

<b>4E1303</b>	Roll No. _____	[Total No. of Pages : <b>4</b> ]
	<div style="border: 1px solid black; display: inline-block; padding: 2px 10px;"><b>4E1303</b></div>	
<b>B.Tech. IV Sem. (Main/Back) Examination, July - 2023</b> <b>4AE1-02 Technical Communication/All branches</b>		

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 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. Mention two objectives of Technical communication.
2. What do you understand by the term “Technical Document”.
3. Define the term “Technical Discourse”?
4. Name different types of “Technical Reports”?
5. Distinguish between Technical and non - Technical communication.
6. Suggest two methods of enhancing Listening communication skills.
7. Mention any two ways for improving Linguistic abilities of engineering students.
8. What do you mean by Information Development.
9. What does Structure of technical articles stand for.
10. Mention the different types of Technical Articles.

## PART - B

### (Analytical/Problem solving questions)

Attempt any five questions

(5×4=20)

1. Describe how to write a **Technical Project Proposal** in a step by step manner.
2. Recently your college held several competitions as part of Techfest celebrations. Write an article in 100-125 words on the topic 'The prize distribution' for your college magazine. Sign as sweety/suresh.
3. Write an E-mail to announce and congratulate your team as it has achieved the quarterly goal of reaching \$500,000 in sales. Invent all relevant information.
4. What is the importance of **Communication Skills**? Discuss in detail.
5. On the basis of your reading of the passage given below, make **notes** in points only, using abbreviations, wherever necessary. Also, suggest a suitable title.

Although environmental pollution can be caused by natural events such as forest fires and active volcanoes, use of the word pollution generally implies that the contaminants have an anthropogenic source - that is, a source created by human activities. Pollution has accompanied humankind ever since groups of people first congregated and remained for a long time in any one place. Indeed, ancient human settlements are frequently recognized by their wastes - shell mounds and rubble heaps, for instance. Pollution was not a serious problem as long as there was enough space available for each individual or group. However, with the establishment of permanent settlements by great numbers of people, pollution became a problem, and it has remained one ever since.

Cities of ancient times were often noxious places, fouled by human wastes and debris. Beginning about 1000 CE, the use of coal for fuel caused considerable air pollution, and the conversion of coal to coke for iron smelting beginning in the 17th century exacerbated the problem. In Europe, from the Middle Ages well into the early modern era, unsanitary urban conditions favoured the outbreak of population - decimating epidemics of disease, from plague to cholera and typhoid fever. Through the 19th century, water and air pollution and the accumulation of solid wastes were largely problems of congested urban areas. But, with the rapid spread of industrialization and the growth of the human population to unprecedented levels, pollution became a universal problem.

By the middle of the 20th century, an awareness of the need to protect air, water, and land environments from pollution had developed among the general public. In particular, the publication in 1962 of Rachel Carson's book *Silent Spring* focused attention on environmental damage caused by improper use of pesticides such as



DDT and other persistent chemicals that accumulate in the food chain and disrupt the natural balance of ecosystems on a wide scale. In response, major pieces of environmental legislation, such as the Clean Air Act (1970) and the Clean water Act (1972 ; United states), were passed in many countries to control and mitigate environmental pollution.

6. Suggest some tried and tested techniques on how to **Revise** a technical text.
7. Fill in the blanks (Any four) :

1. He ..... (write) to me every month.
  - a. is writing
  - b. has been writing
  - c. had been writing
  - d. writes
2. There was nothing he could do ..... wait.
  - a. and
  - b. except
  - c. otherwise
  - d. than
3. This damaged building is ..... sale.
  - a. in
  - b. at
  - c. on
  - d. for
4. He ..... (be) weak in english in the beginning.
  - a. being
  - b. was
  - c. been
  - d. has been
5. He became ..... IAS officer.
  - a. an
  - b. a
  - c. no article
  - d. the

### PART - C

(Descriptive/Analytical/Problem solving/Design Question)

**Attempt any Three questions.**

(3×10=30)

1. What is technical communication? Discuss the different forms of communication.
2. What do you mean by minutes of meeting? What 8 things should the minutes of a meeting include?
3. Ankush Goyal, a resident of 315, Goal Chouraila, Mumbai reads an advertisement in the newspaper for the requirement of engineering graduates to market the products of a multinational company located in Mumbai. He decides to apply for the same. Write Ankush's application to the personnel manager, Larsen and Turbo Ltd. 365, Badlapur, Mumbai.

