



8th Semester End Term Examination: 2021-22.

Subject : Application of Numerical Method In Civil Engineering
Course : B.TECH [CIVIL]
Roll No:
Full Marks : 70
Time : 3 Hours.

Instructions to the Candidates:

- Read the question paper very carefully.
- Start writing from 2nd page onwards; Don't Write On The 1st Page Backside.
- Question Paper is divided into Three Parts -A, B & C.
- Part-A is containing 12 multiple choice questions.
- Part- B containing SIX questions out of which FOUR questions are to be answered.
- Part C containing FOUR questions out of which TWO questions are to be answered.
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PART - A

Multiple Choice Questions

[12x1=12]

1. Which of the following is not a method of Numerical Integration?
 - a. Trapezoidal Rule
 - b. Simpson's One-Third Rule
 - c. Simpson's Three-eighth Rule
 - d. Newton's Backward Difference Method
2. The process of constructing a sequence of vectors and obtaining the solution of a system using specified accuracy is called _____.
 - a. Elimination
 - b. Iteration
 - c. Reduction
 - d. Raphson method
3. The rounded off value to the two digits of decimal for 3.145 is:
 - a. 3.15
 - b. 3.1
 - c. 3.14
 - d. 3.0
4. The round off value to the two digits of decimal for 7.235 is:
 - a. 7.23
 - b. 7.25
 - c. 7.24
 - d. 7.20

5. Significant figure in 235900 are:

- a. 2
- b. 5
- c. 0.5
- d. 0.3

6. In the function $\int_{-1}^1 \frac{1}{1+x^2} dx$, value of h for 8 intervals will be-

- a. 0
- b. 0.25
- c. 0.5
- d. 0.3

7. In Gauss Jordan method which of the following transformations are allowed?

- a. Diagonal transformation
- b. Row transformation
- c. Column transformation
- d. Square transformation

8. In Simpson's 1/3 rule, curve $y=f(x)$ is considered to be a

- a. Hyperbola
- b. Circle
- c. Parabola
- d. Straight line

9. Which of the following method is employed for solving the system of linear equations?

- a. Runge Kutta
- b. Gauss Seidal
- c. Newton Raphson
- d. Simpson's Rule

10. The number of significant digits in the number 204.020050 is

- a. 5
- b. 8
- c. 6
- d. 9

11. When $\Delta f(x) = f(x+h) - f(x)$, then constant $k=?$

- a. $f(x+k) - f(x)$
- b. 0
- c. $f(k) - f(0)$
- d. 1

12. How many significant digits does the floating-point number 0.03140×10^3 have?

- a. 6
- b. 4
- c. 5
- d. 3

PART - B

Answer any FOUR out of SIX

[4x7=28]

1. Using Lagrange's Formula, find the polynomial for the given data:

x	0	1	3
y	5	6	50

2. Using Newton's divided difference formula, find $f(6)$ from the following data:

x	1	2	7	8
y	1	5	5	4

3. Use Newton's backward difference formula to construct an interpolating polynomial of degree 3 for the data:

$f(-0.75) = -0.07181250,$
 $f(-0.5) = -0.024750,$
 $f(-0.25) = 0.33493750,$
 $f(0) = 1.10100$

Hence, find $f\left(-\frac{1}{3}\right)$

- 4. Solve by using iteration method: $2x - \log_{10}x - 7 = 0$
- 5. Find $f'(10)$ from the following data using Newton's divided difference formula-

x	3	5	11	27	34
f(x)	-13	23	899	17315	35606

6. The velocity 'v' of a particle at a distance 's' from a point on its path is given by the table below:

s	0	10	20	30	40	50	60
v	47	58	64	65	61	52	38

Estimate the time taken to travel 60m by Simpson's One-Third Rule.

