

Total No. of Questions:

Total No. of Pages: 02

Roll No. _____

B.Tech IV sem (Main/Back) Exam April-May 2026

Agricultural Engg.

4AG2-01 Advance Engineering Mathematics-II

Paper Code : 4E1313

AG, CE, MI

Time: 3 Hours

Maximum Marks: 70

Attempt all ten questions from Part A, five questions out of seven questions from Part B and three questions out of five questions 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)

1. _____ 2. _____

Part A (Answer should be given up to 25 words only)

All questions are compulsory

- Q.1 If n persons sit around a table, find the probability that two specified persons not to be sit together.
- Q.2 State Baye's Theorem.
- Q.3 Define discrete random variable.
- Q.4 If random variable X and Y have the joint probability density function given by

$$f(x, y) = \frac{1}{2}x^3y, \quad 0 \leq x \leq 2, \quad 0 \leq y \leq 1$$

determine whether X and Y are independent.

- Q.5 If $Mo(t)$ denoting moment generating function about origin and $Ma(t)$ denoting moment generating function about 'a' then prove that

$$Ma(t) = e^{at} Mo(t)$$

- Q.6 State Chebyshev's inequality.
- Q.7 Define Variance.
- Q.8 Write formula for rank correlation coefficient.
- Q.9 State principle of least squares.
- Q.10 Define null hypothesis.

10 x 2 = 20

Part B (Analytical/Problem solving questions)

Attempt any Five questions

- Q.1 A bag contains $(2n+1)$ coins. It is known that n of these coins have a head on both sides, whereas the remaining $(n+1)$ coins are fair. A coin is picked up from the bag at random and tossed. Find the probability of getting head.
- Q.2 The joint probability mass function of (X, Y) is given by $P(X=x, Y=y) = K(2x+3y)$, $X=0, 1, 2$, $Y=1, 2, 3$. Find K , Marginal probability distributions of X and Y . Also find conditional probability distribution of X for $Y=1$.
- Q.3 If the random variable X assume the value r with probability mass function $P(X=r) = q^{r-1}p$, $r=1, 2, 3, \dots$. Find moments generating function and hence find mean and variance.

Q.4 For a Normal distribution $N(\mu, \sigma)$ prove that Mean=Mode=Median.

Q.5 Obtain the coefficient of rank correlation for the following data :

x:	68	64	75	50	64	80	75	40	55	64
y:	62	58	68	45	81	60	68	48	50	74

Q.6 Find the best fit of line from following data :

x:	20	60	100	140	180	220	260	300	340	380
y:	0.18	0.37	0.35	0.78	0.56	0.75	1.18	1.36	1.17	1.65

Q.7 In a sample of 1000 people, 540 are rice eaters and the rest are wheat eaters. Can we assume that both rice and wheat are equally popular at 1% level of significance? Given critical value at 1% level of significance for two tailed test is 2.58. 5x 4 = 20

Part C (Descriptive/Analytical/Problem Solving/Design question)

Attempt any three questions

Q.1 If a computer Centre owner want to purchase 3 Computers from a sale in which there are 3 new Computers, 4 used but still working and 5 defective but can be brought in working condition after minor repair. If X and Y denote new and used but still working Computers in the lot of used but still working computers in the lot of 3 purchased computers. Find :

- The joint probability mass function of X and Y .
- The marginal probability of X and Y .
- The conditional probability of X given $Y=1$.

Q.2 a) A bag contains a coin of value M and a number of other coins whose aggregate value is m . A person draws coins one by one till the coin of value M is drawn. Find the value of his expectation.

b) The first four moments of a distribution about the value 5 of a variate are 2, 20, 40 and 50. Find mean, variance, β_1 and β_2 . comment upon the nature of the distribution.

Q.3 a) The sum of mean and variance of binomial distribution is 15 and sum of their squares is 117. Determine the distribution.

b) Determine first four moments about origin of Poisson's distribution.

