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320731(20)

B. E. (Seventh Semester) Examination, Nov.-Dec. 2021

(New Scheme)

(Civil Engg. Branch)

STRUCTURAL ENGINEERING DESIGN-III

Time Allowed : Four hours

Maximum Marks : 80

Minimum Pass Marks : 28

*Note : Attempt all questions. Part (a) is compulsory in each question. Attempt any **one** part from part (b) & (c) for question having 14 marks. Use IS 800 : 2007 & Steel Table permitted. Assume suitable data and draw neat sketch wherever required. Right side digit indicates marks.*

Unit-I

1. (a) What is tension field action in plate girders?   2

    (b) Design a welded plate girder of span 24 m to carry superimposed load of 35 kN/m. Avoid use of

bearing and intermediate stiffness. The girder is laterally restrained. Use steel of grade Fe 410 and assume yield stress of steel to be 250 MPa.   14

(c) Design a welded plate girder 24 m in span and laterally restrained throughout. It has to support a uniform load of 100 kN/m throughout the span exclusive of self-weight. Design the girder for intermediate transverse stiffners. The steel for the flange and web plates is of grade Fe 410. Yield stress of steel may be assumed to be 250 MPa irrespective of the thickness of plates used. Connections need not be designed. Design the cross section, the end load bearing stiffener. Use post-critical method for the design.   14

Unit-II

2. (a) What is need of using equivalent uniform moment factor in the design of beam-columns?   2

(b) Check the adequacy of a beam-column ISHB 450 @ 855·4 N/m for the factored loads as shown in Fig. (a). The column is part of a non-sway frame with bottom end hinged. The effective length of the

member is 3·5 m about both the axes. Steel is of grade Fe 410.   14
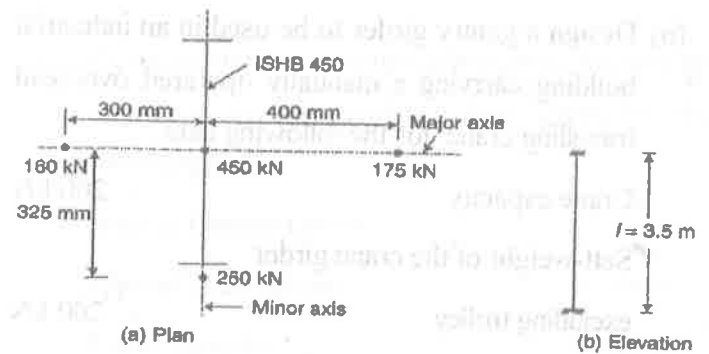

(a) Plan   (b) Elevation

Fig. (a)

(c) Design an I-section truss member for the following data.

Effective length of the member : $L = 3.5$ m

Factored axial tension : $T = 450$ kN

Factored moment at the two ends of the member about strong axis :

$M_z = 35$ kNm and 20 kNm, respectively,

Steel of grade : Fe 410   14

Unit-III

3. (a) Differentiate between surge load and drag load as applied to gantry girders carrying cranes.   2

    (b) Design a gantry girder to be used in an industrial building carrying a manually operated 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, Electronic motor, hook, etc.	– 40 kN
Approximiate 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
Diameter of crane wheels	– 150 mm

Steel is of grade Fe 410. Design also the field welded connection if required.

The support bracket connection need not be designed.   14

    (c) Design a simply supported gantry girder to carry an electric overhead travelling crane, given for the following data :   14

Span of Gantry Girder	– 6·5 m
Span of crane girder	– 16 m
Crane capacity	– 40 kN
Self-Weight of Crane Girder Excluding Trolly	– 200 kN
Self-Weight of Trolly	– 50 kN
Minimum Hook approach	– 1·0 m
Distance Between Rail	– 3·5 m
Self-Weight of Rail	– 0·3 m

Unit-IV

4. (a) Explain flexible, rigid or semi-rigid connection.   2

(b) Design a seat connection for a factored beam end reaction of 110 kN. The beam section is ISMB 250 @ 365·9 N/m connected to the flange of column section ISHB 200 @ 365·9 N/m using bolted connections. Steel is of grade Fe-410 and bolts of grade 4·6.   14

(c) Design an un-stiffened welded seat connection for a beam ISMB 250 @ 365·9 N/m transmitting an end reaction of 110 kN, due to the factored loads, to the flange of column ISHB 200 @ 365·9 N/m. The seat angle is welded to the column flange in work-shop.   14

Unit-V

5. (a) What are secondary stresses in roof trusses?   2

   (b) Design the principal tie member of a fink type roof truss for the following data. Design also its connection with a 12 mm thick gusset plate using 20 mm diameter bolts of grade 4·6. Use steel of grade Fe 410.   14

   Design tensile force 150 kN   (due to D.L. and L.L.)

