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(Pages : 2)

Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2014

Eighth Semester

Branch : Civil Engineering

CE 010 803 – ENVIRONMENTAL ENGINEERING – II (CE)

(New Scheme–2010 Admissions)

[Regular]

Time : Three Hours

Maximum : 100 Marks

Part A

Answer all questions.

Each question carries 3 marks.

1. Write a short note on time of concentration and its significance.
2. Explain an oxygen sag curve with a neat sketch.
3. Write the necessity of maintaining constant velocity in grit chamber.
4. Write a short note on the factors which affect the sludge digestion and their control.
5. Discuss the merits and demerits of Imhoff tank.

(5 × 3 = 15 marks)

Part B

Answer all questions.

Each question carries 5 marks.

6. Describe conservancy and water carriage system. What are the merits and demerits of the two systems?
7. Define sewer appurtenance. List out the various sewer appurtenance used in a sewerage system.
8. What is a manhole? With a neat sketch, explain the various parts of a typical drop manhole.
9. Give the list of methods available for the treatment of sewage.
10. Write a short note on disinfection of sewage by using chlorine.

(5 × 5 = 25 marks)

Part C

Answer all questions.

Each question carries 12 marks.

11. Explain briefly about the physical, chemical and biological characteristics of sewage.

Or

Turn over

12. Determine the size of a circular sewer for a discharge of 600 lps running half full. Assume natural slope of the ground as 1 in 10000 and $n = 0.015$.
13. What do you understand by self-purification of a stream? Explain the factors affect this property.

Or

14. Under what circumstances is pumping of sewage necessary? Mention which type of pump is suitable for sewage pumping. Why?
15. With a neat sketch, explain the construction and operation of a sedimentation tank.

Or

16. Design an aerated grit chamber for treating municipal waste water with an average flow rate $0.5 \text{ m}^3/\text{s}$ (43.2 MLD). Assume peak flow rate to be 3 times the average.
17. With a neat sketch, explain the construction and working of a trickling filter.

Or

18. Sketch and explain the types of aeration systems in activated sludge process.
19. Enumerate the various methods that can be used to dispose of the digested sludge. Discuss any one of the important methods which is used in India.

Or

20. Design a septic tank for a small colony of 150 persons, provided with assured water supply from the municipal head works at 120 lpd. Assume any data you may need. Also draw a neat sketch of the septic tank designed.

(5 × 12 = 60 marks)

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Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2014

Eighth Semester

Branch : Civil Engineering

CE 010 802 – BUILDING TECHNOLOGY AND MANAGEMENT (CE)

(New Scheme–2010 Admissions)

[Regular]

Time : Three Hours

Maximum : 100 Marks

Part A

Answer all questions.

Each question carries 3 marks.

1. Explain the common faults in formwork.
2. Explain the use and application of Ferro cement.
3. Briefly explain the different types of organizational set up.
4. Explain the functions of material management.
5. How is the validity of an oral agreement established?

(5 × 3 = 15 marks)

Part B

Answer all questions.

Each question carries 5 marks.

6. Write short note on manufacturing process for structural units.
7. What is meant by Technical Planning?
8. Explain the importance of inspection and quality control in construction.
9. What is meant by inventory control Technique?
10. When one party breaches contracts, what are the remedial measures to be taken to safeguard the work?

(5 × 5 = 25 marks)

Part C

Answer all questions.

Each full question carries 12 marks.

11. Explain IS method for Mix design.

Or

Turn over

12. You are required to design a mix with given set of materials. Explain the various test conducted in laboratory and why.
13. Explain with neat sketch methods of production in prefabricated construction.

Or

14. Explain Cost time analysis in Network Planning.
15. Explain the objectives of Civil Engineering Management.

Or

16. Explain Safety laws and measures in construction.

17. Write notes on :

- (a) Item wise contract.
- (b) Lump sum contract.
- (c) Percentage contract.

