G 1554

B.TECH. DEGREE EXAMINATION, MAY 2016

Fourth Semester

Branch : Civil Engineering

CE 010 404—OPEN CHANNEL FLOW AND HYDRAULIC MACHINES (CE)

(New Scheme—2010 Admission onwards)

[Regular/Improvement/Supplementary]

Time : Three Hours

Maximum : 100 Marks

Part A

Answer **all** *questions.*
Each question carries 3 marks.

1. When a flow is said to be uniform ? Write the Mathematical equation for the flow.

2. Explain the method of measurement of discharge in rivers by area-velocity-method.

3. Explain the term hydraulic jump with sketch.

4. Write a note on draft tube.

5. Explain cavitation in pumps.

(5 × 3 = 15 marks)

Part B

Answer **all** *questions.*
Each question carries 5 marks.

6. Derive the condition for the test side slope of the most economical trapezoidal channel.

7. Brief backwater computation by direct step method.

8. Explain gauges and recorders for stream flow measurement.

9. Differentiate impulse and reaction turbines.

10. Sketch a centrifugal pump with main parts.

(5 × 5 = 25 marks)

Part C

Answer **all** *questions.*
Each full question carries 12 marks.

11. Find the velocity of flow and rate of flow of water through a rectangular channel of 6 m. wide and 3 m. deep, when it is running full. The channel is having bed slope as 1 in 2000. Take Chezy's constant C = 55.

Or

Turn over

12. Explain the terms :

    (a) Specific energy.

    (b) Specific force.

13. Derive the differential equation for steady gradually varied flow in open channels.

Or

14. Find the slope of the free water surface in a rectangular channel of width 20 m., having depth of flow 5 m. The discharge through the channel is 50 m³/s. The bed of the channel is having a slope of 1 in 4000. Take Chezys constant C = 60,

15. In a hydraulic jump occurring in a horizontal rectangular channel the Froude number before the jump is 10, and the energy loss in the jump is 3.2 m. (i) Estimate is sequent depth ; (ii) Discharge intensity ; (iii) Froude number after the jump.

Or

16. The depth of flow of water of a certain section of a rectangular channel of 4 m. wide, is 0.5 m. The discharge through the channel is 16 m³/s. If the hydraulic jump takes place on the downstream side, find the depth of flow after the jump.

17. Prove that the force exerted by a jet of water on a fixed semi-circular plate in the direction of the jet when the jet strikes at the centre of the semi-circular plate is two times the force exerted by the jet on a fixed vertical plate.

Or

18. Neatly sketch the hydro-electric power plant layout and discuss various efficiencies of hydraulic turbine.

19. A centrifugal pump is to discharge 0.118 m³/s at a speed of 1450 r.p.m. against a head of 25 m. The impeller has a diameter 250 mm. and its width at outlet is 50 mm. and manometric efficiency is 75 %. Determine the vane angle at the outer periphery of the impeller.

Or

20. A double acting reciprocating pump, running at 40 r.p.m. is discharging 1.0 m³ of water per minute. The jump has a stroke of 400 mm. The diameter of the piston is 200 mm. The delivery and suction head are 20 m. and 5 m. respectively. Find the slip of the pump and power required to drive the pump.

(5 × 12 = 60 marks)

B.TECH. DEGREE EXAMINATION, MAY 2016

Fourth Semester

Civil Engineering

CE 010 406—CIVIL ENGINEERING DRAWING (CE)

(New Scheme—2010 Admission onwards)

[Regular/Improvement/Supplementary]

Time : Three Hours   Maximum : 100 Marks

Select Suitable Scale for drawing indicating the same.

The select suitable data wherever needed, stating the same.

Marks will be given for neatness.

Drawing Sheet will be Supplied.

Part A

Answer any **one** *question.*

The question carries 30 marks.

1. (a) Draw the root line of the building given in figure 1. assuming, Manglore pattern tiled roofing. Draw cross section A-A, Clearly name the various members and give their approximate dimensions.

Or

  (b) Draw the plan and cross sectional elevation of an open well R.C.C. stair case to connect between two floors of 3.6 m height difference in a stair room size 6 m × 7.5 m. Assume that the building is intended for public use. Show the approximate detailing of reinforcement.