4. You are Ankush/Ankita. You partook in a program planned by 'Entrepreneurs Club'. You had the opportunity of listening to professionals about social entrepreneurship, Scalable startup entrepreneurship, Small business entrepreneurship, Large company entrepreneurship, Innovation entrepreneurship, etc. Write a report on the program of about 150-200 words for "Entrepreneurs Avenues" mentioning the importance of entrepreneurship.
  5. Write a note on information Design.
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4E1302

4E1302

**B.Tech. IV Sem. (Main/Back) Examination, July - 2023**  
**4AE1-03/ Managerial Economics and Financial Accounting /**  
**All branches**

**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 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. Describe the principle of economics.
2. Discuss the word national income.
3. Define Monopolistic competition.
4. What is the importance of balance sheet.
5. Describe an Isoquant?
6. What is fund flow analysis?
7. What do you understand by scale of production?
8. Describe demand function.
9. Explain law of supply.
10. Define managerial economics.

**PART - B****(Analytical/Problem Solving questions)****Attempt any Five questions.****(5×4=20)**

1. Differentiate between NI, GNP and GDP.
2. Discuss in detail on scarcity and choice.



3. List out the various types of price elasticity of demand and explain them.
4. How do total product, average product and marginal product change due to change in the use of one input and keeping other input constant?
5. Differentiate between explicit and Implicit cost.
6. Discuss in detail the features of monopoly market with its price curve.
7. Interpret the use of balance sheet highlight it with example.

### PART - C

(Descriptive/Analytical/Problem Solving/Design question)

**Attempt any Three questions.**

(3×10=30)

1. Explain circular flow of 3 sector economy model.
2. Discuss elasticity of demand, also explain types of elasticity of demand with graphs.
3. Describe in detail :
  - a. Law of variable proportions.
  - b. Laws of returns to scale.
4. The following figures relates to trading activities of shipra Ltd for the year 31<sup>st</sup> March 2023 :

	Rs.		Rs.
Sales	10,00,000	Administrative expenses :	
Purchases	7,00,000	Salaries	30,000
Closing stock	1,40,000	Rent	6,000
Opening stock	1,10,000	Stationery and postage	2,000
Sales return	40,000	Depreciation	10,000
Selling and distribution expenses :		Other charges	20,000
Salaries	18,000	Provision for taxation	70,000
Advertising	7,000	Non operating income :	
Travelling	5,000	Dividend received	18,000
		Non operating expenses :	
		Loss on sale of shares	3,000

Prepare statement of profit and loss under as per part II of schedule II of companies act, 2015.

5. Discuss balance sheet and its importance with a suitable example.

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	<b>4E1313</b>	
	<b>B.Tech. IV- Sem. (Main/Back) Examination July- 2023</b> <b>Civil Engineering</b> <b>4CE2-01 Advance Engineering Mathematics - II</b> <b>AG, CE, MI</b>	
	<b>Time : 3 Hours</b>	<b>Maximum Marks : 70</b>

**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 following supporting material is permitted during examination. (As Mentioned in form No. 205).*

**PART - A**

(Word limit 25)

**All questions are compulsory.**

(10×2=20)

1. State Baye's theorem.
2. Define random variable.
3. What is mathematical expectation.
4. Explain skewness and kurtosis.
5. Write the formula of first three moments about the mean.
6. Find the mean of poisson distribution.
7. Define correlation with mathematical formula.
8. What is method of least square.
9. State Chebyshev's inequality.
10. Define standard error in sampling theory. Write the formula of standard error of the number of successes in a sample of size n.