Q.4 Explain the method of least squares for fitting of a second degree parabola and use it to fit a parabola to the following data :

x:	1	1.5	2	2.5	3	3.5	4.0
y:	1.1	1.3	1.6	2.6	2.7	3.4	4.1

Q.5 a) Obtain the lines of Regression for given data :

x:	1	2	3	4	5	6	7	8	9
y:	9	8	10	12	11	13	14	16	15

b) Random Samples of 400 men and 600 women were asked whether they would like to have fly over near their residence. 200 men and 325 women were in favour of the proposal. Test the hypothesis that proportions of men and women in favour of the proposal, are same against. That they are not, at 5% level. Given at 5% level of significance the significant value is 1.96. 3 x 10 = 30

Total No. of Questions : 22

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Roll No. _____

B.Tech IV sem (Main/Back) Exam April-May 2026

Aeronautical Engg.

4AN1-02 Technical Communication

Paper Code : 4E1303

All Branches

Time: 3 Hours

Maximum Marks: 70

Attempt all ten questions from Part A, five questions out of seven questions from Part B and three questions out of five questions 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)

1. _____

2. _____

Part A (Answer should be given up to 25 words only)

All questions are compulsory

T-435

- Q.1 What is Ideation in the process of Technical communication ?
- Q.2 What do you mean by Linguistic Competence ?
- Q.3 What is SQ3R Reading Technique ? Who developed this technique ?
- Q.4 Name any four graphic aids generally used in technical document ?
- Q.5 How will you ensure maximum engagement and share while preparing the online content ?
- Q.6 Define technical discourse.
- Q.7 What do you mean by the term Minutes of Meeting ?
- Q.8 What is Topicalising in the process of note making?
- Q.9 What does the term 'BCC' mean in the heading of an email ?
- Q.10 What is the main purpose of report writing?

10 x 2 = 20

Part B (Analytical/Problem solving questions)

Attempt any Five questions

- Q.1 What are the aspects of effective technical communication ?
- Q.2 How does active reading differ from passive reading ?
- Q.3 Reading is a complex communication process of receiving and interpreting the written word Elaborate.
- Q.4 What are the factors which affect the information and document design?
- Q.5 Correct the following sentences :
 - (i) Neither of the boys are selected for the final
 - (ii) The people of South India loves their tradition and follows them whole-heartedly.
 - (iii) Sartia is more better than Hari in playing chess.
 - (iv) What a terrible night it is ?

- Q.6 What are the main steps that are involved in summarizing technical texts ?
Q.7 What do you mean by the term Methodology in technical articles ?

5 x 4 = 20

Part C(Descriptive/Analytical/Problem Solving/Design question)

Attempt any three questions

T-435

- Q.1 Write short notes on following :
i. Literature survey and data collection.
ii. Difference between report and a Proposal.
iii. Strategies for reading technical text.
iv. Internal and External Proposals.
- Q.2 Assume yourself as Shashwat Sharma, a B. Tech. student from MNIT Jaipur. Write an email message to Mr. Ayush Bhatia personnel manager of NTPC Power Management Institute at Noida, U.P. requesting him to allow you to do summer training there as a part of your academic assignments.
- Q.3 Suppose you want to avail a study loan from State Bank of India. Write a letter to the Chief Manager, SBI branch of your locality requesting him/her to send you all the information related to the loan.
- Q.4 What are the types of Technical Report ? Mention the structure of a format Report ?
- Q.5 What is the importance of Technical communication in engineering? How can clear, concise and accurate documentation contribute to the success of engineering projects?

3 x 10 = 30

Total No. of Questions : 22

Total No. of Pages : 02

Roll No. _____

B.Tech IV sem (Main/Back) Exam April-May 2026

Aeronautical Engg.

4AN1-03 Managerial Economics & Financial Accounting

Paper Code : 4E1302

All Branches

Time: 3 Hours

Maximum Marks: 70

Attempt all ten questions from Part A, five questions out of seven questions from Part B and three questions out of five questions 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)

1. _____

2. _____

Part A (Answer should be given up to 25 words only)

All questions are compulsory

T-435

Q. 1 Define Managerial Economics.

Q.2 What is the meaning of demand ?

Q.3 Define monopoly?

Q.4 What is the meaning of Cash Flow analysis?

Q.5 What is the meaning of Oligopoly?

Q.6 Define Financial statement analysis ?

T-435

Q.7 Define opportunity cost ?

Q.8 What is the meaning of survey method ?

