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4E1313

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4E1313

B.Tech. IV-Sem. (Main/Back) Exam. - 2024

CIVIL ENGG.

4CE2-01, Advance Engineering Mathematics-II

AG, CE, MI

Time : 3 Hours **Maximum Marks : 70**

Attempt all 10 questions from Part-A, 05 questions out of 07 questions from Part-B and 03 questions out of 05 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 **[10×2=20]**

(Answer should be given up to 25 words only)

All questions are compulsory

Q.1. The probability that a regularly scheduled flight departs on time is 0.83 and the probability that is departs and arrive on time is 0.78. Find the probability that a plane arrive on time, given that it departed on time.

Q.2. When A and B are two independent events such that $P(A) = 1/2$ and $P(B) = 1/3$, find $P(A \cup B)$ and $P(A \cap B)$.

Q.3. If X and Y are two independent random variables and $E(X) = 3/2$ and $E(Y) = 1$, then what will be the value of $E(2XY)$?

Q.4. Write the Chebyshev's Inequality.

Q.5. What is the value of p, when binomial distribution is symmetrical?

Q.6. What will be the value of correlation coefficient r if the regression lines are perpendicular to each other?

Q.7. Write the Spearman's formula for modified rank correlation coefficient for repeated rank.

Q.8. How many normal equations required for fitting a polynomial of m degree, by least square method?

Q.9. Which distribution is useful for large sample while testing for population means?

Q.10. What is the meaning of the testing of the hypothesis?

PART-B [5x4=20]

(Analytical/Problem-solving questions)

Attempt any five questions

Q.1. Demonstrate the probability of not getting a 7 or 11 total on either of two tosses of a pair of fair dice.

Q.2. If X is a continuous random variable whose pdf is given by :

$$f(x) = \begin{cases} c\left(4x - 2x^2\right), & 0 < x < 2 \\ 0 \quad , & \text{otherwise} \end{cases}$$

Find (a) the value of c and (b) $P(X > 1)$.

Q.3. Determine the moment generating function of binomial distribution.

Q.4. In a component manufacturing industry there is a small chance of 1/500 of any component to be defective. The components are supplied in packets of 10. Use Poisson distribution to calculate the approximate number of packets containing one defective component in a consignment of 10000 packets.

Q.5. The I.Q.'s of a group of 6 persons were measured, and they then sat for a certain examination. Their I.Q.'s and examination marks were as follows :

Person :	1	2	3	4	5	6
I.Q. :	110	100	140	120	80	90
Exam marks :	70	60	80	60	10	20

Compute the coefficient of rank correlation.

Q.6. Find the most likely price in Bombay corresponding to the price of Rs. 70 at Calcutta from the following :

	Calcutta	Bombay
Average price	65	67
Standard deviations	2.5	3.5

Correlation coefficient between the prices of commodities in the two cities is 0.8.

Q.7. A coin is tossed 400 times and it turns up head 216 times. Discuss whether the coin may be unbiased one.

PART-C [3x10=30]

(Descriptive/Analytical/Problem-Solving/Design questions)

Attempt any three questions

Q.1. Suppose a student dormitory in a college consist of 30% freshmen of Whom 10% own a car, 40% sophomores of whom 20% own a car, 20% juniors of whom 40% own a car and 10% seniors of whom 60% own a car. Find the probability that a student in the dormitory owns a car. If a student does own a car. find the probability that the student is a junior.

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Q.2. X is normally distributed and the mean of X is 30 and standard deviation is 5. Find out the probability of the following : (a) $26 \le X \le 40$, (b) $X \ge 45$ and (c) $|X30| > 5$. Given that $P(0 < Z < 0.8) = 0:2881$.

Q.3. Applying the theory of least square method, fit a second degree parabola to the following data :

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

Q.4. Calculate the correlation coefficient for the following data :

x	11	10	9	8	7	6	5
y	20	18	12	8	10	5	4

Q.5. In a year there are 956 births in a town A, of which 52.5% were males, which in town A and B combined, this proportion in a town of 1,406 births was 0.496. Is there any significant difference in the proportion of male births in the two towns?