PART-C

Answer any TWO out of FOUR

[2x15=30]

1. Determine the first two derivatives at $x = 1.1$ for the following data using Newton's backward difference method:

x	1.0	1.1	1.2	1.3	1.4	1.5	1.6
y	7.989	8.403	8.781	9.129	9.451	9.750	10.031

2. Solve the following equations using Gauss Jordan Method:

$10x + y + z = 12$
 $2x + 10y + z = 13$
 $x + y + 5z = 7$

3. Obtain cubic spline polynomial which best fits with the following data given that $y_0'' = y_3'' = 0$

x	-1	0	1	2
y	-1	1	3	35

4. Solve the following system of equation using Cramer's Rule:

$x + 2y + 3z = -5$
 $3x + y - 3z = 4$
 $-3x + 4y + 7z = -7$



ARKAJAIN
University
Jharkhand

8th Semester End Term Examination: 2021-22.

Subject : Environmental Impact Assessment Roll No:

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PART - A

Multiple Choice Questions

[12x1=12]

1. The practice of preparing EIA for a project was first initiated on _____ in the _____.
a) 1st January 1970, US
b) 1st January 1994, USA
c) 27th January 1994, India
d) 27th January 1970, USSR
2. The main cause of acid rain is
a) soil pollution
b) air pollution
c) water pollution
d) all of the above
3. According to India's Environmental Impact Assessment Notification, 2006, all projects which need Environmental Clearance from regulatory authorities have been divided into _____ categories-
a) 2
b) 3
c) 4
d) 1

12. Category B of India's Environmental Impact Assessment Notification, 1994 includes _____ number of projects. These need Environmental Clearance when project cost exceeds _____.
- 1, Rs 5 crores
 - 1, Rs 5 crores
 - 5, Rs 1 crores
 - 5, Rs 5 crores

PART - B

Answer any FOUR out of SIX

[4x7=28]

1. What are the different zones in which Atmosphere is sub-divided into?
2. What do you mean by EIA?
3. What do you understand by Cost-Benefit Analysis?
4. Define Development. What is the significance of Developmental projects?
5. Discuss the stages in Environmental Clearance Process for New Projects.
6. What are the general details that an EIA report should contain?

PART-C

Answer any TWO out of FOUR

[2x15=30]

1. State the most dreaded adverse impacts of UV radiations.
2. How does Acid Rain occur? State the effects of Acid Rain.
3. What do you understand by 'Environmental Management Plan'? Name the steps that an EIA essentially involves.
4. Discuss the role of an Environmental Engineer or Consulting Firm in Obtaining Environmental Clearance for a Project.

4. The pH of normal rainwater is
 - Basic
 - Alkaline
 - Acidic
 - Neutral
5. The pH below which the precipitation is regarded as acid rain is
 - 6
 - 5.6
 - 7
 - 7.3

6. Screening is done for -
 - Both Category A and Category B projects
 - Only Category A projects
 - Only Category B projects
 - None

7. Category B of India's Environmental Impact Assessment Notification, 1994 includes _____ number of projects. These need Environmental Clearance when project cost exceeds _____.
 - 16, Rs 50 crores
 - 25, Rs 5 crores
 - 15, Compulsory
 - 50 crores

8. Which of the following is not a Greenhouse gas?
 - Ozone
 - N₂O
 - CO₂
 - SO₂

9. The number of projects included under India's Environmental Impact Assessment Notification, 1994 are -
 - 28
 - 39
 - 25
 - 32

10. Global warming is caused by -
 - Methane
 - Nitrogen Dioxide
 - Greenhouse gases
 - Hydrogen

11. The Ministry of Environment and Forests (MoEF), Government of India issued its first notification governing the need of submission of Environmental Impact Assessment (EIA) with Environmental Management Plan (EMP) for specified developmental projects for clearance, before execution on -
 - 1st January 1970
 - 1st January 1994
 - 27th January 1994
 - 27th January 1970



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University
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Subject : Pre Stress Concrete Design

Roll No:

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PART - A

Multiple Choice Questions

[12x1=12]

1. The soffit of the beam after the transfer of pre stress to concrete will be under
a. Bondage
b. Compression
c. Breakage
d. Tension
2. The concrete members which are pre stressed by providing the tensioned tendons are termed as _____
a. Linear pre stressed members
b. Circular pre stressed members
c. Pre tensioning members
d. Internally prestressed members
3. The maximum permissible stresses are mainly governed by _____
a. Principle stresses
b. Compressive stresses
c. Ultimate stress
d. Tensile stresses
4. Which system of prestressing is widely used in India?
a. Gifford-Udall
b. Magnel-Balton
c. Lee-mccall
d. Freyssinet