Q.9 What is payback Period ?

Q.10 Define Managerial Economics.

10 x 2 = 20

Part B (Analytical/Problem solving questions)

Attempt any Five questions

Q.1 Discuss the importance of Managerial Economics in decision making.

Q.2 Define 'Demand' and explain the factors that influence the demand of product.

Q.3 Calculate the BEP in units and rupees using the following details :

- Selling price per unit Rs. 100
- Variable cost per unit Rs. 60
- Fixed cost Rs. 20,000
- Actual sales Rs. 2,00,000

Q.4 Discuss the various concept of National income- Gross National products, Net National Product, Personal income and dispensable Income.

Q.5 Define Balance Sheet ? Give two characteristics of Balance Sheet ?

Q.6 Distinguish between Monopolistic competition and Perfect Competition ?

Q.7 You are required to calculate.

- i) Margin of Safety
- ii) Total sales
- iii) Variable cost from the following figures
 - Fixed costs Rs. 12, 000
 - Profit Rs. 1,000
 - Break-Even Sales Rs. 60,000

5 x 4 = 20

Part C(Descriptive/Analytical/Problem Solving/Design question)

Attempt any three questions

Q.1 Define **Ratio Analysis**. Explain the importance of Liquidity and Profitability ratio for a firm.

Q.2 How the price and output is determined under the perfect competition during the short period ?

Q.3 Explain the concept of Market Equilibrium the context of Demand and Supply. Discuss how changes in demand and supply affect equilibrium price and quantity. Use diagrams to illustrate your answer.

Q.4 Calculate the Net present value (NPV) of the two projects X and Y. Suggest which of the two projects should be accepted assuming a discount rate of 10%.

Item	Project -A	Project-B
Initial Investment	Rs. 80,000	Rs. 1,20,000
Life Period	5 years	5 years
Scrap Value	Rs. 4,000	Rs.8000
(Annual Cash Inflows)	(CFAT)	(CFAT)
Year : 1	Rs. 24,000	Rs. 70,000
, 2	Rs. 36,000	Rs. 50,000
, 3	Rs. 14,000	Rs. 24,000
, 4	Rs. 10,000	Rs.8,000
, 5	Rs. 8,000	Rs.8,000

Q.5 Define **Managerial Economics** and discuss its nature, scope, and relationship with other disciplines like statistics and Mathematics.

3 x 10= 30

Total No. of Questions : 22

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B.Tech IV sem (Main/Back) Exam April-May 2026

Civil Engg.

4CE3-04 Basic Electronics for Civil Engineering Applications

Paper Code : 4E1314

Time: 3 Hours

Maximum Marks: 70

Attempt all ten questions from Part A, five questions out of seven questions from Part B and three questions out of five questions 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)

1. _____

2. _____

Part A (Answer should be given up to 25 words only)

All questions are compulsory

- Q.1 Discuss Half adder.
- Q.2 The binary number 10101 is equivalent to decimal number.
- Q.3 State Demorgan's theorem.
- Q.4 What are the α and β of a BJT?
- Q.5 Discuss hexadecimal and BCD number system.
- Q.6 What are the selection criteria for the transducer?
- Q.7 Draw a truth table and logic diagrams J-K Flip flop
- Q.8 How many types of resolutions are in remote sensing?
- Q.9 Draw the V-I characteristics of PN diode
- Q.10 Write the applications of strain gauges

10×2=20

Part B (Analytical/Problem solving questions)

Attempt any Five questions

- Q.1 Describe the process of Geo-referencing and the role of Resampling in image rectification.
- Q.2 Explain the characteristics of different types of satellite orbits.
- Q.3 Differentiate any two in brief: (i) Gross errors and Systematic errors (ii) absolute and relative errors (iii) Accuracy and Precision. T-435
- Q.4 Write a short note on different types of sensors.
- Q.5 Discuss the following in brief: (i) Control surveys using GNSS (ii) Total station and traversing methods
- Q.6 Discuss the atmospheric errors and removal in data capturing with sensors.
- Q.7 Draw and explain the working of temperature sensors.