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B.Tech. IV-Sem (Main/Back) Exam 2024

CIVIL ENGINEERING

4CE3-04 Basic Electronics for Civil Engineering Applications

Time: 3 Hours Maximum Marks: 70

Instructions to Candidates :

Attempt all ten questions from Part A. Attempt any 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 missing may suitably be assumed and stated clearly. Units of quantities used/ calculated must be stated clearly. Use of the following supporting material is permitted during examination(Mentioned in form No.205)

1. ..... 2. .....

PART-A **[10x2=20]**

(Answer should be given up to 25 words only)

All questions are compulsory

Q.1. Convert the decimal number 25 to binary and hexadecimal.

Q.2. State De Morgan's Theorem.

Q.3. What is the difference between a half adder and a full adder?

Q.4. Describe the working principle of an R-S flip-flop.

Q.5. Define a diode and draw its V-I characteristics.

Q.6. What are the three configurations of a Bipolar Junction Transistor (BJT)?

Q.7. Explain the significance of calibration in instrumentation.

Q.8. What is the function of an electronic theodolite?

Q.9. Define gross error and systematic error.

Q.10. What are strain gauges and how are they used in measurements?

PART-B **[5x4=20]**

(Analytical/Problem solving questions)

Attempt any five questions

Q.1. Simplify the Boolean expression using De Morgan's Theorem :

$$(A \cdot B)' + (A' + B)(A \cdot B)' + (A' + B)$$

Q.2. Design a full adder circuit using basic logic gates and explain its operation.

Q.3. Discuss the digital image processing and give the definition of pre-processing, enhancement, classification and accuracy assessment.

Q.4. Analyze the operation of a Common Emitter (CE) transistor configuration and derive its input and output characteristics.

Q.5. Describe the method of using a total station for a control survey and its advantages over traditional methods.

Q.6. Calculate the absolute and relative error in the measurement of a 100-meter distance with a measured value of 99.5 meters.

Q.7. Explain how a thermocouple works and how it is used to measure temperature.

PART-C [3x10=30]

(Descriptive/Analytical/Problem Solving/Design questions)

Attempt any three questions

Q.1. Describe the working principle and applications of J-K flip-flop in digital circuits. Include a timing diagram in your explanation.

Q.2. Explain the different types of measurement errors, their sources, and how they can be minimized in civil engineering measurements.

Q.3. Discuss the process of data acquisition in civil engineering using digital systems. Explain the importance of dynamic measurements and data processing.

Q.4. Explain the various types of displacement sensors used in civil engineering, including their working principles and applications.

Q.5. Discuss the applications of optical and microwave remote sensing techniques in civil engineering. Provide examples of how these techniques are used in real-world scenarios.

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B.Tech. IV-Sem. (Main/Back) Exam. - 2024

CIVIL ENGINEERING

4CE4-05 / Strength of Materials

Time : 3 Hours **Maximum Marks : 70**

Instructions to Candidates :

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 [10x2=20]

(Answer should be given up to 25 words only)

All questions are compulsory

Q.1. Define stress and strain. Explain the relationship between them.

Q.2 What is the difference between tensile and compressive stress?

Q.3. Explain the concept of Young's modulus.

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Q.4. Define Poisson's ratio and its significance in material mechanics.

Q.5. Define principal plane.

Q.6. Differentiate between brittle and ductile materials with examples.

Q.7. What do you mean by Pure shear?

Q.8 What is Hooke's Law? Provide the mathematical expression.

Q.9. Describe the concept of bending moment in a beam.

Q.10. Explain the term 'torsion' and where it is commonly observed.

PART-B [5x4=20]

(Analytical/Problem solving questions)

Attempt any five questions

Q.1. Differentiate between normal stress and tangential (shear) stress.

Q.2 What is the degree of static indeterminacy? Also, differentiate between determinate and indeterminate structure.

Q.3. Derive that the maximum shear stress of rectangular cross section is 1.5 times of average shear stress.

Q.4. What is Euler's Buckling load at failure? Also, write the assumptions use in Euler's theory.

Q.5. Derive the relation in between shear force, bending moment and load intensity.

Q.6. What is Tensor? Derive the expression for transformation of two-dimensional stress system in second order tensor.