   Design compressive force 40 kN   (due to D.L. and W.L.

(c) Design a strut in a roof truss for the following data :   14

Length of the strut	= 2·235 m
Factored compressive force	= 50 kN
	(due to D.L. and L.L.)
Factored tensile force	= 17·80 kN
	(due to D.L. and W.L.)
Grade of steel	= Fe 410
Grade of bolts	= 4·6
Bolt diameter	= 20 mm

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320732(20)

B. E. (Seventh Semester) Examination, Nov.-Dec. 2021

(New Scheme)

(Civil Engg. Branch)

WATER RESOURCES ENGINEERING-I

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

*Note : Attempt all questions. Part (a) of each question is compulsory. Attempt any **two** parts from (b) (c) and (d). Part (a) carry 2 marks & rest of carries 7 marks.*

Unit-I

1. (a) Define base period and crop period.   2

(b) Describe the advantages and disadvantages of irrigation. 7

(c) Describe the different types of irrigation with their suitability. 7

(d) A water course has a culturable commanded area of 1200 hectares. The intensity of irrigation for crop A is 40% and for B is 35%, both the crops being Rabi crops. Crop A has kor period of 20 days and crop B has kor period of 15 days. Calculate the discharge of the water course if the kor depth for crop A is 10 cm and for B it is 16 cm. 7

Unit-II

2. (a) Define intensity of Irrigation. 2

(b) Draw a neat sketch of network of canals. Also describe the location of a particular type to suit the requirements. 7

(c) Write short notes on any **two** of the following : 7

(i) Garret's diagrams

(ii) Canal on alluvial soil

(iii) Maintenance of irrigation channels

(d) Design a regime channel for a discharge of 50 cumecs and silt factor 1·1, using Lacey's theory. 7

Unit-III

3. (a) Define water logging. 2

(b) Describe the remedial measures taken against water logging. 7

(c) Explain the terms-canal outlets and modular outlets through neatly drawn sketches. 7

(d) Design a concrete lined channel to carry a discharge of 50 cumecs at a bed slope of 0·025 per cent. The side slopes of channel are 40° with the vertical. The values of Manning's N may be taken as 0·018. 7

Unit-IV

4. (a) Define meandering of a river. 2

(b) Describe in brief various methods of flood control. 7

(c) Explain the following by with the help of neat sketches : 7

(i) Groynes

(ii) Guide Banks

(d) Write short notes on any **two** of the following :   7

    (i) National policy of floods

    (ii) Economics of flood control

    (iii) Flood forecasting

Unit-V

5. (a) Define trap efficiency.   2

   (b) Draw a neat sketch to depict various zones of a reservoir and also explain it.   7

   (c) Explain the procedure for estimating the safe yield of a reservoir.   7

   (d) Write shot notes on any **two** of the following :   7

    (i) Reservoir capacity from mass curve

    (ii) Soil conservation

    (iii) Storage zones of reservoirs

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320733(20)

B. E. (Seventh Semester) Examination, Nov.-Dec. 2021

(New Scheme)

(Civil Engg. Branch)

ENVIRONMENTAL ENGINEERING-II

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note : Attempt part (a) of all questions (2 marks).
*Attempt any **two** out of **three** from part-'b'.*
[(2+2×7)×5=80 marks]

Unit-I

1. (a) Define the term self cleansing velocity. Write and explain each term in the stokes equation with their

appropriate design values for circular concrete sewers?

(b) A populations of 36,000 is residing in a town having an area of 62 hectares. If the average coefficient of runoff for this area is 0·6 and the time of concentration of the design rain is 30 minutes, calculate the discharge for which sewers of a proposed combined system will be designed?

(c) Derive the hydraulic elements of a circular sewer.

(d) A 50 cm diameter sewer is to discharge 0·07 cumecs at a velocity as self-cleansing as a sewer flowing full at 0·85 m/sec. Find the depth and velocity of flow and the required slope. Take uniform value of N = 0·015.

Unit-II

2. (a) Draw BOD curve for a domestic waste water sample and list various segments on it.