5×4=20

Part C (Descriptive/Analytical/Problem Solving/Design question)

Attempt any three questions

- Q.1 What is data acquisition? Explain in detail about ADC & DAC.
- Q.2 Explain the construction and working of BJT. Discuss the CC, CB and CE configuration with the help of input and output characteristics.
- Q.3 Write a short note on applications of optical and microwave remote sensing techniques for Civil Engineering.
- Q.4 Discuss the following steps of Digital Image Processing in detail:
- Pre-processing
 - Enhancement
 - Classification
 - Accuracy assessment.
- Q.5 Write the short note on any two
- Causes of Geometric Distortions in remote sensing data
 - Various sources and types of Radiometric Distortions in satellite imagery
 - Define and differentiate between FOV (Field of View) and IFOV (Instantaneous Field of View)

3×10=30

Total No. of Questions: 22

Total No. of Pages: 04

Roll No. _____

B.Tech IV sem (Main/Back) Exam April-May 2026

Civil Engg.

4CE4-05 Strength of Materials

Paper Code : 4E1315

Time: 3 Hours

Maximum Marks: 70

Attempt all ten questions from Part A, five questions out of seven questions from Part B and three questions out of five questions 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)

1. _____

2. _____

Part A (Answer should be given up to 25 words only)

All questions are compulsory

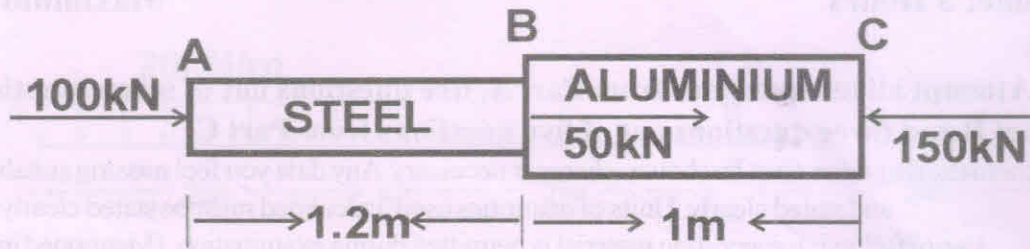
- Q.1 Define proof stress. T-495
- Q.2 What is elastic instability in a column?
- Q.3 Explain the parallel axis theorem.
- Q.4 What is complimentary shear stress?
- Q.5 Illustrate the contraflexure point with suitable example.
- Q.6 Define ductility and hardness of a material.
- Q.7 What is slenderness ratio in a column?
- Q.8 List any two principal methods used for calculating the deflection of beams.
- Q.9 What are the perfect, deficient and redundant frames?
- Q.10 What do you mean by statically determinate and indeterminate beam? **10 x 2 = 20**

Part B (Analytical/Problem solving questions)

Attempt any Five questions T-495

- Q.1 Derive the expression for two perpendicular normal stresses accompanied with state of simple shear.

- Q.2 A member ABC is formed by connecting a steel bar of 20 mm diameter to an aluminium bar of 30 mm diameter, and is subjected to forces as shown in Figure. Determine the total deformation of the bar, taking E for aluminium as $0.7 \times 10^5 \text{ N/mm}^2$ and that for steel as $2 \times 10^5 \text{ N/mm}^2$.



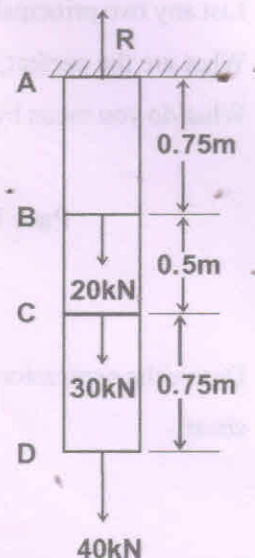
- Q.3 Discuss the extension in length of the uniformly tapering circular bar.
- Q.4. Discuss the parallel axis theorem and polar moment of inertia. Derive the expression for moment of inertia for a triangular section.
- Q.5 What are the equilibrium conditions of a column? Define effective length and discuss Rankine's formula for column.
- Q.6 Discuss major and minor principal stresses and draw Mohr's circle for two unlike stresses p_1 and p_2 .
- Q.7 Draw the SFD and BMD for simply supported beam when point load applied at center of span L .