Q.7. Define theory of failure. Why distortion energy theory gives more appropriate result in case of shear failure?

PART-C [3x10=30]

(Descriptive/Analytical/Problem Solving/Design questions)

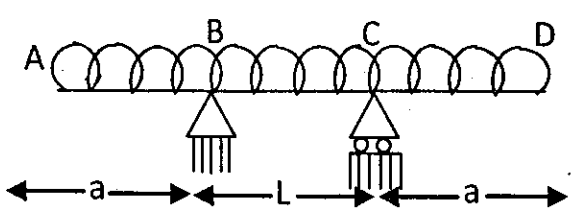
Attempt any three questions

Q.1. For the given loading diagram draw shear force diagram (SFD) and bending moment diagram (BMD) if-

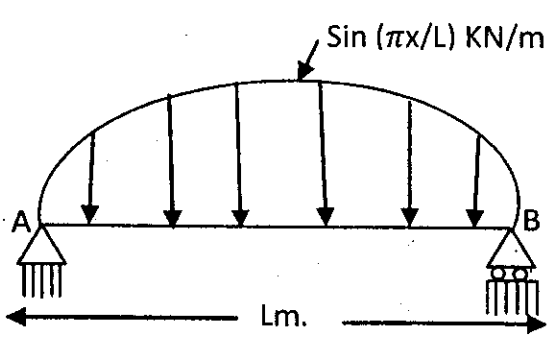
(i) L>2a

(ii) L=2a

(iii) L<2a

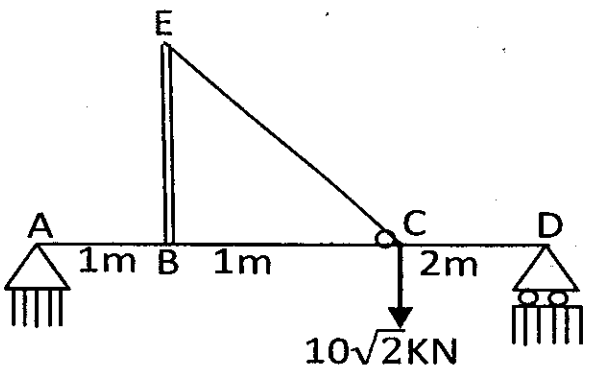


Q.2 A simply supported beam having varing distribution load w = sin (πx/L) kN/m. Determine maximum deflection of beam and slope at end.



Q.3. There is MOHR's circle of radius R and center R/2. Determine the shear stress in the plane of pure shear. Take R = 100 MPa.

Q.4. A Beam ABCD is simply supported at D and hinge at A, the vertical struct BE, 1 m. long is fixed at B as shown in figure. The flexible spring carries a load $10\sqrt{2}$ kN passes over a frictionless pully. Draw SFD, BMD and ATD (Axial thrust diagram).



Q.5. Define the use of following terms in strength of material :

(a) Elasticity

(b) Strain hardening

(c) Creep and fatigue

(d) Resilience, proof resilience and modulus of resilience

(e) Toughness and Modulus of toughness

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B.Tech. IV Sem. (Main/Back) Exam. 2024

CIVIL ENGG.

4CE4-06 Hydraulics Engineering

Time : 3 Hours **Maximum Marks : 70**

Instructions to Candidates :

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 **[10x2=20]**

(Answer should be given up to 25 words only)

All questions are compulsory

1. Define Geometric and Kinematic similarity.

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2. What is Froude Number?

3. Explain critical depth.

4. What is silt excluder?

5. Define Gradually varied flow.

6. Define energy correcton factor.

7. Define unit hydrograph.

8. Differentiate pump and turbine.

9. Define aquifers.

10. Write different types of rain gauges.

PART-B **[5x4=20]**

(Analytical/Problem solving questions)

Attempt any five questions

1. Derive the velocity distribution equaction in Hydrodynamically.

2. Explain the term draft tube along with its principle.

3. What do you understand by similitude? State the condition for perfect similitude.

4. Describe main parts of a centrifugal pump.

5. Derive the parameters for most economical triangular section.

6. Derive the expression for force exerted by fluid jet on moving flat plate held normal to jet.

7. What do you mean by run off? Discuss different factors affecting run-off.

PART-C [3x10=30]

(Descriptive/Analytical/Problem Solving/Design question)

Attempt any three questions

1. The pressure difference Δp in a pipe of diameter D and length l due to turbulent flow depends on the velocity V, viscosity μ, density ρ and roughness K. Using Buckingham's π theorem, obtain an expression for Δp.