(b) Explain the purpose of the grit chamber. What is the logic that governs its design? Determine the dimensions (length × width × depth) and detention

time for a grit chamber for a maximum waste water flow of 8000 m³/day to remove particles having average settling velocity of 0·02 m/sec for a constant flow through velocity of 0·3 m/sec maintained by provision of proportional flow weir.

(c) Explain the type-II settling adopted for the design of primary settling tank. Describe the settling column test to determine the relevant data for the design of the PST.

(d) Explain the treatment mechanism in a septic tank and soak pit with sketches. What are the precautions that should be taken while constructing the septic tank to ensure its efficiency?

Unit-III

3. (a) Define MCRT. List factors affecting slugde digestion.

(b) Write notes on the following : (with neat labeled diagrams)

(i) Activated Sludge Process

(ii) Oxidation ditch

(iii) Facultative Lagoon

(c) Design the activated sludge unit treatment with following data for a town of population of 65,000.

(c) A single stage filter is designed for an organic loading of 15,000 kg of BOD in raw sewage per hectare meter per day with a recirculation ratio of 1·8. This filter treats a flow of 8 MLD of raw sewage with a BOD of 320 mg/L. Using NRC model, determines the strength of the effluent.

Unit-IV

4. (a) Show the flow diagram of "Algal-bacterial Symbiosis"?

(b) A town disposes sewage by land treatment. It has a sewage farm of area 350 hectares. The area includes an extra provision of 50% for rest and rotation. The population is 62,000 and water supply rate is 130 lpcd. If 70% of water is converted into sewage, determine the consuming capacity of the land?

(c) A sewage containing 200 mg/L of suspended solids is passed through primary settling tanks, trickling

filters and secondary sedimentation tanks. How much gas will pro2bably be produced in the digestion of sludge from two million litre of sewage?

(d) Why there is need to adopt effluent standards for waste water disposal in surface water bodies? Why these standards differ for disposal into a public sewer? What are stream standards?

Unit-V

5. (a) Give a general idea about the per capita per day quantity of solid waste generated in India and some western countries.

(b) Explain the solid waste management methods like land filling and pyrolysis.

(c) Explain the 4R's of SWM in detail.

(d) Explain the term "Composting". Give the different type of composting in use, and describe any one with the aid of sketch.

320734(20)

B. E. (Seventh Semester) Examination, Nov.-Dec. 2021

(New Scheme)

(Civil Engg. Branch)

QUANTITY SURVEYING and COST EVALUATION

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note : *Attempt all questions. Part (a) from each question is compulsory. Attempt any two parts from part (b), (c) and (d) of each question.*

Unit-I

1. (a) Write the units of following :   2

    (i) Glazing,

    (ii) Supply of Bricks,

   (iii) Stone masonrywork,

   (iv) Brick work in foundation

                                                 7

(b) Explain following :

   (i)   Supplementry Estimate

   (ii) Plinth Area method of building estimate

   (iii) Muster Roll

(c) Prepare a preliminary estimate of a building project with a total plinth area of all buildings of 1500 sq.m Given that.   7

   (i)   Plinth area rate –₹ 950·00 per sq.m.

   (ii)   Extra for special architectural treatment–2% of the Building Cost.

   (iii) Extra for water supply and sanitary installation– 5% of Building Cost.

   (iv) Extra for Internal Electrical Installation–12% of the Building Cost.

   (v)   Extra for Services– 6% of the Building Cost

   (vi) Contingencies–3%

   (vii) Supervision charges–7%

Or

Prepare a preliminary estimate of a double storeyed building having carpet area of 1,800 sq.m. It may be asssumed that 30% of the built up area will be taken by corridors, stairs, varandhas etc. and 10% of the built up area by walls.

Given plinth area rate is 15,000 Rs/m². Extra for water supply and sanitation is 5% of building cost, Extra due to deep foundation at site is 1% of building cost. Internal electrical installation is 12% of building cost and contingencies is 3%.