5 x 4 = 20

Part C(Descriptive/Analytical/Problem Solving/Design question)

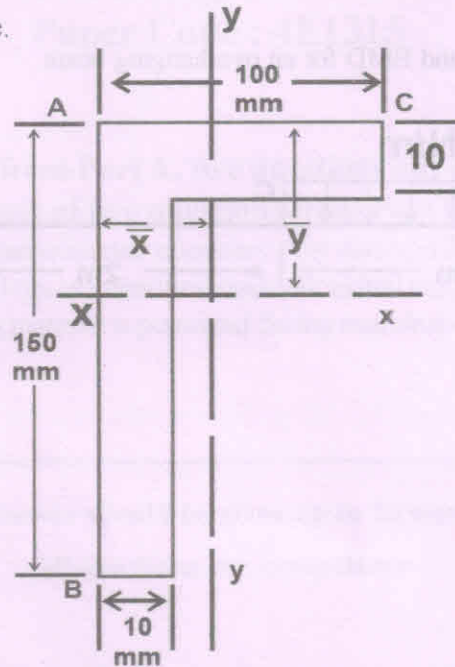
Attempt any three questions

- Q.1 A steel bar of 2m length and uniform section of 600 sq. mm is suspended vertically and loaded as shown in figure. Taking $E=2.05 \times 10^3 \text{ N/mm}^2$, determine the total elongation of the bare.

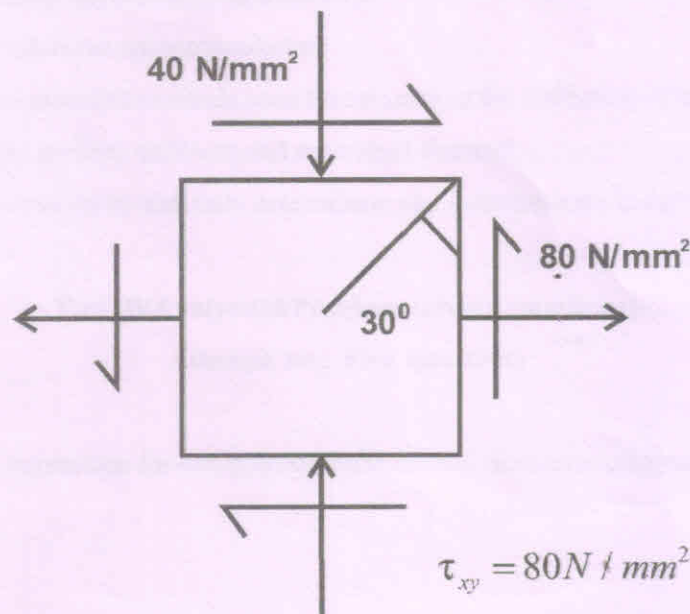


T-425

- Q.2 Discuss the theory of simple bending in detail and derive the expression for flexure formula.
- Q.3 Find the moment of inertia and radius of gyration along x-axis and y-axis for an unequal angle section shown in figure.



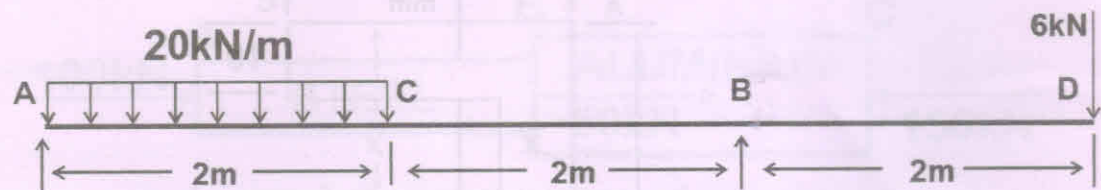
- Q.4 For given state of stress, calculate.
- Normal and shear stress on oblique plane.
 - Principal stress and its location. T-425
 - Maximum Shear stress and its plane.
 - Obliquity and resultant stress



Q.5

Draw the SFD and BMD for an overhanging beam.

3 x 10 = 30



Total No. of Questions: 22

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Roll No. _____

B. Tech IV sem (Main/Back) Exam April-May 2026

Civil Engg.