2. Show that in a Rectangular Channel:

   (i) Critical depth is two third of specific energy, and-

   (ii) Froude Number at critical depth is unity.

3. What is Hydraulic Jump? Derive the expression for energy loss in a Hydraulic Jump in a Rectangular Channel.

4. Explain the steps involved in converting a flood hydrograph to a unit hydrograph.

5. Compare Kennedy's theory and Lacey's theory. What are the limitations of both the theories?

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B. Tech. IV-Sem. (Main/Back) Exam, 2024

CIVIL ENGINEERING

4CE4-07 Building Planning

Time : 3 Hours **Maximum Marks : 70**

Instruction to Candidates :

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 **[10x2=20]**

(Answer should be given up to 25 words only)

All questions are compulsory

Q.1. Define Bioclimatic chart.

Q.2. Define Acoustics.

Q.3. What are different climatic zones in India ?

Q.4. What is the Site plan ?

Q.5. Define Built up area, Carpet area and Super Built up area.

Q.6. Write down the bye laws regulations regarding set back.

Q.7. What is Roominess ?

Q.8. Define Thermal Comfort.

Q.9. Define Circulation.

Q.10. What do you mean by Grouping ?

PART-B **[5x4=20]**

(Analytical/Problem solving questions)

Attempt any five questions

Q.1. Discuss the requirements of good lighting system in a building.

Q.2. What do you understand by Building Bye laws.

Q.3. Discuss various sun shading devices.

Q.4. Discuss various factors affecting orientation of building.

Q.5. Discuss fire fighting provisions in a building.

Q.6. Discuss regulations regarding floor area ratio and sanitation provisions.

Q.7. Write short note on elegance and global climate.

PART-C [3x10=30]

(Descriptive/Analytical/Problem solving/Design questions)

Attempt any three questions

Q.1. What is Sun Path diagram ? What is significance in building planning. Explain the methods of drawing sun path diagram.

Q.2. What are the remedial treatments for. sound insulation of walls, floors and ceiling.

Q.3. What are the louvers ? Explain their types with the help of a diagram.

Q.4. Classify the Buildings based on : Occupancy and types of construction.

Q.5. Discuss various factors affecting orientations of building.

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4E1318

B. Tech. IV-Sem. (Main/Back) Exam, 2024

CIVIL ENGINEERING

4CE4-08 Concrete Technology

Time : 3 Hours **Maximum Marks : 70**

Instruction to Candidates :

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 **[10x2=20]**

(Answer should be given up to 25 words only)

All questions are compulsory

Q.1. Write names of the main compounds of cement and values of their respective heat of hydration.

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Q.2. Enumerate two physical properties of coarse aggregates and their typical values.

Q.3. What do you understand by 'manufactured sand' ?

Q.4. Illustrate role of water-cement ratio on compressive strength of concrete through figure.

Q.5. Enumerate any two measures to reduce possible 'bleeding' in concrete.

Q.6. Enumerate any two measures to reduce 'drying shrinkage' of concrete.

Q.7. Write expression (formula) of correction factor for 'height/diameter of concrete core on its compressive strength.

Q.8. Which admixture is to be used for a concrete to be transported from batching plant to site in hot summer day for a travel time of about 90 minutes.

Q.9. Which type of admixture is used in concrete while concreting tunnel linings.

Q.10. If the values of rapid chloride permeability of two concrete samples A and B are 2500 and 800 coloumbs respectively, which of A and B is expected to be more durable and why ?

PART-B

[5x4=20]

(Analytical/Problem solving questions)

Attempt any five questions

Q.1. Fill the number of days/hours of removal of formwork in the cases tabulated below:

Ambient Temperature range in °C	Size of structural Member, in mm	Number of Days/Hours of Removal of Formwork
6–20	Columm, 500x900 mm	
35–48	Columm, 300x500 mm	
6–20	Slab, 3200x5500 mm	
35–48	Slab, 3200x5500 mm	
6–20	Beam 450x800 mm	

Q.2. Explain situation in which 'slip' formwork is preferred.