## PART - B

(Word limit 100)

Attempt any five questions.

(5×4=20)

1. If four whole numbers taken at random are multiplied together, find the probability that the last digit in the product is 1,3,5,7 or 9.
2. Two random variables X and Y have the following joint probability density function:

$$f(x,y) = \begin{cases} 2-x-y; & 0 \leq x \leq 1, 0 \leq y \leq 1 \\ 0; & \text{otherwise} \end{cases}$$

Find :

- i. Marginal density function of X.
  - ii. Conditional density function of Y.
  - iii. Variance of X and Y.
3. Karl Pearson's coefficient of skewness of a distribution is 0.32. Its standard deviation is 6.5 and mean is 29.6. Find the mode and median of the distribution.
  4. 10% bolt produced by a machine are defective. Find the probability of following when they are checked at random by examining sample of 5 : (i) none is defective (ii) one is defective (iii) atmost one is defective.
  5. Fit a straight line to the following data taking x as the independent variable :  
x: 1    2    3    4    5  
y: 5    7    9    10    11
  6. In a large city A, 20% of a random sample of 900 school boys had defective eye sight. In another large city B, 15.5% of a random sample of 1600 school boys had the same defect. Is this difference between the two populations significant?
  7. A machine puts out 16 imperfect articles in a sample of 500. After the machine is overhauled, it puts out 3 imperfect articles in a batch of 100. Has machine been improved?

## PART - C

Attempt any Three questions.

(3×10=30)

1. From a lot of 25 items contain 5 defectives, a sample of 4 items is drawn at random (i) without replacement (ii) with replacement. Find the expected number of defectives in the sample.



2. Define moment generating function of poisson distribution. A driver has two taxis, which he hires out day by day. The number of demands for a taxi on each day is distributed as a Poisson variate with mean 1.5. Calculate the proportion of days on which (i) neither of the cars is used (ii) some demand is refused. ( $e^{-1.5} = 0.2231$ ).
  3. Calculate the coefficient of correlation between x and y using the following data.  

x:	1	2	3	4	5	6	7	8	9
y:	9	8	10	12	11	13	14	16	15
  4. The income of a group of 10000 persons was found to be normally distributed with mean Rs. 1750 per month and standard deviation of Rs. 50. Show that of this group 95% had income exceeding Rs. 1668 and only 5% had income exceeding Rs. 1832. What was the lowest income among the richest 100? (Use normal table).
  5. The guaranteed average life of a certain type of electric light bulbs is 1000 hours with a standard deviation of 125 hours. It is decided to sample the output so as to ensure that 90% of the bulbs do not fall short of the guaranteed average by more than 2.5%. What must be the minimum size of sample? (Use normal table).
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4E1314

Total No. of Questions:

Total No. of Pages:

Roll No. \_\_\_\_\_

**B.Tech. IV-Sem (Main/Back) Exam 2023****Civil Engg.****4CE3-04 Basic Electronics for Civil Engineering Applications****4E1314****Time: 3 Hours****Maximum Marks: 70**

**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 following supporting material is permitted during examination (As mentioned in form No.205)

1. NIL2. NIL**Part A (word limit 25 )**

- Q.1 Why NAND and NOR gates are Universal gates?  
 Q.2 What is the requirement of Instrument calibration?  
 Q.3 Define Gross error and relative error.  
 Q.4 What is the need for image classification?  
 Q.5 Describe FOV and IFOV Resolution  
 Q.6 What is the Load sensor? How load sensor works?  
 Q.7 What is the meaning of graphical data processing?  
 Q.8 Draw the V-I characteristics of P-N junction diode.  
 Q.9 What do you mean by resolution of any measuring instrument?  
 Q.10 How numerical data processing is different from graphical data processing? 10 x 2 = 20

**Part B (Word limit 100)**

- Q.1 Briefly explain the applications and calibration mechanism of electronic theodolites?  
 Q.2 Why accuracy, precision and resolution are important for any instrument? What are the effects if resolution of any instrument is poor?  
 Q.3 Write the applications of optical remote sensing technique. How this optical remote sensing is differed from microwave remote sensing  
 Q.4. Why data acquisition and data processing are essential? Also explain the digital system advantage over analog systems.  
 Q.5 Explain systematic and absolute error. What are the main reasons for these types of errors?  
 Q.6 Briefly explain about the different orbits of satellites with the characteristics of these orbit.  
 Q.7 Write down the truth table of full adder circuit. Also draw the circuit of full adder using NAND Gate.

