Compare municipal and industrial wastewater treatment with reference to (i) Objectives of organization (ii) Variation in waste water generation (iii) Management. 10

2. (a) Explain effects of allowing industrial waste water discharge on municipal sewerage system. 10

(b) Explain effects of industrial waste water discharge on receiving stream with reference to (i) Organic matter (ii) Colour and (iii) Floating solids and liquids. 10

UNIT–II

3. (a) What do you understand by the term waste strength reduction? Explain with suitable examples. 10

(b) Explain various possible steps for industrial waste water volume reduction with examples. 10

4. (a) What is difference between equalization and proportioning? Explain. 10

(b) What is neutralization? Name various methods of neutralization and explain any *one* in detail. 10

UNIT–III

5. (a) What is population equivalent? Calculate population equivalent of 5 MLD industrial waste water discharge containing 2000 mg/L suspended solids. 10

(b) Give effluent standards for following parameters for discharging into inland surface waters: (i) BOD (ii) Suspended Solids (iii) Temperature (iv) Sulfide (v) Phenolic compounds. Also indicate adverse effects due to these on quality of receiving water. 10

6. (a) Suppose discharge of an industrial waste water is allowed in municipal sewerage system for joint treatment. How will municipal authorities determine total charges to be levied on industry for accepting and treating industrial waste water? Explain. 10

(b) Give effluent standards for following parameters for discharging on land: (i) pH (ii) Oil & grease (iii) Dissolved inorganic solids (iv) Arsenic (v) Boron. Also indicate adverse effects due to these on land. 10

UNIT–IV

7. (a) Explain in brief cotton textile manufacturing flow scheme indicating sources of waste water generation with general characteristics of waste water. 10

   (b) What are main contaminants in tannery waste water? Suggest treatment strategy for the same. 10

8. (a) What are sources of waste water generation in a sugar mill? Give typical characteristics of sugar mill waste water and suggest treatment alternatives for the same. 10

   (b) Describe in brief various processes involved in nitrogenous fertilizer plant and suggest measures for minimizing volume and strength of waste water generated from fertilizer plant. 10

Date – 06/12/2017

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BT-7/D-17 **37047**

SEWERAGE AND SEWAGE TREATMENT

Paper : CE-407E

Time : Three Hours] [Maximum Marks : 100

Note : Attempt *five* questions selecting at least *one* question from each unit. Assume appropriate data wherever necessary.

UNIT–I

1. (a) How is sewage flow estimated for designing a sewerage system? Explain. 10

(b) Explain various shapes of sewers giving their relative merits and demerits. 10

2. (a) A 200 mm diameter circular sanitary sewer is laid at a slope of 1 in 500.

Calculate following:

(i) Velocity of flow and discharge when flowing full.

(ii) Velocity of flow and discharge when flowing 0.5 Full 10

(b) Enumerate various sewer appurtenances and explain any one in detail. 10

UNIT–II

3. (a) How solids present in sewage are classified? How dissolved solids present in a sample are determined? Explain. 10

(b) How is oil and grease present in a sewage sample determined? Explain. 10

4. (a) What is difference between BOD and COD? Calculate COD of sewage using following data :

(i) Volume of sample = 50 mL

(ii) Volume of 0.25 N ferrous ammonium sulphate used for titrating blank = 24.0 mL

(iii) Volume of 0.25 N ferrous ammonium sulphate used for titrating sample = 15.0 mL 10

(b) Give permissible limits of following parameters if effluent is discharged in a river :

(i) Suspended solids

(ii) COD

(iii) Fluoride

(iv) Sulphide

(v) Faecal coliform. 10

UNIT–III

5. (a) Name various treatment units provided in a conventional sewage treatment plant and state objective of each treatment unit. 10

(b) Calculate number and size of primary settling tank necessary for a sewage treatment plant designed to serve population of 50,000 persons. Assume per capita sewage flow 110 lpcd. 10

6. (a) Explain difference between low and high rate trickling filters. 10

(b) What are sludge drying beds? Explain with the help of neat labelled diagram. 10

UNIT–IV

7. (a) Explain various biochemical processes involved in self purification of a river. 10

(b) What crops should be grown in sewage farms? Suggest precautionary measures to avoid health hazards to farm workers and consumers of farm produce. 10

8. (a) Enumerate conditions when sewage disposal by dilution is favourable. 10

(b) Suggest preventive measures to avoid sewage sickness of land. 10

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BT-7/D-17 **37048**

HYDRO ELECTRIC POWER DEVELOPMENT

Paper : CE-413 E

Time : Three Hours] [Maximum Marks : 75

Note : Attempt *five* questions in all, selecting at least *one* question from each unit. All questions carry equal marks. Assume any missing data.