Unit-II

2. (a) Explain Lead and Lift.   2

    (b) What type of data is required for Detailed Estimate? 7

    (c) Estimate the following item of works for given plan of Builing as per given cross-section of wall and foundation by long wall-short wall method. 7

       (i)   Earth work in excavation in foundation

       (ii)   Concrete in foundation

       (iii) Brick work in plinth and foundation

       (iv) Brick work in superstructure
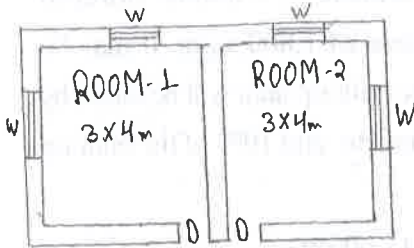
their :- Wall thickness - 30cm

Door "D" - 2.1X1.2m
Window "W" - 1.2X1.2m

Or

A road embankment is 20 m wide with side slope 2 : 1. The ground is level in transverse directinis to the centre line. Calculate volume contained in the length of 350 m. The central height at 5 m initervals being 2, 3·5, 3·0, 4·0, 3·0, 3·5 and 4·0 m respectively.   7

Unit-III

3. (a) Define Rate Analysis.   2

   (b) Write detailed specification of R. C. C. Work.   7

   Or

   Write detailed specification of Ist class brick work in Super Structure.   7

(c) Work out the quantity of materials required for 100 sq. mtr. of 2 cm thick cement/concrete 1 : 3 : 6.   7

Or

Analyze the rate of brick work for brick masonry in superstructure for 1 cubic meter by using Ist class brick and 1 : 3 cement Mortar.

Unit-IV

4. (a) Explain Lump sum contract.   2

   (b) Write short notes on : (any **three**)   7

   (i)   Labour Contract

   (ii) Negotiated tender

   (iii) Earnest money

   (iv) Global tender

   (v)   Liquidated Damages

   (c) What do you understand by termination of contract? What are the criteria for termination of contract?   7

   Or

   Explain the essential requirement of valid contract.

Unit-V

5. (a) Define Book Value.   2

(b) Write short notes on : (any **three**)   7

   (i)   Salvage Value

   (ii) Market value

   (iii) Sinking Fund

   (iv) Depreciation

   (v)   Free holds

Or

What are the objects of valuation of properties?

(c) A leasehold property is to produce a net annual income of ₹ 12,000 for the next 30 years. The owner expects a return of 8% on his capital and also sets apart a sinking fund installment to accumulate at 6% annually to replace the capital. Determine the value of the property.   7

Or

A new building having six equal flats is constructed at a cost ₹ 30,00,000/- on a plot of land costing ₹ 10,00,000/-. The owner expects 12% return on the construction cost and 8% return on cost of Land. Calculate the standard rent for each flat of the building. Considering the following data :

   (i)   Future life of the building be 70 years

   (ii) Interest on sinking fund be 6%

   (iii) Scrap value 10%

   (iv) Other outgoing at 30% of net return from the building (sinking fund co-efficient for 70 yrs. @ 6% = 0·0010)

   (v)   Annaul repairs at 1% of the cost construction.

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320744(20)

B. E. (Seventh Semester) Examination, Nov.-Dec. 2021

(New Scheme)

(Civil Engg. Branch)

CONSTRUCTION EQUIPMENTS and TECHNIQUES

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note : Attempt all questions. All questions carry equal marks. Part (a) is compulsory is of 2 marks. Attempt any two from (b), (c) and (d) carrying (7) marks each.

Unit-I

1. (a) Define mass diagram.   2

(b) Give difference between grader & scrapers. Explain with neat sketches. 7

(c) Give short notes : 7

    (i) Pile driving equipment

    (ii) Hauling equipment

(d) Explain the types of conveyors. 7

Unit-II

2. (a) What are the stages involved in aggregate production? 2

(b) Explain various types of clushers in brief. 7

(c) Give short notes : 7

    (i) Concrete pumps

    (ii) Ready mix concrete

(d) Give short notes : 7

    (i) Feeders

    (ii) Screening equipments

Unit-III

3. (a) Define sheet piles. 2

(b) Write short note on Caission sinking. 7

(c) Explain the process of glouting. 7

(d) Describe tunnelling techniques. Classify tunnel in brief. 7

Unit-IV

4. (a) Define Sub structure. 2

(b) Describe in detail the process of vacuum dewatering of concrete floors. 7

(c) Describe technique of high rise buildings. 7

(d) Give short notes on : 7

    (i) Operation of offshore system

    (ii) Paving technology

Unit-V

5. (a) What is Screw Anchors? 2

(b) Describe Mud Jacking Process. 7

(c) Give short notes on : 7

    (i) Modern sequence in demolition and dismentalling

    (ii) Water proofing

(d) Explain pipeline conveyors used in pipeline laying construction. 7

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B. E. (Seventh Semester) Examination, Nov.-Dec. 2021

(New Scheme)