5 x 4 = 20



Part C(Any three)

Q. 1 Briefly explain the Following.

- a) J-K flip flop
- b) Demorgan Theorem

Q.2 Explain the working of Common collector configuration with the working diagram, V-I characteristics. Also explain why it is called the common collector configuration.

Q.3 Why Pre-processing is required for an image? Also discuss the requirement of image enhancement for digital images with explaining of all building blocks of image processing.

Q.4 Explain the working principle of thermal flow sensors with suitable diagram. How this sensor is different from ultrasonic flow sensor and electromagnetic flow sensor?

Q.5 Write a short note on

- a) Geometric and radiometric distortions
- b) Traversing methods for computations of coordinates

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**4E1315****4E1315****B.Tech. IV Sem. (Main/Back) Examination, July- 2023****Civil Engineering****4CE4-05 Strength of Materials****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 following supporting material is permitted during examination(As mentioned in form No.205)*

**PART - A**  
**(Word Limit 25)**

**(10×2=20)**

1. Define the term brittleness and ductility.
2. Define point of contra flexure.
3. What do you mean by principal stress?
4. What is hook's law? Write down different types of stresses and strains.
5. What do you understand by principle of superposition?
6. Define slope and deflection. Also write the methods to find slope and deflection.
7. Discuss prismatic and non-prismatic section.
8. Define slenderness ratio.
9. Write the assumption of Euler's theory for column
10. Draw shear stress distribution for rectangular cross section. Write the formula to find out maximum shear stress for rectangular cross section.



**PART - B**  
**(Word Limit 100)**

(5×4=20)

1. Discuss middle third rule with neat sketch.
2. Derive an expression for deformation of a tapering circular bar of length 'L' whose diameter varies uniformly 'd' at one end to 'D' at other end when subjected to axial pull of 'P'.
3. Derive torsion equation for solid circular shaft ( $T/I_p = \tau/R = G\theta/L$ ).
4. Mention effective length for all ideal condition of column along with neat sketch of deflected shape.
  - a) Column fixed at both ends;
  - b) Column fixed at one end and hinged at another end;
  - c) Both end hinged;
  - d) Fixed at one end and free at another end
5. A rectangular beam 60 mm wide and 150 mm deep is simply supported over a span of 6 m. if the beam is subjected to central point load of 12 kN, find the maximum bending stress induced in the beam section.
6. Draw a neat diagram of stress-strain curve for a mild steel bar subjected to tensile load. Also describe the term yield stress, proof stress and ultimate stress.
7. Determine total elongation of a steel bar of variable section as shown in Fig. 1. Take  $E = 2.05 \times 10^5 \text{ N/mm}^2$ ,  $L_1 = L_3 = 1\text{m}$  and  $L_2 = 1.2\text{m}$ ,  $d_1 = d_3 = 30 \text{ mm}$  and  $d_2 = 35 \text{ mm}$ .

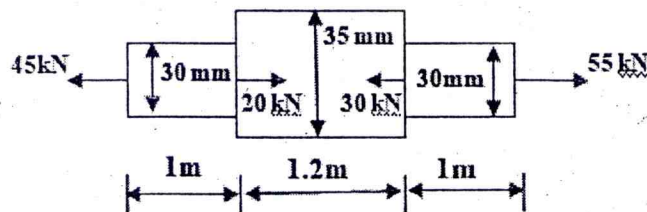


Fig. 1.