Or

18. Explain the following :

- (a) Cost plus percentage contract.
- (b) Cost plus fixed fee contract.
- (c) Cost plus fluctuating fee contract.

19. Explain the various components of contract documents.

Or

20. Explain :

- (a) Security amount.
- (b) EMD.
- (c) Warranty periods.

(5 × 12 = 60 marks)

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Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2014

Eighth Semester

Branch : Civil Engineering

CE 010 805 G02 – ENVIRONMENTAL POLLUTION CONTROL TECHNIQUES (Elective IV) [CE]

(New Scheme–2010 Admissions)

[Regular]

Time : Three Hours

Maximum : 100 Marks

Part A

Answer **all** questions.

Each question carries 3 marks.

1. Define Air Pollution. List out the sources of Air pollutants.
2. Which are the measures to be taken to control water pollution?
3. What are the objectives of pretreatment of Industrial waste water?
4. Discuss about the 3R concept in solid waste management.
5. Which are the main sources of noise pollution?

(5 × 3 = 15 marks)

Part B

Answer **all** questions.

Each question carries 5 marks.

6. Classify the air pollutants and give *two* examples in each type.
7. Explain the main objectives of waste water analysis.
8. Differentiate the terms waste volume reduction and waste strength reduction.
9. Explain in detail about the collection and transport of Municipal solid waste.
10. Write a short note on various effects of noise pollution.

(5 × 5 = 25 marks)

Part C

Answer **all** questions.

Each question carries 12 marks.

11. Enumerate the various control devices for particulate contaminants and explain any *one* of them with its merits and demerits.

Or

Turn over

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General

12. Suggest suitable methods to minimize exhaust emissions in Vehicles.
13. With a flow diagram, explain the term activated sludge process. Mention its advantages and disadvantages.

Or

14. With a neat sketch, explain the working of a trickling filter.
15. What do you mean by lagooning? Explain the significance of lagooning in industrial waste treatment.

Or

16. Which are the various methods employed for the waste volume reduction? Mention its advantages.
17. What is composting? List out the various types and explain any *one* of them in detail.

Or

18. Write a short note on incineration method of solid waste disposal with its merits and demerits.
19. Differentiate the terms Sound and Noise. Discuss the methods used to control noise.

Or

20. Discuss the salient features of Environmental Protection Act.

(5 × 12 = 60 marks)

18. A cement concrete pavement 20 cm thick and 7.5 m width has a longitudinal joint along the centre line. Design the diameter, length and spacing of the tie bars, if the allowable working stress in steel is 1400 kg/cm^2 in tension, allowable bond strength of deformed bars in concrete is 24.6 kg/cm^2 and coefficient of friction is 1.2. Assume unit weight of concrete as 2400 kg/cm^3 .
19. Explain the principle and procedure of Benkelman Beam test.

Or

20. Explain with neat sketch the various types of distresses in cement concrete pavement and their causes.

(5 × 12 = 60 marks)

B.TECH. DEGREE EXAMINATION, MAY 2014

Eighth Semester

Branch : Civil Engineering

CE 010 804 L05—HIGHWAY AND AIRFIELD PAVEMENTS—Elective III (CE)

(New Scheme—Regular—2010 Admissions)

Time : Three Hours

Maximum : 100 Marks

Part A

Answer all questions.
Each question carries 3 marks.

1. Explain ESWL and the concept in the determination of equivalent wheel load.
2. Enumerate the various methods of flexible pavement design. Briefly indicate the basis of design in each case.
3. Explain the critical locations of loading as regards wheel load stresses in cement concrete pavement.
4. Explain various types of joints in rigid pavement.
5. Write short notes on Alligator cracking and Reflection cracking.

(5 × 3 = 15 marks)

Part B

Answer all questions.
Each question carries 5 marks.

6. With neat sketch enumerate the differences between Flexible pavement and Rigid pavement.
7. Explain group index method of pavement design.
8. Explain the following terms :
 - (a) Modulus of subgrade reaction.
 - (b) Radius of relative stiffness.
 - (c) Radius of resisting section.
9. Explain temperature stresses in rigid pavement.
10. Write a note on pavement evaluation.

