

7E1712	Roll No. _____	[Total No. of Pages : 3]
	7E1712	
	B.Tech. VII - Sem. (Main/Back) Examination, January - 2023	
	Civil Engg.	
7CE4-01 : Transportation Engineering		

Time : 3 Hours

Maximum Marks : 120

Min. Passing Marks : 42

Instructions to Candidates:

Attempt all Ten questions From Part A, Five Questions out of seven from Part B and four questions out of five from Part C .

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No.205)

PART - A

(Answer should be given up to 25 words only)

All questions are compulsory.

(10×2=20)

1. How economic activity and transportation are related to each - other ? discuss.(2)
2. Write about scope of transportation Engineering. (2)
3. What is the difference between National Highways and State Highways? (2)
4. What are the basic requirements of an ideal alignment between two terminal stations? (2)
5. What are the objects of Highway geometric design? (2)
6. What is the use of fly-ash/pond-ash as highway materials? (2)
7. Give definition of flexible and rigid pavements as per IRC. (2)
8. What do you understand by Berms and Shoulders? (2)
9. What do you understand by Rail Fastenings? (2)
10. Define terminal area in construction of Airport. (2)

PART - B

(Analytical/Problem solving questions)

Attempt any Five questions.

(5×8=40)

1. Give difference between Macadam method and Telford method, also draw typical cross-section for Macadam and Telford's construction. (8)
2. Write short notes on following: (8)
 - a) Nagpur Road plan
 - b) Star and Grid pattern
 - c) Indian Road Congress
 - d) PMGSY project.
3. a) Give difference between stopping sight distance and overtaking sight distance. (4)
b) Calculate the value of :
 - i) Head light sight distance.
 - ii) Intermediate sight distance for a highway with a design speed of 65 km ph. Assume suitably all the data required. (4)
4. Give the name of various test carried out on Bitumen. Explain ductility test on Bitumen with the help of neat diagram. (8)
5. a) Write advantages and disadvantages of Bituminous Roads and Concrete Roads. (4)
b) What are the specifications of compaction of different layers of bituminous roads? (4)
6. a) Define the rails. Explain types of Rails with the help of diagram. (4)
b) Write about types and selection of Gauges in Railway construction with specifications. (4)
7. a) Write about factors affecting selection of site for Airport. (4)
b) Define harbour. Explain component of harbours with the help of neat diagram. (4)

PART - C

(Descriptive/Analytical/Problem Solving/Design Questions)

Attempt any Four questions.

(4×15=60)

1. a) Define super elevation and what are the objectives of super elevation. Discuss the factors on which the amount of super elevation to be provided depends. (7)
b) Calculate the length of transition curve and the shift using following data:
 - i) Design speed = 80 km ph and radius of circular curve is 300 metre. Allowable rate of introduction of super - elevation is 1 in 150.
 - ii) Pavement width including extra widening = 7.5 metre. (8)

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2. a) What do you understand by quality assurance in Highway Construction? Explain. (5)
b) What are the various methods of flexible pavement design? Explain group index of pavement design. What are the limitation of this method? (10)
 3. a) Explain the desirable properties of aggregate. (5)
b) Explain the test principle and procedure of CBR Test. Draw sketches showing standard details of CBR penetration test. (10)
 4. a) Calculate the extra width of pavement required on a horizontal curve of radius 700 meter on a two lane highways, the design speed being 80 km ph. Assume wheel base = 6 meter. (8)
b) Explain briefly the construction of earth roads, discuss the advantages and limitations of earth roads. (7)
 5. Write short notes on followings:-
 - i) Permanent ways in Railway.
 - ii) Function of Sleepers.
 - iii) Airport Size.
 - iv) Runway Length
 - v) Ports and Docks. (15)
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7E1713	Roll No. _____	[Total No. of Pages : 2]
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	B.Tech. VII - Sem. (Main/Back) Examination, January - 2023 Open Elective - I 7CE6-60.1 : Environmental Impact Analysis	

Time : 3 Hours

Maximum Marks : 120

Min. Passing Marks : 42

Instructions to Candidates:

Attempt all ten questions from Part A, five questions out of Seven from Part B and Four questions out of Five from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No.205)

PART - A

(Answer should be given up to 25 words only)

ALL questions are compulsory.