**PART - C**  
**(Any Three)**

(3×10=30)

1. A steel rod 5 m long and of 40 mm diameter is used as a column, with one end fixed and the other free. Determine the crippling load by Euler's formula. Take  $E = 200 \text{ GPa}$ .
2. Write the assumption made in simple theory of bending. Also derive an expression for flexural formula for simple theory of bending ( $M/I = f/y = E/R$ ).
3. A solid shaft is rotated at 80 rpm and power transmitted to the shaft is 200 kw. If the maximum shear stress to be allowed is 75 MPa, then
  - a) determine the diameter of solid shaft.
  - b) if the solid shaft is to be replaced by hollow circular shaft such that  $d_i = 0.6 d_o$ , then determine the internal diameter ( $d_i$ ) and outer diameter ( $d_o$ ) of hollow circular shaft. Also determine the percentage saving in material if hollow shaft is used.
4. A simply supported beam of span 4 m is carrying a uniformly distributed load of 2 kN/m over the entire span. Find the maximum slope and deflection of the beam. Take  $EI$  for the beam as  $80 \times 10^9 \text{ N-mm}^2$ .
5. Draw the bending moment and shear force diagrams for the beam shown in Fig. 2. Indicate the values of shear force and bending moment at all critical sections.

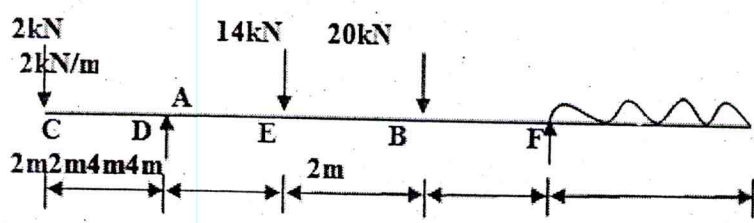


Fig. 2.

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4E1316

4E1316

B.Tech. IV- Sem. (Main/Back) Examination, July - 2023

Civil Engineering

4CE4-06 Hydraulics Engineering

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 following supporting material is permitted during examination. (As Mentioned in form No. 205)*

**PART - A****(Word limit 25)****All questions are compulsory.****(10×2=20)**

1. Explain kinematic, dynamic, and geometric similarities.
2. Define Boundary layer thickness.
3. What is cavitation?
4. What is Rapidly varied flow?
5. Define Alternate and Sequent depth
6. What is draft tube?
7. Explain Infiltration capacity.
8. Discuss Darcy's law.
9. What is transmissivity?
10. Define prismatic Channel.

**PART - B****(Word limit 100)****Attempt any Five questions.****(5×4=20)**

1. Explain Rayleigh's method with example.
2. Explain separation of boundary layer with neat diagram.

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3. A sluice gate discharges water into a horizontal rectangular channel with a velocity of 10 m/s and depth of flow of 1 m. Determine the depth of flow after the jump and consequent loss in total head.
  4. The discharge of water through a rectangular channel of width 8 m, is  $15 \text{ m}^3/\text{s}$  when depth of flow of water is 1.2 m. Calculate : (i) Specific energy of the flowing water, (ii) Value of minimum specific energy, (iii) Critical depth and critical velocity.
  5. Explain general components of the hydroelectric power plant in brief.
  6. Determine the optimum number of rain gauges in a catchment area from the following data:
    - a) Number of existing rain gauges station(n) = 8
    - b) Permissible Error = 6%
    - c) Mean annual rainfall at the gauges = 1000, 950, 900, 850, 800, 700, 600 and 400 mm.
  7. Explain Different properties of Aquifer in detail.

### PART - C

Attempt any **Three** questions.

