

DR. AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

SUPPLIMENTRY EXAMINATION- SUMMER 2024

Course: - B-Tech

Branch:-Civil Engineering

Semester:-VI

Subject code & Name: BTCVC602\_Y18 Foundation Engineering

Max. Marks: 60

Date: 15/06/2024

Duration: 3.00 hr.

Instruction to the students:-

1. All the questions are compulsory.
2. The level of question/ expected answer as per OBE or the course outcome (CO) on which the question is based is mentioned in ( ) in front of the question.
3. Use of non-programmable scientific calculator is allowed.
4. Assume suitable data whenever necessary.

Q.1 Solve any two of the following. (Level/CO) Marks

- |                                                                                                                                                                                               |     |   |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|---|
| A. Enlist different soil exploration methods & explain any one in details                                                                                                                     | CO1 | 6 |
| B. Enlist and explain the geophysical methods of soil exploration                                                                                                                             | CO1 | 6 |
| C. In a geophysical exploration, the time distance plot gave $V_1 = 320$ mps.<br>And $V_2 = 900$ mps and the break in the plot was located at 35 m.<br>Determine the depth of the overburden. | CO1 | 6 |

Q.2. Solve any two of the following.

- |                                                                                                                                                                                                                                                                                                    |     |   |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|---|
| A. What are the assumption made in Terzaghi's analysis of bearing capacity<br>of continuous footing.                                                                                                                                                                                               | CO2 | 6 |
| B. Explain the plate load test in details with neat sketch                                                                                                                                                                                                                                         | CO2 | 6 |
| C. A strip footing, 1 M wide at its base is located at a depth of 0.9m below<br>the ground surface. The properties of foundation soil are $\gamma = 17.70$ KN/M <sup>3</sup> ,<br>$C = 20$ KN/M <sup>3</sup> and $\phi = 19^\circ$ Determine safe bearing capacity using Factor of<br>Safety = 2.5 | CO2 | 6 |

Q.3. Solve any two of the following.

- |                                                                                                                                                                                                                                                                                                   |     |   |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|---|
| A. Define mat footing and explain under what circumstance mat footing is<br>adopted.                                                                                                                                                                                                              | CO3 | 6 |
| B. What is problem associated with expansive soil.                                                                                                                                                                                                                                                | CO3 | 6 |
| C. Design a combined rectangular footing to carry column load of 3500 KN<br>And 4250 KN at 6.2 M spacing on a sandy soil with allowable soil pressure<br>of 350 KN/M <sup>2</sup> . Lighter column is at a distance of 350 MM clear from the<br>property line. Assume column size 500 MM x 500 MM | CO3 | 6 |

Q.4. Solve any two of the following.

- |                                                                                                               |     |   |
|---------------------------------------------------------------------------------------------------------------|-----|---|
| A. Write short notes: shape and factors deciding shape of caisson foundation.                                 | CO4 | 6 |
| B. Explain in details the concept of Negative skin friction                                                   | CO4 | 6 |
| C. Discuss with sketches the construction of under-reamed piles and the<br>equipment's used for this purpose. | CO4 | 6 |

Q.5. Solve any two of the following.

- |                                                                    |     |   |
|--------------------------------------------------------------------|-----|---|
| A. What are the different types of soil failure?                   | CO5 | 6 |
| B. Discuss the causes of soil slope failure                        | CO5 | 6 |
| C. Explain the Swedish circle method of analysis of slope failure. | CO5 | 6 |

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**Dr. Babasaheb Ambedkar Technological University, Lonere**  
**Regular and Supplementary - Summer 2024**

Course: B. Tech.      Branch: Civil Engineering      Semester: VI

Subject Code & Name: BTCVC602\_Y22 *Foundation Engineering*

Max Marks: 60

Date: 15/06/2024

Time: 3Hr.

**Instructions to the Students:**

1. All the questions are compulsory.
2. The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.
3. Use of non-programmable scientific calculators is allowed.
4. Assume suitable data wherever necessary and mention it clearly.