(5 × 5 = 25 marks)

Turn over

Part C

Answer all questions.

Each question carries 12 marks.

11. What is frost action? Discuss the effect and factors on which the intensity of frost action depends? Suggest measures to prevent or reduce the adverse effects.

Or

12. Calculate the design repetitions for ten year period equivalent to 2268 kg wheel load if the mixed traffic in both directions is 1860 vehicles per day. The details of distribution of different wheel loads of commercial vehicles are given below :

Wheel load, kg	Percentage in total traffic volume
2268	25
2722	12
3175	9
3629	6
4082	4
4536	2
4990	1

13. Design a highway pavement for a wheel load of 4100 kg with a tyre pressure of 5 kg/cm² by McLeod method. The plate bearing test carried out on subgrade soil using 30 cm diameter plate yielded a pressure of 2.5 kg/cm² after 10 repetitions of load at 0.5 cm deflection.

Or

14. Soil subgrade sample was obtained from the project site and the CBR test was conducted at field density. The following were the results:

Penetration, mm	Load kg	Penetration, mm	Load kg
0.0	0.0	3.0	56.5
0.5	5.0	4.0	67.5
1.0	16.2	5.0	75.2
1.5	28.1	7.5	89.0
2.0	40.0	10.0	99.5
2.5	48.5	12.5	106.5

The different pavement materials available near the construction site are as follows :

- Compacted sandy soil with CBR value = 10%
- Poorly graded gravel with CBR value = 20%
- Well graded gravel with CBR value = 95 %
- Minimum thickness of bituminous concrete surfacing may be taken as 5 cm. The traffic survey revealed the present ADT of commercial vehicles as 1100. The annual rate of growth of traffic is found to be 8 percent. The pavement construction is to be completed in 2 years after the last count.

Design the pavement section by CBR method as recommended by IRC, using all the four pavement materials.

15. Calculate the warping stresses at interior, edge and corner for a concrete pavement of thickness 20 cm with transverse joints at 4.5 m spacing. The width of slab is 3.5 m. For concrete $E = 3 \times 10^5 \text{ kg/cm}^2$ and $\mu = 0.15$, K value for subgrade = 5 kg/cm³. Temperature differential is 0.9 C per cm. Assume thermal coefficient for concrete as $10 \times 10^{-6} \text{ per}^\circ \text{C}$.

Or

16. Calculate the stresses at interior, edge and corner regions of a cement concrete pavement using Westergaard's stress equations. Use the following data:

Wheel load, P = 5100 kg

$E = 3.0 \times 10^5 \text{ kg/cm}^2$

Pavement thickness, $h = 18 \text{ cm}$

Poisson's ratio for concrete = 0.15

Modulus of subgrade reaction $K = 6 \text{ kg/cm}^2$

Radius of contact area, $a = 15 \text{ cm}$.

17. A concrete pavement of thickness 20 cm is constructed over a granular sub-base having modulus of reaction 30 kg/cm². The maximum temperature difference between the top and bottom of the slab during summer day and night is found to be 16° C. The spacing between the transverse contraction joint is 4.5 m and that between longitudinal joint is 3.5 m. The design wheel load is 5100 kg, radius of contact area is 15 cm, E value of CC is $3 \times 10^5 \text{ kg/cm}^2$, Poisson's ratio is 0.15, and the coefficient of thermal expansion of CC $10 \times 10^{-6} \text{ per}^\circ \text{C}$ and friction coefficient is 1.5. Using the edge and corner load stress charts given by the IRC and the chart for the warping stress coefficient, find the worst combination of stresses at edge.

Or

Turn over

B.TECH. DEGREE EXAMINATION, MAY 2014**Eighth Semester**

Branch : Civil Engineering

CE 010 801 – ADVANCED STRUCTURAL DESIGN (CE)

(New Scheme–2010 Admissions)

[Regular]

Time : Three Hours

Maximum : 100 Marks

Part A

Answer all questions.