(10×2=20)

1. What is the outcome of the course? (2)
2. Describe the concept of ecosystem imbalances. (2)
3. What is E.I.A? (2)
4. Explain the preliminary assessment method of E.I.A. (2)
5. What are the effects of noise on people? (2)
6. Describe the Land pollution. (2)
7. What is the water quality criteria? (2)
8. Describe the air quality criteria. (2)
9. How the economic profile of community is affected through development projects? (2)
10. What are the different barriers of noise? (2)

PART - B

(Analytical/Problem solving questions)

Attempt any Five questions.

(5×8=40)

1. Explain in brief the effect of human activity on Environment. (8)
2. Discuss the industrial policy of Government of India. (8)
3. Describe the aim of Stockholm and Basal convention. (8)
4. Describe the following : (4×2=8)
 - a. E.I.S.
 - b. E.M.P.
 - c. Rio - Earth summit.
 - d. Guidelines of MoEF.
5. Describe the impact of environment on water quality of development projects. (8)
6. Discuss the air quality impact on industry transport systems. (8)
7. Describe the environmental impact on thermal and nuclear power plants. (8)

PART - C

(Descriptive/Analytical/Problem Solving/Design questions)

Attempt any Four questions.

(4×15=60)

1. Describe the different methodologies for Environmental impact assessment. (15)
 2. Explain the noise scales and rating methods? How can you estimate the noise impacts on transportation? (15)
 3. How the environmental impact can be assessed on cultural and socio environment? (15)
 4. What are the different energy impact of environment assessment? Describe the EIA of hydropower power plants. (15)
 5. What is the need of public participation in environmental decision making? How the public participation can be increased? (15)
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7E1714	Roll No. _____	Total No. of Pages : 2
	7E1714	
	B.Tech. VII sem. (Main / Back) Examination, January - 2023	
	Open Elective - I	
7CE6-60.2 Disaster Management		

Time : 3 Hours

Maximum Marks : 120

Min. Passing Marks : 42

Instructions to Candidates:

Attempt All TEN questions from Part A, five questions out of Seven from Part B and Four questions out of Five from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205).

PART - A

(Answer should be given up to 25 words only)

All questions are compulsory

(10×2=20)

1. Write down the objectives of disaster Management.
2. Write down causes of road accidents.
3. What is risk Management?
4. What is natural disaster?
5. What is Man made disaster?
6. Write down characteristics of natural hazards.
7. What is the role of mass media in disaster Management?
8. Enumerate steps for formulating risk reduction plan.
9. Write down legislative support at state levels.
10. Write down safety management norms in disaster Management.

PART - B

(Analytical/Problem solving questions)

Attempt any Five questions

(5×8=40)

1. Describe various causes of flood disaster and preventive measures for flood disaster.
2. Write down various steps for formulating disaster risk reduction plan.
3. Write short notes on risk Management.

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4. Describe various precautions to be taken during earthquake.
 5. Explain Response time, Frequency and forewarning levels of different Hazards.
 6. Discuss Industrial Disaster.
 7. Explain with neat sketch Disaster Management cycle.

PART - C

(Descriptive/Analytical/Problem Solving/Design questions)

Attempt any **Four** questions

(4×15=60)

1. Describe various policies framed in India to prevent disaster.
 2. Explain the Industrial Safety plan.
 3. Explain various factors for building collapse and remedies to prevent building collapse.
 4. Explain different types of survival kits available during nuclear disaster.
 5. Describe various strategies for disaster Management planning.
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7E1710	Roll No. _____	[Total No. of Pages : 2]
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	B.Tech. VII - Sem. (Main/Back) Examination, January - 2023 Open Elective - I 7AG6-60.1 : Human Engineering and Safety	

Time : 3 Hours

Maximum Marks : 120

Min. Passing Marks : 42

Instructions to Candidates:

Attempt all Ten questions, from Part A, Five question out of Seven from Part B and Four questions out of Five from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No.205)

PART - A

(Answer should be given up to 25 words only)

All questions are compulsory.

(10× 2=20)

1. Write the scope of this course.
2. Define the concept of system development.
3. What do you mean by human performance?
4. Define visual displays.
5. Describe the energy measurement.
6. Define the term "noise".
7. Describe Anthropometry.
8. How Vibration can be controlled?
9. Differentiate noise and vibration.
10. Define dangerous machine.

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PART - B

(Analytical/Problem solving questions)

Attempt any Five questions.

(5×8=40)

1. Describe the basic processes of system development.
2. Explain the information input process in system development.
3. Describe the direct and indirect methods of energy measurement.
4. How the noise can be measured and discuss the factors to control the noise?
5. Describe the heat exchange process in Anthropometry.
6. Characterize the dangerous machine and explain the dangerous machine act.
7. Explain the process of rehabilitation and compensation to accident victims.