	(Level/CO)	Marks
<b>Q. 1 Solve <u>any two</u> of the following.</b>		<b>12</b>
A) What are the purposes of soil exploration?	<b>Remember</b>	<b>06</b>
B) Draw the neat sketch of soil sampler showing its components. Explain the below terms associated with it: 1) Area Ratio, 2) Inside Clearance & 3) Outside clearance	<b>Understand</b>	<b>06</b>
C) A sampling tube has inner diameter of 80 mm and cutting edge of inner diameter 70 mm. it has outside diameter of sampling tube and cutting edge are 83 mm and 86 mm respectively. <b>Determine the</b> 1) Area Ratio, 2) Inside Clearance & Outside clearance of the sampler. The tube is pushed at the bottom of the bore hole to a distance of 600 mm with the length of sample collected as 550 mm. <b>Find the recovery ratio</b> and comment on the results.	<b>Apply &amp; analyze</b>	<b>06</b>
<b>Q.2 Solve <u>any two</u> following questions.</b>		<b>12</b>
A) What are the general modes of bearing capacity failure of a footing. Explain in detail with sketches?	<b>Understand</b>	<b>06</b>
B) A strip footing of width 3 m is located at a depth of 1.40 m below the moist soil having cohesion $c = 20 \text{ kN/m}^2$ and angle of internal friction $\phi = 30^\circ$ . Take FOS = 2.5, $\gamma = 18 \text{ kN/m}^3$ , $\phi = 30^\circ$ , $N_c = 37.2$ , $N_q = 22.5$ and $N_\gamma = 19.7$ . Determine (a) Ultimate bearing capacity, (b) Net safe bearing capacity, and (c) Gross safe bearing capacity Use the general shear failure theory of Terzaghi.	<b>Apply</b>	<b>06</b>
C) A strip footing of width 1.5 m resting on a saturated clay $\{C_u = 30 \text{ kN/m}^2, \phi_u = 0^\circ, \gamma_{sat} = 20 \text{ kN/m}^3\}$ is located at a depth of 2 m below ground level. The water table is also at a depth of 2 m from the ground level. Determine the ultimate bearing capacity of footing by using Terzaghi's Theory. If the water table rises by 1 m, calculate the percentage reduction in the ultimate bearing capacity.	<b>Analyze</b>	<b>06</b>

<b>Q. 3</b>	<b>Solve <u>any two</u> of the following.</b>		<b>12</b>
A)	What are expansive soils? Explain in detail the characteristics of expansive soils?	<b>Understand</b>	<b>06</b>
B)	Define and explain the following terms: A) Swelling Potential B) Swelling Pressure C) Free Swell	<b>Remember</b>	<b>06</b>
C)	Write a short note on settlement of shallow foundations?	<b>Understand</b>	<b>06</b>
<b>Q.4</b>	<b>Solve <u>any two</u> of the following.</b>		<b>12</b>
A)	State and explain in detail the Engineering News Record Formula (ENR) and Hiley's Formula?	<b>Remember</b>	<b>06</b>
B)	A precast concrete pile of size 30 cm x 30 cm is to be driven into clay strata whose unconfined compressive strength is 80 kN/m <sup>2</sup> . Compute the length of pile required to carry a safe working load of 400 kN with factor of safety of 2.5. Assume adhesion factor $\alpha$ as 0.6 and $N_c = 9.0$	<b>Apply</b>	<b>06</b>
C)	A 10 m long 300 mm diameter pile is driven in a uniform deposit of sand ( $\phi = 38^\circ$ ). The water table is at great depth and is not likely to rise. The average dry unit weight of sand is 18 kN/m <sup>3</sup> . Calculate the safe load capacity of the pile with factor of safety of 2.5. Use $N_q = 137$	<b>Analyze</b>	<b>06</b>
<b>Q. 5</b>	<b>Solve <u>any two</u> of the following.</b>		<b>12</b>
A)	What are the different types of slopes. Explain in detail with neat sketch and example?	<b>Understand</b>	<b>06</b>
B)	Enlist and explain in detail the different types of slope failures?	<b>Understand</b>	<b>06</b>
C)	An infinitely long slope in dense sand having an inclination of 28° to the horizontal. Compute the factor of safety against shear failure if the angle of internal friction of the soil is 33°	<b>Apply</b>	<b>06</b>

**\*\*\* End \*\*\***

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Supplementary Summer Examination 2024

Course: B.Tech.