(3×10=30)

1. The pressure difference  $\Delta p$  in a pipe of diameter (D) and length (l) due to viscous flow depends on the velocity (V), Viscosity ( $\mu$ ) and density ( $\rho$ ). Using Buckingham's  $\Pi$  theorem obtain an expression for  $\Delta p$ .
2. For a turbulent flow in a pipe of diameter 300 mm, find the discharge when the center line velocity is 2.0 m/s and the velocity at a point 100mm from the center as measured by pitot tube is 1.6 m/s.
3. Show the following relationships for most efficient trapezoidal channel.
  - i) Top width = 2 X length of one side slope.
  - ii) Best side slope is 600 to the horizontal.
4. In a catchment the average rainfall for a storm at two continuous 6-hr interval was 3 cm and 6 cm respectively. The extraction losses  $\phi$ -index was estimated to be 0.2 cm/hr. For the same catchment the calculated data for 6-hr UH is given. Find the DRH due to storm.

Time(h)	0	6	12	18	24	30	36	42	48	54	60
Ordinate of 6h UH	0	10	25	40	100	150	100	75	25	15	0

5. Design an earthen channel of 40 cumecs capacity by Lacey's design method. Channel side slope may be assumed to be 1:1. The average size of the bed material may be taken as 0.8 mm.



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	<b>4E1317</b>	
	<b>B.Tech. IV - Sem. (Main/Back) Examination, July- 2023</b> <b>Civil Engineering</b> <b>4CE4-07 Building Planning</b>	

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 following supporting material is permitted during examination (As mentioned in form No.205)*

**PART - A**  
**(Word Limit 25)**

(10×2=20)

1. What is the site plan? List out various factors which affecting the selection of site.
2. Define the following terms: -
  - a) Carpet area
  - b) Super built-up area
3. Define the term 'Climate'. Enlist various climatic zones of India.
4. Write a short note on Bi-climatic Chart.
5. Describe the Acoustics in building services.
6. Define FSI and FAR.
7. What do you means of energy conservation in buildings?
8. Define means of access.
9. Describe about Vastu Shastra with respect to direction for the planning of buildings.
10. Write a short note on Sun-Path diagram.

**PART - B**  
**(Word Limit 100)**

**(5×4=20)**

1. Discuss the louvers as a Sun shading device.
2. What is the difference between earth's magnetic field and Earth's energy field in terms of Vastu?
3. How the building in warm and humid climate differs from the buildings in composite climate?
4. How does the air change contribute to the ventilation of any building? Write the air change criteria for a residential building.
5. How does the shape of the plot affects the residents of the building? Write about different type of shapes and their effects.
6. Enlist principles of building planning. Describe any four of them.
7. Explain firefighting provisions in a building.

**PART - C**  
**(Any Three)**

**(3×10=30)**

1. The bioclimatic chart helps in maintaining the sustainability and reduces pollution. Explain this with any live example.
2. Enumerate the broad principles of the building bye-laws.
3. Discuss functional requirements of a good ventilating system. Explain the effect of wind velocity in a room when windows are provided in the opposite walls.
4. Prepare a single line plan of a primary school of 350 students capacity on a plot of size 100 x 150 m. The road is on the east side of plot.
5. Draw a single line plan of a residential building having following arrangements. Also mention schedule of opening and calculate built up area and plot area.
  - a) First bed room size 12' x 10'.
  - b) Second bed room size 10' x 16'.
  - c) Dining room - to be assume.
  - d) Kitchen size 10' x 8'.
  - e) Verandah of 10' wide.
  - f) Setback distance 12' in front and 4' in rest sides.



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4E1318

4E1318

B.Tech. IV - Sem. (Main/Back) Examination, July - 2023

Civil Engineering

4CE4-08 Concrete Technology

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 following supporting material is permitted during examination. (As mentioned in form No. 205).*

**Part - A**

(word limit 25)

**All questions are compulsory.****(10×2=20)**

1. Name among the Bogue's compounds, which one gets start hydrating first. Write approximate value of its heat of hydration per unit mass in first 24 hours.
2. Write down the names of apparatus/accessories used for determining specific gravities of
  - i. Cement.
  - ii. Fine aggregate.
3. Out of the main hydration products of cement, which is mainly responsible for strength of concrete. Write down its approximate content percentage in a fully compacted concrete with water cement ratio 0.55 and at 28 days age.
4. Write the minimum water contents required to make one cubic metre of concrete with 20 mm and 10 mm nominal size of aggregate, if no chemical admixtures are to be used.
5. Show water - cement ratio law of a fully compacted workable concrete through figure write typical values (with variable quantity) on X and Y axis.