PART - C

(Descriptive/Analytical/Problem Solving/Design questions)

Attempt any four questions.

(4×15=60)

1. What are the safety gadgets for spraying and threshing?
 2. Explain the Chaff cutting and tractor and trailer operation.
 3. Define the following: (i) Energy cost of different activities (ii) Acceptable work load
 4. Explain the performance reliability
 5. Discuss the major types of displays and uses for the display.
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7E7062

B.Tech. VII - Sem. (Back) Examination, January - 2023

Civil Engineering

7CE2A : Design of Steel Structures - I

Time : 3 Hours

Maximum Marks : 80

Min. Passing Marks : 26

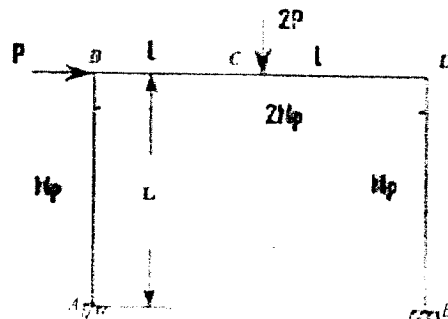
Instructions to Candidates:

Attempt any five questions, selecting one question from each unit. All questions carry equal marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/ calculated must be stated clearly)

Use of following supporting material is permitted during examination. (Mentioned in form No.205)

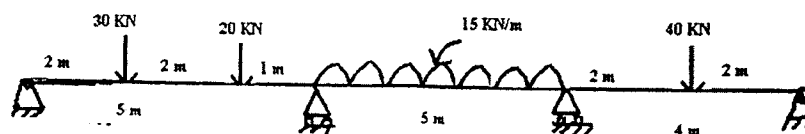
UNIT - I

1. a) State statical and kinematical theorems for plastic analysis. (4)
- b) Compute the value of true collapse load for the portal frame loaded as shown in fig. Below: (12)



(OR)

1. a) Find out the shape factor of a triangular section. (4)
- b) A continuous beam ABCD is loaded as shown in fig. below taking load factor as 1.8, Determine the value of M_p for which it may be designed for uniform section. (12)

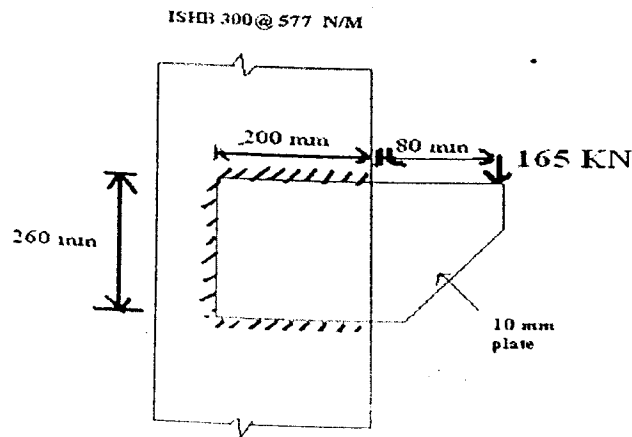


UNIT - II

2. a) What is prying action? How it is accounted for? (4)
- b) An ISA 100x100x10 mm angle is to be weld in shop to 12 mm gusseted plate. The Angle carries a Factored pull of 300KN applied along its centroidal axis. Determine the length of size of fillet weld required at the heel and toe of the angle. (12)

(OR)

2. a) A bracket plate is welded to the flanges of a column section ISHB 300@577 N/m as shown in fig. below. If the width of weld is 200mm, depth 260mm and eccentricity from the face of column is 80 mm. determine the size of weld to support a factored load of 165 KN. (8)



- b) Design a single angle section for a tension member to carry a factored axial load of 225 kN. Use 20mm dia. Shop bolts with $f_{ub} = 400 \text{ N/mm}^2$. Draw the neat sketch of the joint. (8)

UNIT - III

3. a) Differentiate between lacings and battens design of section. (4)
- b) Write down the design steps of compression member with suitable diagram including Apply all necessary checks. (12)

(OR)

3. a) Write a short note on imperfection factor. (4)
- b) A built up column is to be designed for an axial factored load of 1400 kN. Taking two ISLB or ISMB Sections, placed side by side, design the column if it is 4.0 m in length. The column is hinged at top and fixed at bottom. Also design a system of battens for the column. (12)

UNIT - IV

4. a) Write a short note on lateral torsional buckling. (4)
- b) Design a laterally restrained beam to carry a uniformly distributed load of 20KN/m. The beam is Unsupported for a length of 3.5m and is simply placed on longitudinal beams at its ends. (12)