4CE4-06 Hydraulics Engineering

Paper Code : 4E1316

Time: 3 Hours

Maximum Marks: 70

Attempt all ten questions from Part A, five questions out of seven questions from Part B and three questions out of five questions 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)

1. _____ 2. _____

Part A (Answer should be given up to 25 words only)

All questions are compulsory

- Q.1 What is Reynold's number ?
- Q.2 What is boundary layer ?
- Q.3 What is specific energy ?
- Q.4 What is cavitation ?
- Q.5 Explain Darcy's law ?
- Q.6 What are the types of pump ?
- Q.7 What is transmissivity ?
- Q.8 What is unit Hydrograph ?
- Q.9 What is Infiltration ?
- Q.10 What are the types of canals ?

10 x 2 = 20

Part B (Analytical/Problem solving questions)

Attempt any Five questions

- Q.1 Explain the term distorted models and undistorted model. What is the use of distorted models?
- Q.2 Obtain expression for the velocity distribution for turbulent flow in smooth pipes.
- Q.3 Define the term most economical section of a channel. What are the conditions for the also rectangular channel of the best section.
- Q.4 Explain the terms (a) Rapidly varies flow and (b) Gradually varied flow.
- Q.5 Find the discharge through a trapezoidal channel of width 6m and side slope of 1 horizontal to 3 vertical. The depth of flow of water is 3m and Chezy's constant $C=60$. The slope of the bed of the given channel is given 1 in 5000.
- Q.6 Obtain the expression for the force exerted by a jet of water on a fixed vertical place in direction of the jet.
- Q.7 What is Aquifer also explain various type of aquifer

5x 4 = 20

Part C (Descriptive/Analytical/Problem Solving/Design question)

Attempt any three questions

- Q.1 Using Buckingham's π theorem, show that the velocity through a circular orifice is given by

$$V = \sqrt{2gH} \phi \left[\frac{D}{H}, \frac{\mu}{\rho V H} \right]$$

Where H is the head causing flow, D is the diameter of the orifice, μ is coefficient of viscosity, ρ is the mass density and g is the acceleration due to gravity.

- Q.2 Derive an expression for the variation of depth along the length of the bed of the channel for gradually varied flow in an open channel. State clearly the assumptions made.

- Q.3 By applying the momentum equation to open channel flow, show that the sequent depths and flow rate are related by $2q^2/g = y_1 y_2 (y_1 + y_2)$. State the assumptions made in the derivation.

- Q.4 Explain Lacey's Regime theory, along with the important terms involved.

- Q.5 The ordinates of a 3-hr unit hydrograph of a basin at 6 hr interval are given below.
0, 3, 5, 9, 11, 7, 5, 4, 2, 1, 0 cumecs. Derive the storm Hydrograph due to a 3-hr storm with a total rainfall of 15 cm. Assume an initial loss of 0.5 cm and a ϕ index of 1 cm/hr. Take base flow = 4 cumecs.

$$3 \times 10 = 30$$

Total No. of Questions: 22

Total No. of Pages: 02

Roll No. _____

B. Tech IV sem (Main/Back) Exam April-May 2026

Civil Engg.

4CE4-07 Building Planning

Paper Coe : 4E1317

Time: 3 Hours

Maximum Marks: 70

Attempt all ten questions from Part A, five questions out of seven questions from Part B and three questions out of five questions 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)

1- NIL _____

2. NIL _____

Part A (Answer should be given up to 25 words only)

All questions are compulsory

- Q.1 Describe the term "Site plan".
- Q.2 Discuss the uses of sun chart.
- Q.3 Define bioclimatic chart.
- Q.4 Discuss the term "Orientation".
- Q.5 Explain the importance of building - bye-laws.
- Q.6 Describe aspect and prospect in principles of planning.
- Q.7 Differentiate built up area, carpet area and super built up area with neat sketch.
- Q.8 What is the relevance of Vastu Shastra in modern building planning?
- Q.9 Define FSI and FAR with formula.
- Q.10 How sound insulation can be achieved in buildings.