Each question carries 3 marks.

1. Write a note on impact factor of bridge.
2. What are the characteristics of folded plates?
3. What are the elements of an industrial building?
4. What are the loads on a gantry girder?
5. Write the classification of steel bridges.

(5 × 3 = 15 marks)

Part B

Answer all questions.

Each question carries 5 marks.

6. Write a short note on IRC class A loading.
7. What is membrane theory of shells?
8. Write briefly about the loads on roof truss.
9. Explain the elements of a plate girder with a neat sketch.
10. What you mean by a plate girder bridge? Write the advantage of providing bracing in plate Girder Bridge.

(5 × 5 = 25 marks)

Part C

Answer all questions.

Each question carries 12 marks.

11. Design a box culvert using the following data. Width of carriage way = 7.5 m, foot path on either side is 0.6 m width, span = 3 m, height of the vent = 3 m. Use M-25 concrete and Fe-415 steel.

Or

Turn over

12. Design the interior slab panel of a T-beam slab bridge, 2.5 m wide between the two main T-beams and 3 m long between the cross girders. Carriage way width is 7 m and kerbs of 500 mm wide are provided. Use IRC Class A loading. Adopt M25 concrete and Fe415 steel bars. Sketch the reinforcement details.
13. Design a simply supported cylindrical shell roof with the following details. Radius of the shell is 8 m and span is 20 m and the thickness of the shell is 80 mm. Take live load of 2 KN/m². Use M-25 concrete and Fe-415 steel. Sketch the details.

Or

14. Design a reinforced concrete shell with a circular directrix with the following dimensions. Distance between the traverse is 20 m, Radius of shell is 6 m, and thickness of shell is 60 mm and semi central angle is 60°. L.L is 100 N/mm². Use M-20 concrete and Fe-415 steel
15. Design a fink type roof truss for an industrial building given the following data. Overall length is 48 m, overall width is 16.5 m, width of c/c of roof columns is 16 m, height of column is 11 m, and roofing material is asbestos cement sheets.

Or

16. The trusses for a factory building are spaced at 6 m c/c and the purlin is spaced at 2 m c/c. The pitch of the truss is 28° and the span of the truss is 18 m. The roof consists of asbestos sheets with weight 15 kN/m². Design (a) Suitable I-section purlin and (b) Angle section purlin and properly sketch the connections with ACC sheets to purlin.
17. Design a gantry girder to be used in an industrial building carrying an electric overhead travelling crane for the following data :

Crane capacity – 200 kN

Self weight of the crane girder excluding trolley – 200 kN

Self weight of the trolley, electric motor, hook, etc. – 40 kN

Approximate minimum approach of the crane hook to the gantry girder – 1.20 m

Wheel base – 3.5 m

C/C distance between gantry rails – 16 m.

C/C distance between columns (span of gantry girder) – 8 m.

Self-weight of rail section – 300 N/m.

Yield stress of steel – 250 N/mm².

Or

18. Design a plate girder, 20 m span, to be provided in a hall of a restaurant. The superimposed, exclusive self weight is 100 kN/m². Design the web splice at one-third of span and flange splice at one-fourth of the span.

19. The effective span of a deck type plate girder highway bridge is 27 m. The width of carriage way is 7.5 m with 1.5 m wide foot paths on either side. The 3 main girders are spaced at 3.5 m c/c. The cross girders are provided at 4 m c/c. The deck slab is 200 mm thick RCC. The bridge has to design for IRS class A Loading.

Or

20. A deck type plate girder railway bridge is to be constructed for a broad gauge single line track on the main line. The following data is available.

Effective span – 20 m.

C/C distance between plate girders – 2 m.

Dead load on each girder – 800 N/m.

Dead load of track with sleepers – 6800 N/m.

Lateral load – 9000 N/m.

Design the super structure of the bridge.

(5 × 12 = 60 marks)