(OR)

4. a) Differentiate between Web Crippling and Web buckling. (4)
- b) Design a suitable section for a beam to carry a superimposed UDL of 40 KN/m over a simply Supported span of 5m. The compression flange of the beam is laterally Supported. Apply all necessary checks. (12)

UNIT - V

5. A steel Column ISHB400@759.3 N/m is subjected to a factored axial load of 1600 KN. Design a slab base Plate for the column. Assume that the bearing surfaces of the column and base plate machined. Use M-20 Grade of concrete footing. (16)

(OR)

5. Design a grillage foundation for a column ISHB450@87.2 Kg/m carrying a factored axial load of 2000 KN. The allowable bearing pressure on soil is 160 KN/m². The base Plate has 800mm × 700mm whose larger Dimension is placed parallel to the web of I-section. (16)

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7E7063

B.Tech. VII - Sem. (Back) Examination, January - 2023

Civil Engineering

7CE3A Design of Concrete Structures - II

Time : 3 Hours

Maximum Marks : 80

Min. Passing Marks : 26

Instructions to Candidates:

Attempt any five questions, selecting one question from each unit. All questions carry equal marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly).

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

UNIT - I

1. a. What is the difference between pre - tensioning and post tensioning. (4)
- b. Describe the various losses in pre - stressing. (12)

(OR)

1. a. Write a short note on Freyssinet System. (6)
- b. Determine the loss of prestress due to creep in concrete in a beam 200mm×400mm, prestressed by a force of 500 kN by steel cables placed at an eccentricity of 500 mm. Take M 45 concrete, creep coefficient = 2. (10)

UNIT - II

2. a. Write a note on redistribution of bending moments in beam. (4)
- b. Design a rectangular beam having cross - section of 300×600 mm. Beam is subjected to moment (M_u) = 60 kN-m, shear force V_u =50kN and torsional moment T_u =30kN-m. Take concrete grade of M20 and steel grade of Fe415. (12)

(OR)

2. A curved beam is in the form of a full continuous circle in plan with a radius of 4m and is supported continuously on six supports. The beam carries a U.d.l of 3kN/m length, inclusive of its own weight. Determine the bending moment, twisting moment and shear force at salient locations and plot B.M. T.M, and S.F diagrams. (16)

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- i. Inside diameter of room = 10 m
- ii. Rise of dome = 3m.
- iii. Live load due to wind, ice, snow etc = 1.5 kN/m^2 .

(OR)

- ## UNIT - IV

- (OR)**

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- Diagram of a T-shaped cross-section with the following dimensions:
- Base width: 1 m
 - Base height: 0.4 m
 - Stem width: 0.4 m
 - Stem height: 5.4 m
 - Top flange width: 2 m
 - Top flange height: 0.6 m
 - Total height: 6 m

(OR)

- (2)

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7E7064**B.Tech. VII Sem. (Back) Examination, January - 2023****Civil Engineering****7CE4A Transportation Engineering - II****Time : 3 Hours****Maximum Marks : 80****Min. Passing Marks : 26****Instructions to Candidates:**

Attempt any five questions, selecting one question from each unit. All questions carry equal marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination.

(Mentioned in form No. 205).

UNIT - I

1. a. Describe the requirements for an ideal permanent way. Also sketch the neat diagram of permanent way. (8)
- b. Discuss different types of rail section used on B.G. and M.G. in India. Mention the relative merits and demerits of any two of them. (8)

(OR)

1. a. A B.G. track has a sleeper density on (M+6). If the track is laid with welded rails of 26 metre length, find out the number of sleepers on rail length. (8)
- b. What are the functions of ballast in railway track? Also discuss the requirement of good qualities of the ballast. (8)

UNIT - II

2. a. What do you understand by crossing? Explain different types of crossing with the help of neat sketches. (8)
- b. What are the components of design of a turnout. Explain different methods of design of turn out. (8)

(OR)

2. a. Distinguish between elevated and underground railway systems. Also enumerate the factors that favour the selection of one over the other. (8)
- b. Explain the principles of interlocking. Describe various mechanical devices used for it. (8)

UNIT - III

3. a. What are the objects of providing transition curve? Explain briefly the essential requirements of an ideal transition curve. (8)
- b. Explain the terms 'Super elevation' and 'Cant deficiency' in brief. Also write the limits of Super elevation and Cant deficiency for Indian Railway. (8)

(OR)