(30 marks)

Part B

Answer the following.
the question carries 70 marks.

2. (a) A 35 m × 30 m site has 12 m wide pwd road abatting the longer side. Plan a residential building in the site with proper ventilation and lighting to satisfy the following requirements.. Road is on the eastern side of plot.

Car porch : 12 to 18m2 ; Sit out : 2 to 3 m wide

Living room : 14 to 18 m^2 ; Dining : 14 to 18m^2

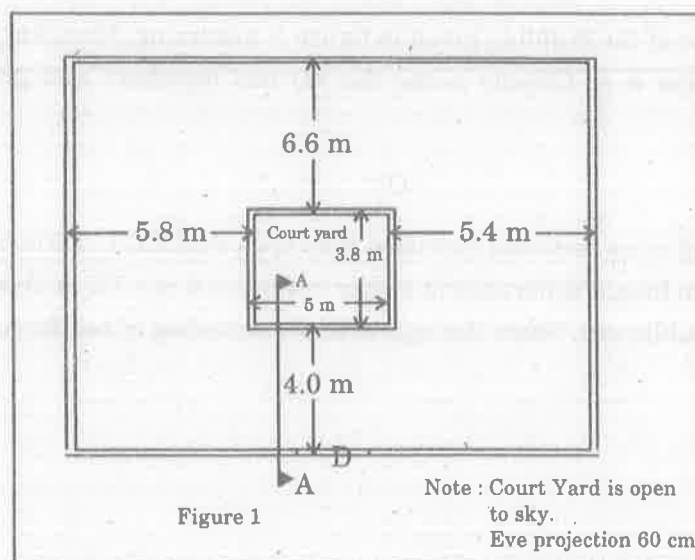Master Bed room : 12 to 15m^2, provide attached toilet.

Guest Bedroom 1 : 12 to 15m^2, provide attached toilet

Work Area 8 to 12m^2 Kitchen : 10 to 12m^2.

Servants room : 10 to 12 m^2.

Common toilet : 3.5 to 6m^2.

Draw to suitable scale (i) Detailed plan ; (ii) Cross sectional elevation ; (iii) Front elevation ; (iv) site and service plan. Also write the specifications.

6.6 m

5.8 m — Court yard — 5.4 m
3.8 m

A

5 m

4.0 m

A

D

A

Figure 1

Note : Court Yard is open to sky.
Eve projection 60 cm.

(70 marks)

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Reg. No..................................

Name..................................

B.TECH. DEGREE EXAMINATION, MAY 2016

Fourth Semester

Branch : Civil Engineering

CE 010 403—MECHANICS OF SOLIDS–II (CE)

(New Scheme—2010 Admission onwards)

[Regular/Improvement/Supplementary]

Time : Three Hours

Maximum : 100 Marks

Part A

Answer all questions.
Each question carries 3 marks.

1. State moment area theorems.

2. Explain Maxwell's Reciprocal theorem.

3. What do you mean by influence line diagram ?

4. List the different types of arches.

5. Define product of inertial.

(5 × 3 = 15 marks)

Part B

Answer all questions.
Each question carries 5 marks.

6. Determine the deflection and slope at quarter point of simply supported beam of span L subjected to u.d.l. w/m.

7. Explain the principle of virtual work for deformable bodies.

8. Draw the ILD for bending moment and shear force at any point of a simple supported beam.

9. Calculate the reactions at the crown of a circular arch of span 25 m. with a central rise 5 m. hinged at the crown and springing. It carries a point load of 100 kN at 6 m. from the left support.
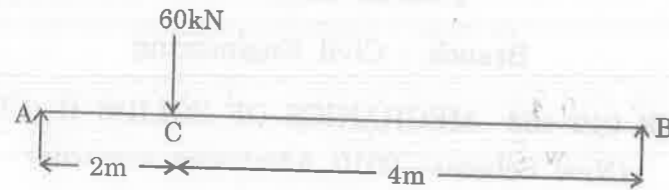
10. State and explain Mohr's theory.