Q.3. How much coarse aggregate content is reduced while designing a pumpable concrete mix as compared to that of normal concrete and why ?

Q.4. List any three differences in mix proportioning of a 'self compacting concrete' and normal concrete.

Q.5. Explain use of half-cell potential meter.

Q.6. Explain 'Carbonation' phenomenon in concrete.

Q.7. Describe 'bulking' test on fine aggregate.

PART-C [3x10=30]

(Descriptive/Analytical/Problem solving/Design questions)

Attempt any three questions

Q.1. (i) Describe suitability and particular application areas of different compaction methods of concrete. [8]

(ii) List two types of concrete mixers [2]

Q.2. (i) Explain Rebound Hammer test and its applicability for assessment of concrete structures. [8]

(ii) List main physical properties of 'microsilica'.

Q.3. Determine quantities required to make one cubic metre of M45 Grade concrete with OPC 43 grade, Specific gravities of cement, fine aggregate, coarse aggregate and superplasticizer are 3.10, 2.90, 2.60 and 1.12 respectively water absorption values of fine and coarse aggregates are 1.0 and 0.5 percent respectively. These is no free moisture in aggregates. Slump required is 50 mm. Fine aggregate conforms to zone II. [10]

Q.4. (i) Explain effect of 'aggregate - cement interface' on properties of concrete. [6]

(ii) Illustrate though a figure 'Creep' of concrete with age of concrete. [4]

Q.5. (i) Explain 'J' ring test of concrete and its applicability through figure. [7]

(ii) List any three properties of 'flyash' as specified by IS3812 for use as an admixture in concrete. [3]

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Total No. of Questions : 22 Total No. of Pages : 04

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4E1211

B.Tech. IV-Sem. (Back) Exam. - 2024

PCC CIVIL ENGINEERING

4CE4-08 Concrete Technology

Time : 3 Hours **Maximum Marks : 120**

Instructions to Candidates :

Attempt all ten questions from Part-A, five questions out of seven questions from Part-B and four 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 **[10×2=20]**

(Answer should be given up to 25 words only)

All questions are compulsory

Q.1. What are the various components of concrete?

Q.2. How would you classify aggregates based on their size and shape?

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Q.3. List out the factors affecting workability of concrete.

Q.4. Enumerate the different steps of handling of concrete in field.

Q.5. Define about Sulphate resisting cement.

Q.6. What do you mean by curing of concrete?

Q.7. What do you mean by M25?

Q.8. Differentiate between Nominal Mix and Design Mix.

Q.9. What do you mean by carbonation of concrete?

Q.10. Name of the admixture used for quick setting of concrete.

PART-B **[5×8=40]**

(Analytical/Problem solving questions)

Attempt any five questions

Q.1. Discuss about C-S-H gel.

Q.2. Discuss various ingredients of ordinary Portland cement, also write their percentage in cement.

Q.3. Describe the properties of manufactured sand.

Q.4. Describe the durability of concrete.

Q.5. Explain batching, mixing and transportation of concrete in the field.

Q.6. Explain various causes of deterioration of concrete.

Q.7 Write a short note on application and use of Rebound Hammer test for NDT.

PART-C [4×15=60]

(Descriptive/Analytical/Problem Solving/ questions)

Attempt any four questions

Q.1. List out various physical properties of aggregate also explain any one laboratory test procedure of coarse aggregate to check physical property.

Q.2. What do you mean by workability of concrete? Explain the factors which affect workability. How will you determine workability by slump test?

Q.3. Design concrete mix of grade of M 30 by I.S method using ordinary Portland cement of 43 grade fine aggregate conforming to zone II, assuming quality control as good, take sp gravity of aggregate and coarse aggregate 3.15 and 2.85 respectively. Use maximum size of aggregate as 20mm. Assume suitable data wherever necessary.

Q.4. What are Super Plasticizers? How are these helpful in modifying the properties of concrete?

Q.5. Explain with neat sketch requirements for good formwork for columns and beams.

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