UNIT–I

1. (a) Give a brief account of hydro, thermal and nuclear power in India. (7½)

(b) Discuss power duration curve and its role for assessment of amount of hydro power available at the site. (7½)

2. (a) A runoff river plant on a stream has inflow 25 cumecs and net head 32 m with provision for pondage to meet daily peak demand with a load factor of 62%. (i) Determine power generation capacity of the plant at 81% overall efficiency. (ii) The plant runs a peaking station for 3 hours and balance period in the day for average load. What amount of pondage is needed ? (7½)

(b) Explain the difference between base load and peak load plants. For what type of conditions hydro electric power is very much suitable ? (7½)

UNIT–II

3. (a) What is an intake ? Mention different types of intake giving examples where these are used in hydro projects. (7½)

   (b) Discuss briefly different types of hydraulic valves used in penstocks with sketches. (7½)

4. (a) A stone gate 9.0 m × 6.0 m has submerged weight 30 metric ton has to operate at a load of 20 meter. If the gate travels at a maximum speed of 1.0 meter/min, find the HP required to operate the gate if overall efficiency is 85% and FOS is 2.2. Take coefficient of rolling friction 0.004 and 5% of water load for bearing friction. (7½)

   (b) How do you classify penstocks ? Derive expression for economical diameter of penstock. (7½)

UNIT–III

5. (a) Determine no. of turbines and diameter of runner for a power plant having 20 cumecs inflow, 10 m head, turbine efficiency 90% and speed 155 rpm. Assume specific speed as 255 rpm and speed ratio as 0.9. (7½)

   (b) What are the characteristic curves of Francis turbine? Draw them neatly. (7½)

6. (a) What is cavitation ? How cavitation is important for setting of turbine relative to tail water ? (7½)

(b) Explain types of draft tubes with sketches. Derive a relation for efficiency of a draft tube used in turbines. (7½)

UNIT–IV

7. (a) Define a power house. Elaborate the three parts of hydel power plant with neat sketch. (7½)

(b) Define an underground power house. Why and where construction of such plant is necessitated ? (7½)

8. (a) What do you understand by various types of cavities essentially needed in underground power plant ? Explain them properly. (7½)

(b) What are the components of a Double basin system of a tidal power plant ? Explain its working with neat sketches. (7½)

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BT-8/D-17 **38046**

GEOSYNTHETICS ENGINEERING

Paper–: CE-414 (E)

Time : Three Hours] [Maximum Marks : 75

Note : Attempt *five* questions in all, selecting at least *one* question from each unit. All questions carry marks.

UNIT–I

1. What are Geosynthetics? How are they classified? Discuss the application of Geosynthetics in Civil Engineering Projects. 15

2. Discuss Durability and Ageing of Geosynthetics. 15

UNIT–II

3. How are Woven geotextile and DSF Fabric manufactured? Discuss briefly. 15

4. Distinguish between Woven and Non-Woven geotextiles with the help of neat sketches. 15

UNIT–III

5. How Friction coefficient of reinforced soil is estimated? 15

6. How the Bearing capacity of soil improved with geogrids? Discuss the various modes of failure. 15

UNIT–IV

7. Discuss in detail MEDA CREEK irrigation scheme. 15

8. Describe the Case study of Lining of KAKARPAR CANAL with geosynthetics. 15

15-12-17

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BT-7/D-17 **37052**

CONCRETE TECHNOLOGY

Paper : CE-423-E

Time : Three Hours] [Maximum Marks : 75

Note : Attempt *five* questions in all, selecting at least *one* question from each Section. All questions carry equal marks.

UNIT–I

1. (a) Discuss briefly the following types of cements, their main constituents and advantages : Rapid Hardening cement, Low Heat cement, Portland Pozzolana cement, Sulphate Resistant cement and Hydro-phobic cement. 10

   (b) What do you understand by :

   (i) Deleterious materials in five aggregates and

   (ii) Quality of mixing water and curing water. 2,3

2. How is quality of concrete controlled ? Discuss briefly the various aspects of controlling the quality of ingredients. 15

UNIT–II

3. How is Young's modulus of Elasticity of concrete determined ? Discuss as to how the concrete structures can be prevented from sulphate attack. Discuss the thermal properties of concrete. 15

4. How the mixing of concrete materials and compaction of concrete carried out by internal and external vibrators ? 15

UNIT–III

5. Discuss briefly the various Non-Destructive methods of Testing concrete. 15

6. Discuss the various causes of concrete deterioration and very briefly discuss the preventive methods also. 15

UNIT–IV

7. How is distress caused in fire damaged concrete ? How can these structures repaired ? Also discuss as to how the repairs of under water structures carried out ? 15

8. (a) What is light weight concrete ? Discuss its properties and applications. 7

   (b) Discuss briefly, 'Waste material based concrete' and its Utility. 8