5. In post tensioning, the concrete units are cast by _____
 a. Ducts
 b. Anchorages
 c. Jacks
 d. Wedge
6. In pre stressed concrete _____?
 a. Forces of tension and compression change but lever arm remains unchanged
 b. Forces of tension and compressions remain unchanged but lever arm changes with the moment
 c. Both forces of tension and compression as well as lever arm change
 d. Both forces of tension and compression as well as lever arm remain unchanged
7. Select the incorrect statement ____?
 a. The loss of pre stress is more in pre-tensioning system than in post-tensioning system
 b. Pre-tensioning system has greater certainty about its durability
 c. For heavy loads and large spans in buildings or bridges, post-tensioning system is cheaper than pre-tensioning system
 d. none of the above
8. Shrinkage of concrete depends upon _____?
 1. Humidity of atmosphere
 2. Passage of time
 3. Stress
 4. None
 The correct answer is?
 a. And (2)
 b. only (3)
 c. (2)and (3)
 d. All (1), (2)and (3)
9. The loss in pre stress in pre-tensioning system is primarily due to
 a. elastic deformation of concrete and cable slippage
 b. creep and elastic deformation
 c. shrinkage and creep
 d. shrinkage and deformation
10. Loss of stress due to relaxation of steel is influenced by
 a. elastic deformation of concrete
 b. Anchorage slip
 c. Friction
 d. Initial stress in steel
11. As per Indian standard code of practice for prestressed concrete (IS:1343-1980) the minimum grades of concrete to be used for post-tensioned and pre-tensioned structural elements are respectively
 a. M20 for both
 b. m15and M20
 c. M40 and M30
 d. M30 and M40
12. Which of the following losses of prestress occurs only in pre-tensioning and not inpost-tensioning
 a. elastic shortening of concrete
 b. loss due to friction
 c. shrinkage of concrete
 d. creep of concrete

PART - B

Answer any FOUR out of SIX

[4x7=28]

1. What are the devices used for tensioning? Write the application of post tensioning?
2. What are the advantages and disadvantages of pre stressed concrete design.
3. Explain the various methods of achieving continuity in pre stressed concrete members.
4. A PSC beam of size 300x700 mm is used for a simply supported span of 8m and subjected to a total load (including self-weight) of 35KN/m. Show the profile of a load balancing cable and find out the equation of the cable also. Pre stressing load is 1500KN.
5. A rectangular beam 150mmx300mm is pre stressed by pre stressing load 225 KN with eccentricity 50mm throughout the beam supports a udl of 7.2 KN/m including self-weight. Span of beam is 5m. If modulus of rupture is 5N/mm². Calculate load factor against cracking.
6. What is Load Balancing concept in pre stressing concrete? Discuss with neat sketch.

PART-C

Answer any TWO out of FOUR

[2x15=30]

1. A concrete beam simply supported at both ends with a rectangular section 300x600mm is pre stressed by post tension cable of 500mm² each. The cables are located as constant eccentricity of 100mm span=8m. Cable are stressed to 1600MPa. Calculate maximum deflection of beam when it carries an imposed load of 20KN/m. Allow 20% loss of pre stress. $E_c = 30000\text{MPa}$ $E_s = 2 \times 10^5 \text{MPa}$. Neglect effect of shrinkage & creep.
2. A simply supported post tensioned beam 300x600mm with span of 15m and pre stressing load of 1150KN. At ends eccentricity=0 at end and eccentricity=200mm at mid span (parabolic). Determine the losses due to friction at center of beam. If $K_f = 0.15$ per 100m and $\mu = 0.35$.
3. Described the loss of pre stress in pre stressed concrete structure
4. Write short notes on-
 - a) Anchorage
 - b) Relaxation of steel
 - c) Pressure line
 - d) Cable line
 - e) Cracking moment