Branch: Civil Engineering

Semester: VI

Subject Code & Name: BTCVC603\_Y18 Concrete Technology

Max Marks: 60

Date:19/06/2024

Duration: 3 Hr.

**Instructions to the Students:**

1. All the questions are compulsory.
2. The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.
3. Use of non-programmable scientific calculators is allowed.
4. Assume suitable data wherever necessary and mention it clearly.

	(CO)	Marks
<b>Q. 1 Solve Any Two of the following.</b>		<b>12</b>
A) Explain procedure for determining final Setting time of Cement.	CO 1	6
B) Explain bulking of Sand.	CO 1	6
C) Define Cement. Explain its types.	CO 1	6
<b>Q.2 Solve Any Two of the following.</b>		<b>12</b>
A) Define batching. Write a note on Volume batching.	CO 1	6
B) Illustrate Curing of Concrete in detail.	CO 1	6
C) Define Workability. Explain Slump Cone Test with diagram	CO 2	6
<b>Q. 3 Solve Any Two of the following.</b>		<b>12</b>
A) Define Admixture. Explain functions of Admixture.	CO 2	6
B) Illustrate difference between Accelerator & Retarder.	CO 2	6
C) Write a short note on Damp-Proofing Admixtures and Air Entraining Agents	CO 2	6
<b>Q.4 Solve Any Two of the following.</b>		<b>12</b>
A) What is Creep.? Explain factors affecting on it.	CO 3	6
B) Define: a) Durability b) Fresh Concrete c) Modulus of Elasticity d) Segregation e) Shrinkage of Concrete f) Bond Strength	CO 2	6
C) Define Concrete. Explain its types.	CO 3	6
<b>Q. 5 Solve Any Two of the following.</b>		<b>12</b>
A) Write a short note on Sulphate Attack and Chloride Attack.	CO 3	6
B) Explain procedure for Concrete Mix Design by Indian Standard Method.	CO 3	6
C) Illustrate Quality Measurement in Concrete Construction.	CO 3	6

\*\*\* End \*\*\*

**Instructions to the Students:**

1. All the questions are compulsory.
2. The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.
3. Use of non-programmable scientific calculators is allowed.
4. Assume suitable data wherever necessary and mention it clearly.

	(Level/CO)	Marks
<b>Q. 1 Solve Any Two of the following.</b>		<b>12</b>
A) Write an explanatory note on Highway Planning Survey's	CO1	6
B) State and explain different types of road pattern with diagram.	CO1	6
C) State and explain classification of road based on materials with diagram.	CO1	6
<b>Q.2 Solve Any Two of the following.</b>		<b>12</b>
A) Define: a) Right of way b) Road Margin c) Carriage way d) Shoulder e) Kerb f) Camber	CO 2	6
B) The speed of overtaking and overtaken vehicles are 70 & 40 kmph respectively on two way traffic road. If the acceleration of overtaking vehicle is $0.99 \text{ m/s}^2$ . (i) Calculate safe overtaking sight distance. (ii) Mention the minimum length overtaking zone (Assume $t= 2$ Seconds)	CO 2	6
C) Explain overtaking sight distance in detail with diagram.	CO 2	6
<b>Q. 3 Solve Any Two of the following.</b>		<b>12</b>
A) State different types of tests carried in the laboratory on the sample of aggregate to decide the suitability for its use in road construction and explain any one of them in detail.	CO 3	6
B) Define : a) Bitumen b) Asphalt c) Tar d) Emulsion e) Cutback f) Road Oil	CO 3	6
C) In the Marshall method of mix design the coarse aggregate, fine aggregate, filler and bitumen having respective specific gravities of 2.62 ,2.72, 2.70 &1.02 are mixed in the ratio 55,34.6,4.8 and 5.6 percent respectively. What will be the theoretical specific gravity of the mix?	CO 3	6

**Q.4 Solve Any Two of the following.**

- |    |                                                                           |      |   |
|----|---------------------------------------------------------------------------|------|---|
| A) | Write a note on Speed Studies.                                            | CO 4 | 6 |
| B) | State and explain the methods for collecting origin and destination data. | CO 4 | 6 |
| C) | What is Traffic Engineering? Explain traffic characteristics.             | CO 4 | 6 |