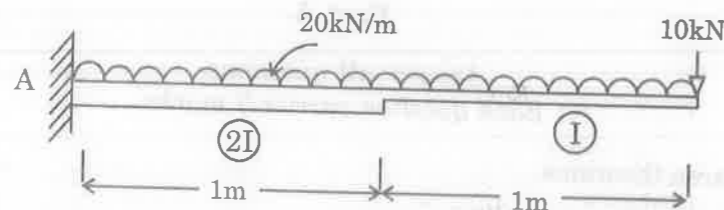(5 × 5 = 25 marks)

Turn over

Part C

Answer all questions.
Each full question carries 12 marks.

11. Determine the deflection under the concentrated load and the maximum deflection in the beam using conjugate beam method.
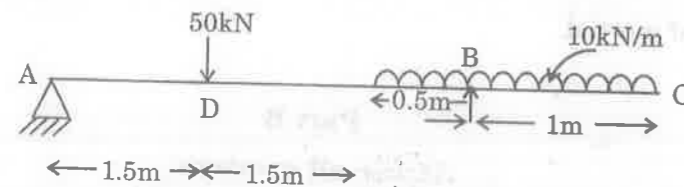

Or

12. Using conjugate beam method, determine the deflection and rotation at the free end in the beam.
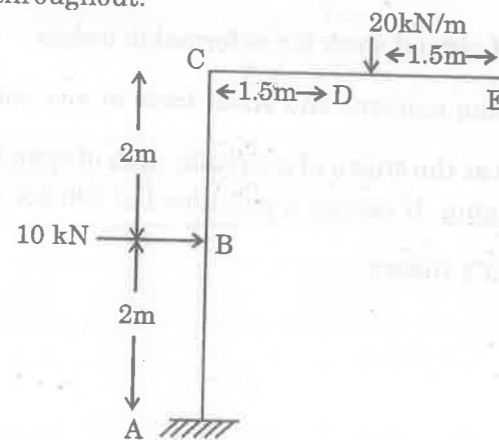

13. Determine the deflection at the free end of the overchanging beam shown in Fig. below. Assume uniform flexural rigidity.
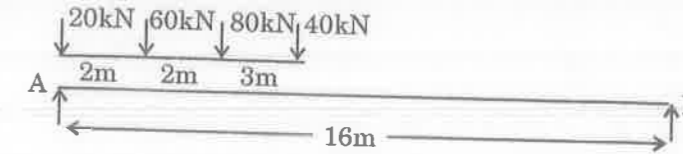

Or

14. Determine the vertical and the horizontal deflection at the free end of the bent shown in Fig. below. Assume uniform EI throughout.

15. A train of concentrated loads shown in Fig. moves from left to right on a simply supported girdes of span 16 m. Determine the absolute maximum shear force and bending moment developed in the beam.

Or

16. The system of concentrated loads shown in Fig. rolls from left to right on the girdes of span 15 m. 40 kN load leading. For a section 4 m from left support, determine (a) Maximum bending moment and (b) Maximum shear force.
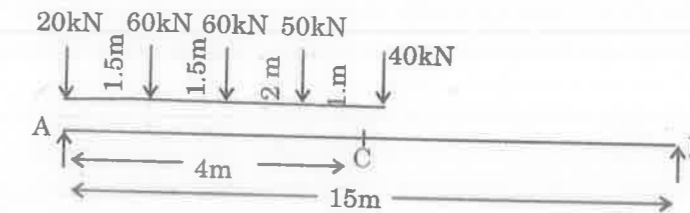
17. A symmetric three hinged parabolic arch has a urban of 30 m and a central rise of 6 m. The arch carries a distributed load of 40 kN/m. at each abutment to zero at mid-span. Determine (a) the horizontal thrust at the abutments ; (b) maximum positive bending moment in the arch.

Or

18. A suspension bridge of 120 m span has two three hinged stiffening girders supported by two cables having a central dip of 12 m. The roadway has a width of 6 m. The dead load on the bridge is 5 kN/m^2 while the live load is 10 kN/m^2 which acts on the left half of the span. Determine the shear force and bending moment in the girder at 30 m. from the left end. Find also the maximum tension in the cable for this position of live load.