6. List any two factors affecting 'bleeding' of concrete.
7. List two factors affecting 'plastic shrinkage' of concrete.
8. Write name of appropriate method of curing, one each for
  - i. roof slabs.
  - ii. columns.
9. Write role of 'retarder' in concrete.
10. Write minimum slump required in pumpable concrete.

### Part - B

(word limit 100)

Attempt any **five** questions

(5×4=20)

1. Write typical number of days for removal of formwork in the following cases of concrete members :
  - i. Column 400×600 mm size, ambient temperature 20°C - 24°C.
  - ii. Column 250×250 mm size, ambient temperature 45°C - 48°C.
  - iii. Roof slab size 15m×22m, ambient temperature 20°C - 24°C.
  - iv. Roof slab size 15 m×22 m, ambient temperature 45°C - 48°C.
2. Write essential ingredients of 'sulphate resisting concrete'; and its mechanism.
3. Name physical properties of fly ash and specifications of IS code for use in concrete for physical properties of fly ash.
4. Write principle of 'ultrasonic pulse velocity test' of concrete. In case of 'A', 'B' and 'C' concretes, pulse velocities have been obtained as 3000 m/sec, 2000m/sec and 1200 m/sec. Which of the 'A', 'B' and 'C' are best quality concrete?
5. Write four factors affecting 'creep' of concrete. Draw typical figure of 'creep strain' with time.
6. If strength values obtained by testing cube specimens at 28 days age are 28.1, 27.8, 27.4, 27.6, 27.7, 27.1, 24.0, 25.2, 25.5, 25.7, 25.9, 25.4, 24.9, 26.8, 26.3, 26.5, 26.7, 26.9, 26.8, 26.7, 26.1, 26.9, 27.1, 26.5, 26.8, 25.9, 25.7, 25.8, 25.5, 26.5, 26.8, 27.1, 26.2, 26.3 and 26.3N/mm<sup>2</sup>. What is the value of its characteristic strength.
7. At a site, coarse aggregates are available in two nominal sizes 20 mm (A) and 10 mm (B). Percentage passing of 'A' from 20 and 10 mm sieves are 72 and 0 respectively. For 'B', the percentage passing from the 20 mm and 10 mm sieves are 100 and 68 respectively. In which proportion, the two aggregate sizes 'A' and 'B' should be mixed to get good grading.

### Part - C

Attempt any **Three** questions

(3×10=30)

1. Describe three types of concrete mixers, their mechanisms of mixing ingredients and suitability for different possible requirements such as RMC batching plant of about 40m<sup>3</sup> per hour; site mixed concrete with requirement of about 4 m<sup>3</sup> per hour, site mixed high performance concrete with maximum size of aggregate 10 mm, and requirement of about 8-10m<sup>3</sup> per hour etc.
2. Describe with help of figures, appropriate method of transporting concrete for casting a roof slab about 10 m (three storeys) high from ground where site mixed concrete is produced. Volume required is approx 5 cubic metre per hour for about 6-6½ hrs in a day. The concreting work is to be completed in one day only.
3. Explain mechanism of corrosion of reinforcement in concrete with figure. How chlorine presence affects it?
4. Determine quantities of ingredients to make a M45 grade concrete with 20% of cementitious materials as GGBFS. Use superplasticizer, which has a specific gravity = 1.12. Assume aggregates in SSD condition and graded coarse aggregates are available

specific gravities of cement = 3.14, fine aggregate = 2.80, Coarse aggregate = 2.65, GGBFS = 2.20. Assume any other data and write all calculations.

5.
  - i. Explain tests of segregation resistance with figure for self compacting concrete.
  - ii. Draw figure's of 'slump - flow test' for SCC. and show its minimum values for SCC in fig.