**Q. 5 Solve Any Two of the following.**

**12**

- |    |                                                                 |      |   |
|----|-----------------------------------------------------------------|------|---|
| A) | Explain different components of pavement with its function?     | CO 5 | 6 |
| B) | Explain the advantages and limitations of CBR method of design. | CO 5 | 6 |
| C) | Explain types of joints in Cement concrete road.                | CO 5 | 6 |

**\*\*\* End \*\*\***

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**Instructions to the Students:**

1. All the questions are compulsory.
2. The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in () in front of the question.
3. Use of non-programmable scientific calculators is allowed.
4. Assume suitable data wherever necessary and mention it clearly.

	(CO)	Marks
<b>Q. 1 Solve Any Two of the following.</b>		<b>12</b>
A) Define Composite material & draw flow chart for classification of Composite material.	CO 1	6
B) Illustrate difference between Thermosets and Thermoplastic.	CO 1	6
C) Write a short note on Fiber reinforced composites and laminar composites.	CO 1	6
<b>Q.2 Solve Any Two of the following.</b>		<b>12</b>
A) Define glass fiber. Explain its types.	CO 1	6
B) Illustrate difference between Nomex and Kevlar.	CO 1	6
C) Explain ceramic fiber with flow chart of manufacturing process.	CO 2	6
<b>Q. 3 Solve Any Two of the following.</b>		<b>12</b>
A) Illustrate difference between Polymer Matrix Composites (PMC) and Metal Matrix Composites (MMC).	CO 2	6
B) What are Particulate Composites? Explain its applications.	CO 2	6
C) Write a short note on Carbon fiber composites and Fiber reinforced polymer.	CO 2	6
<b>Q.4 Solve Any Two of the following.</b>		<b>12</b>
A) Explain autoclave molding method of manufacturing for Composite material.	CO 1	6
B) Explain filament winding with its advantages and disadvantages.	CO 2	6
C) Explain in short: a) Resin Transfer molding b) Pre-peg layer c) Bagging films.	CO 2	6
<b>Q. 5 Solve Any Two of the following.</b>		<b>12</b>
A) Explain necessity for mechanical testing of composite material.	CO 3	6
B) Explain Inter-laminar shear testing on composites.	CO 3	6
C) Explain Compression testing on composites.	CO 3	6



**DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY,  
LONERE - RAIGAD 402103  
Regular & Supplementary Summer 2024**

**Branch: B. Tech.**

**Branch: Civil Engineering**

**Semester: - VI**

**Subject: BTCVPE604F Structural Audit**

**Marks: 60**

**Date:- 21/06/2024**

**Duration: 3 Hrs.**

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**Instructions to the Students:**

1. Each question carries 12 marks.
2. Attempt any **five** questions of the following.
3. Illustrate your answers with neat sketches, diagram etc., whenever necessary.
4. If some part or parameter is noticed to be missing, you may appropriately assume it and should mention it clearly.

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	<b>(Marks)</b>
<b>Q.1</b> State Structural Audit, Objectives and Bye Laws in detail.	<b>(12)</b>
<b>Q.2</b> Write down causes and types of deterioration in structures.	<b>(12)</b>
<b>Q.3</b> Explain Rebound Hammer Test with advantages, application and limitation in detail.	<b>(12)</b>
<b>Q.4</b> Write down about Fire damages Assessment in detail.	<b>(12)</b>
<b>Q.5</b> What are the point consider for preparation of structural Audit Report of RCC Structures.	<b>(12)</b>
<b>Q.6</b> Explain Strength Evaluation of Existing Structures in detail.	<b>(12)</b>

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Course: B. Tech

Semester: VI

Branch: Electrical Engineering/Electrical and Electronics Engineering

Subject Code and Name: BTEEC602\_Y19 Principles of Electrical Machine Design

Max Marks: 60

Date: 15/06/2024

Duration: 3Hr.

**Instructions to the Students:**

1. All the questions are compulsory.
2. The level (K1-Remembering, K2- Understanding, K3 – Applying, K4 – Analyzing, K5 – Evaluating, K6 - Creating) of question or expected answer as per OBE or the course outcome (CO) on which the question is based is mentioned in front of each question.
3. The use of non-programmable scientific calculators is allowed.
4. Assume suitable data wherever necessary and mention it clearly.