TRANSPORTATION PLANING and MANAGEMENT

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note : *Attempt all questions. Each question carrying equal marks. Part (a) of every question is compulsory. Answer any **two** bits from (b), (c) and (d) from the remaining question..*

Unit-I

1. (a) Enumerate basic two transportation problems in India. 2

    (b) Give a brief account on the principle of Transport Planning.   7

(c) What are the goal and objectives of comprehensive transportation planning? Enumerate.   7

(d) Give short notes :   7

   (i) Regional transportation plans

   (ii) Process of urban transport planning

Unit-II

2. (a) What do you understand by the term trip?   2

   (b) Give a brief account on Trip classification.   7

   (c) Give short notes on multiple regression Analysis.   7

   (d) What is Category Analysis? Explain.   7

Unit-III

3. (a) What is Trip Distribution?   2

   (b) Give short notes :   7

   (i) Uniform factor method

   (ii) Average factor method

   (c) What do you understand by elementary gravity model?   7

(d) Give a brief account on limitations of growth factor method.   7

Unit-IV

4. (a) What is diversion curves?   2

   (b) Give a brief account on bionomial and Multinominal logic model.   7

   (c) Give a brief account on multiple 2-route Assignment. 7

   (d) What is model specification? Explain.   7

Unit-V

5. (a) Name Transport facility for elderly population.   2

   (b) Give a brief account on need and benefits of transport project.   7

   (c) Explain benefit cost ratio method.   7

   (d) Explain in brief internal rate of Return method.   7

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B. E. (Seventh Semester) Examination, Nov.-Dec. 2021

(New Scheme)

(Civil Engg. Branch)

TRAFFIC ENGINEERING

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note : *Part (a) from each question is compulsory.*
*Attempt any **two** parts from (b), (c) and (d)*
of each question.

Unit-I

1. (a) What is PCU?   2

(b) Give a brief note on the working and functioning of a Traffic Engineer.   7

(c) Discuss the issues associated with mix traffic on Indian loads and suggest the measures to meet the problem.   7

(d) What is 3 e's of traffic engineering?   7

Unit-II

2. (a) Define spot speed.   2

(b) What are the methods available for traffic count? Give a brief note on it.   7

(c) Explain various types of parking with neat sketch.   7

(d) What is origin and destination studies?   7

Unit-III

3. (a) What is traffic island?   2

(b) Give a brief on different types of traffic signs with examples.   7

(c) Explain various design features responsible for street lighting.   7

(d) Give short notes on :   7
   (i) Islands and Marking
   (ii) Traffic control aids

Unit-IV

4. (a) Define the concept of providing highway lighting.   2

(b) Explain how accident analysis will be carried out.   7

(c) Define and discuss road safety audit.   7

(d) What are application and usages of collecting an accidental data?   7

Unit-V

5. (a) Define noise pollution.   2

(b) Give a brief note on environmental impact assessment.   7

(c) What are the measure for collecting air pollution from traffic.   7

(d) Give a brief note on arboriculture.   7

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B. E. (Seventh Semester) Examination, Nov.-Dec. 2021

(New Scheme)

(Mech., Mechatronics Engg. Branch)

PRODUCT DESIGN & DEVELOPMENT

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

*Note : Attempt all questions. Part (a) of each question is compulsory. Attempt any **two** parts from the rest of **three** parts (b), (c) and (d) in each question.*

Unit-I

1. (a) Define Product Design.   2

   (b) Explain the various product development process phase.   7

(c) Explain the role of Ergonomics in product Design.   7

(d) Write a short note on process of selecting product architecture.   7

Unit-II

2. (a) Define Value Engineering.   2

(b) Define Morphological Chart and explain how is it performed with suitable diagram.   7

(c) Explain the template for house of quality.   7

(d) What are the parameter over which the design strategy for product development process is decided?   7

Unit-III

3. (a) What are the different types of Prototypes?   2

(b) Explain how graphics concept can be used in design & packing (packaging) consumer products.   7

(c) Explain the principle of prototyping.   7

(d) How is the analysis of manufacturing cost performed?   7

Unit-IV

4. (a) What is meant by Ergonomic Needs?   2

(b) Describe the steps involved in industrial design process.   7

(c) What is the need of management of technology and how is it done?   7

(d) Explain the role of oesthetics in product design.   7

Unit-V

5. (a) Define Copyright.   2

(b) Explain the significance of Intellectual Property Right.   7

(c) Explain the design structure matrix with suitable example.   7

(d) What are the various remedies available to accelerate the delayed projects?   7