19. At a certain point in a strained material the principal stresses are $1.75\,f$ (tensile), f (tensile) and $0.60\,f$ (compressive). Taking the elastic limit in pure tension as 235 N/mm^2, find the 'f' value according to failure theories. Take $1/m = 0.25$.

Or

20. A bolt is subjected to an axial pull of 18 kN and a transverse shear force of 9 kN. Find the diameter of the bolt by various theories taking the elastic limit in tension equal to 225 N/mm^2. Take Poisson's ratio = 0.25 and factor of safety = 2.

($5 \times 12 = 60$ marks)

(Pages : 3)

B.TECH. DEGREE EXAMINATION, MAY 2016

Fourth Semester

Branch : Civil Engineering

CE 010 402—CONSTRUCTION ENGINEERING AND MANAGEMENT (CE)

(New Scheme—2010 Admission onwards)

[Regular/Improvement/Supplementary]

Time : Three Hours

Maximum : 100 Marks

Part A

Answer **all** *questions.*

Each question carries 3 marks.

Write short notes on the following :

1. Segregation and bleeding.
2. Sand piling.
3. Dummy activity in a network.
4. Resource levelling.
5. Minimum Wages Act.

(5 × 3 = 15 marks)

Part B

Answer **all** *questions.*

Each question carries 5 marks.

Explain the following :—

6. Qualities of flooring materials.
7. Different pile driving equipments.
8. Total and free float.
9. Crashing and its economical impacts.
10. Industrial safety.

(5 × 5 = 25 marks)

Part C

Answer **all** *questions.*

Each question carries 12 marks.

11. What are the factors affecting workability ? Explain compaction factor with neat sketch.

Or

12. Discuss about domes and folded plates. Where they are used ? What are the construction methods used for them ? List the advantages of dames and folded plates.

Turn over

13. Explain the principles of functional planning with examples.

Or

14. With neat sketch, explain any two large scale earth moving equipments.

15. A project consists of a series of tasks labelled A, B, ... H, I with the following relationships (W < X, Y means X and Y cannot shot until W is completed X, Y < W means W cannot shot until both X and Y are completed). With this notation construct the network diagram having following constrains :

A < D, E ; B, D < F ;

C < G ; B, G < H ;

F, G < I.

Find also the minimum time of completion of the project when time (in days) not completion of each task is as follows :

Task : A B C D E F G H I
Time : 23 8 20 16 24 18 19 4 10

Find the critical path and mark it clearly. Mask, EST, EFT, LST and LFT.

Or

16. A small project is composed of seven activities whose time estimates are listed.

Activity			Estimated time duration		
i	j		Optimistic	Most likely	Pessimistic
1	2	...	1	1	7
1	3	...	1	4	7
1	4	...	2	2	8
2	5	...	1	1	1
3	5	...	2	5	14
4	6	...	2	5	8
5	6	...	3	6	15

Draw the project network.

Find expected duration and variance of each activity. What will be the probability for the project to complete no more than 4 weeks later than expected.

17. The following table gives the activities in a construction project and other relevant information. Draw activity network of the project crash the activity step by step until all paths are critical :

Activity i-j	Normal time days	Crash time days	Normal cost Rs.	Crash cost Rs.
1—2 ...	20	17	600	720
1—3 ...	25	25	200	200
2—3 ...	10	8	300	440
2—4 ...	12	6	400	700

Activity i-j	Normal time days	Crash time days	Normal cost Rs.	Crash cost Rs.
3—4 ...	5	2	300	420
4—5 ...	10	5	300	600
4—6 ...	5	3	600	900
5—7 ...	10	5	500	800
6—7 ...	8	3	400	700

Or

18. Explain in detail about resource allocation resource smoothing and resource levelling.

19. What are the constitutional directions, for the welfare of labourers of construction industry ? What are the acts supporting the welfare of labourers ? Explain any one in detail.

Or

20. Discuss about workers participation in management. What are the obstacles to the concept in the present era.

(5 × 12 = 60 marks)