3. a. What are the different components of geometric design of a railway track? Explain the necessity of providing the gradient in the track. Also explain ruling gradient and pusher gradient. (12)
- b. What do you mean by 'Heel Divergence'? (4)

UNIT - IV

4. a. What do you understand by zoning? and also explain it's types and factors considered while framing zoning laws. (10)
- b. Write short notes on :
- i. Hanger and Apron.
 - ii. Turnaround Taxiways.
 - iii. Imaginary Surface. (6)

(OR)

4. a. What are the various factors affecting the necessary size of an airport? (8)
- b. What is the importance of wind direction in the runway design? Explain the wind rose diagramme in order to ascertain the orientation of runway. (8)

UNIT - V

5. a. Enlist various types of flexible pavement failures. (8)
- b. Describe the CBR method of designing the flexible pavements. (8)

(OR)

5. a. What are the various factors to be considered in airport pavement design? Discuss the significance of each. (8)
- b. What are the main factors responsible for failures in rigid pavements? (8)

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7E7065

B.Tech. VII sem(Back) Examination, January- 2023

Civil Engineering

7CE5A Application of Numerical Methods in Civil Engineering

Time : 3 Hours

Maximum Marks : 80

Min. Passing Marks : 26

Instructions to Candidates:

Attempt any Five questions, selecting One question from each unit. All questions carry equal marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly

Use of following supporting material is permitted during examination. (Mentioned in form No.205)

UNIT -I

1. a) Convert $(0.4140625)_{10}$ to the corresponding binary fraction. (8)
b) Express the roots by employing a Taylor series expansion. Now compute taking only 2 terms of the Taylor series and estimate the corresponding relative error. (8)

(OR)

1. a) Give four examples where the behaviour of physical systems is described by mathematical models. (8)
b) What is meant by absolute and relative errors? Find out the absolute and relative errors, where the actual and measured values are 252.14 mm and 249.02 mm. (8)

UNIT - II

2. a) Find a real root of the equation $x^4 + 2x^3 - x - 1 = 0$ by Bisection method correct upto two decimal places. (8)
b) Using Newton-Raphson method, find root of the equation $x^2 + 4\sin x = 0$ (8)

(OR)

2. a) Find root of the equation $x^2 \sin x - e^x = 0$ by Regula Falsi method. (8)
b) Using successive iteration method, find root of the equation $2x = \cos x + 3$ correct to three places of decimals. (8)

UNIT - III

3. a) Determine the value of k such that the rank of matrix A is 3, where (8)

$$A = \begin{bmatrix} 1 & 1 & -1 & 0 \\ 4 & 4 & -3 & 1 \\ k & 2 & 2 & 2 \\ 9 & 9 & k & 3 \end{bmatrix}$$

- b) Use Gauss elimination to solve (8)

$$27x + 6y - z = 85$$

$$6x + 15y + 2z = 72$$

$$x + y + 54z = 110$$

(OR)

3. Solve the system of equation. (16)

$$\begin{bmatrix} 1 & 2 & 3 \\ 2 & 8 & 22 \\ 3 & 22 & 82 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 5 \\ 6 \\ -10 \end{bmatrix}$$

Using the Cholesky method. Also determine A^{-1} .

UNIT - IV

4. a) Solve the following system of equations using LU Decomposition method: (12)

$$x + y + z = 1$$

$$4x + 3y - z = 6$$

$$3x + 5y + 3z = 4$$

- b) Write applications of system of equations in civil engineering. (4)

(OR)

4. Using Gauss Seidal iterative method solve the following system of equations: (16)

$$4x - y - z = 3$$

$$-2x + 6y + z = 9$$

$$-x + y + 7z = -6$$

UNIT - V

5. a) Demonstrate Newton-Gregory forward formula to find interpolation polynomial, which passes through the points $(1, -1)(2, -1)(3, 1)$ and $(4, 5)$. Hence, compute y when $x = 1.5$ (8)
- b) Using Lagrange's interpolation formula find the cubic polynomial, which holds the following values. (8)

x	0	1	2	3
$f(x)$	1	2	1	10

Hence or otherwise evaluate $f(4)$.

(OR)

5. a) The location of an object and its velocity were measured at different times as shown in the table below. (8)

$t(s)$	Distance (m)	Velocity(m/s)
1	1	3.5
2	12	22

Use Hermite interpolation to approximate the distance as a cubic polynomials in time.

- b) Applying the theory of least square method, fit a second degree parabola to the following data: (8)

x	0	1	2	3	4
y	1	5	10	22	38