10 x 2 = 20

Part B (Analytical/Problem solving questions)

Attempt any Five questions

- Q.1 Discuss different types of buildings with examples.
- Q.2 Describe various sun shading devices.
- Q.3 Discuss the elements of climate and climatic zones of India.
- Q.4. Describe the various factors affecting orientation.
- Q.5 Discuss the NBC regulations regarding mean of access and line of buildings frontages.
- Q.6 Discuss the factors considered in modern building design with respect to Vastu Shastra.
- Q.7 Describe the fire fighting provisions in a buildings

5 x 4 = 20

Part C (Descriptive/Analytical/Problem Solving/Design question)

Attempt any three questions

- Q.1 Explain the methods of drawing sun path diagram with neat sketch.
- Q.2 Discuss the factors affecting orientation and explain the criteria of orientation for tropical climate.
- Q.3 Explain the following principles of planning :
- Poominess
 - Grouping
 - Circulation
 - Elegance
 - Privacy
- Q.4 Discuss the functional design of primary health centres.
- Q.5 Write short notes on following :-
- (a) Lighting and ventilation
 - (b) Doors and windows

3 x 10 = 30

Total No. of Questions : 22

Total No. of Pages: 02

Roll No. _____

B.Tech IV sem (Main/Back) Exam April-May 2026

Civil Engg.

4CE4-08 Concrete Technology

Paper Code : 4E1318

Time: 3 Hours

Maximum Marks: 70

Attempt all ten questions from Part A, five questions out of seven questions from Part B and three questions out of five questions 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)

1. _____

2. _____

Part A (Answer should be given up to 25 words only)

All questions are compulsory

T-496

- Q.1. What are the main compounds present in cement?
- Q.2. What is the heat of hydration in cement?
- Q.3. What is the minimum time to remove the formwork for beam and slab?
- Q.4. What is the significance of the water-cement ratio in concrete?
- Q.5. Define segregation and bleeding in fresh concrete.
- Q.6. What are the factors affecting the workability of concrete?
- Q.7. Define carbonation in concrete and its effect.
- Q.8. What is the role of super plasticizers in concrete?
- Q.9. List two advantages of using fly ash in concrete.
- Q.10. What is self-compacting concrete, and where is it used?

10 x 2 = 20

Part B (Analytical/Problem solving questions)

T-496

Attempt any Five questions

- Q.1. Explain the hydration process of cement, including its basic compounds and the role of C-S-H gel in strength development.
- Q.2. Discuss physical properties of aggregate use in concrete and explain the method to determine Impact value of aggregate as per IS codes.
- Q.3. Define the workability of concrete and explain the slump cone test to determine the workability.
- Q.4. Describe the working and applications of rebound hammer in NDT testing of concrete.
- Q.5. Describe the various methods of transportation of concrete and what precautions should be taken during the process?
- Q.6. Discuss different types of chemical admixtures used in concrete along with their functions and suitability.

4E1318 / 787

787

- Q.7. Discuss the sulphate-resisting and high-performance concrete. Explain their properties and applications.

5x 4 = 20

Part C (Descriptive/Analytical/Problem Solving/Design question)

Attempt any three questions

T-495

- Q.1. Discuss the methods and equipment for concrete compaction and elaborate on different curing techniques, their suitability, and precautions.
- Q.2. Design a concrete mix for M25 grade concrete using the IS method. The following data is provided:
- a) Characteristic strength of concrete = 25 MPa
 - b) Type of cement: OPC 43 Grade
 - c) Maximum nominal aggregate size: 20 mm
 - d) Specific gravity of cement: 3.16
 - e) Specific gravity of coarse aggregate: 2.80
 - f) Specific gravity of fine aggregate: 2.65
 - g) Water absorption:
 - I. Coarse aggregate = 1%
 - II. Fine aggregate = 1.5%
 - h) Free surface moisture:
 - I. Coarse aggregate = 0.5%
 - II. Fine aggregate = 2%
 - i) Workability requirement: Slump = 75 mm
 - j) Exposure condition: Mild
 - k) Sand conforms to Zone II
- Q.3. Describe the different types of Non-Destructive Testing (NDT) methods used in concrete structures. Discuss their principles, applications, and limitations.
- Q.4. Explain the concept of durability in concrete. What are the major causes of concrete deterioration, and how can durability be assessed through tests?
- Q.5. Discuss different types of mineral admixtures used in concrete. How do they influence concrete properties?

3 x 10 = 30