	(CO/Level)	Marks
<b>Q. 1 Solve Any Two of the following.</b>		<b>12</b>
A) <b>Discuss</b> the limitations considered with designing the electrical machine.	<b>CO1/K2</b>	<b>6</b>
B) <b>Explain</b> the nameplate of rotating machines as per standards.	<b>CO1/K2</b>	<b>6</b>
C) <b>Discuss</b> the insulating materials class based on thermal consideration.	<b>CO1/K2</b>	<b>6</b>
<b>Q. 2 Solve Any Two of the following.</b>		<b>12</b>
A) <b>Illustrate</b> a design procedure for lifting magnet design with relevant formulae.	<b>CO2/K3</b>	<b>6</b>
B) A 250 V, 37 kW, DC shunt motor has to exert a maximum torque of 150% of full load torque during the starting period. The resistance of the armature circuit is 0.2 Ohm, and the full load efficiency is 84%. The number of studs is 8. <b>Determine</b> ; a) The upper and lower limits of current during the starting b) The resistance of each section	<b>CO2/K3</b>	<b>6</b>
C) <b>Show</b> the simplex two-layer wave-wound armature with a winding table of a 4-pole generator with 26 conductors.	<b>CO3/K3</b>	<b>6</b>
<b>Q. 3 Solve Any Two of the following.</b>		<b>12</b>
A) The thermal conductivity of assembled armature laminations is 20 times as great along the direction of laminations as in the direction across the laminations. <b>Calculate</b> the loss that will be conducted across the laminations in a stack 40 mm thick and 6000 mm <sup>2</sup> in cross- section with a difference of 20°C. Given that a	<b>CO4/K3</b>	<b>6</b>

difference of 5°C will cause 25 W to be conducted through a cross-section of 2500 mm<sup>2</sup> in area and 20 mm thick measured along the laminations.

- B)** A 50 MVA turbo-alternator has a total loss of 1500 kW. **Calculate** the volume of air required per second and also the fan power if the temperature rise in the machine is to be limited to 30 °C. The other data given is;
- Inlet temperature of air = 25 °C,  
Barometric = 760 mm of mercury,  
Pressure = 2 kN/m<sup>2</sup>,  
Fan efficiency = 0.4.
- C)** **Show** various types of ventilating systems in accordance with the provision of cooling ducts and how the air passes over the heated part of the machine.
- Q. 4 Solve Any Two of the following.**
- A)** **Illustrate** the types of tests performed on transformers as per the Standards for estimation of leakage reactance, resistance of winding, no load current, and losses.
- B)** **Determine** winding parameters for a 100 KVA, 11KV/415 V, 50Hz, three-phase delta/star core type distribution transformer. Assume flux density = 1.2 T, current density = 2.5 A/mm<sup>2</sup>, window space factor = 0.28, and constant K = 0.45 for three-phase core-type distribution transformers. Use a four-step core.
- C)** **Illustrate** the step-by-step design procedure for the magnetic frame of a three-phase power transformer with relevant formulas.
- Q. 5 Solve Any Two of the following.**
- A)** **Describe** objective parameters for the computer-aided optimal design of a transformer with the help of its flowchart.
- B)** **Discuss** the advantages and disadvantages of various approaches to computer-aided design.
- C)** **Explain** objective parameters for the computer-aided optimal design of a DC machine with the help of its flowchart.

\*\*\* End \*\*\*

**Instructions to the Students:**

1. All the questions are compulsory.
2. The level (K1-Remembering, K2- Understanding, K3 – Applying, K4 – Analyzing, K5 – Evaluating, K6 - Creating) of question or expected answer as per OBE or the course outcome (CO) on which the question is based is mentioned in front of each question.
3. The use of non-programmable scientific calculators is allowed.
4. Assume suitable data wherever necessary and mention it clearly.

	(CO/Level)	Marks
<b>Q. 1 Solve Any Two of the following.</b>		<b>12</b>
A) <b>Explain</b> the limitations considered with designing the electrical machine.	<b>CO1/K2</b>	<b>6</b>
B) <b>Describe</b> the nameplate of rotating machines as per standards.	<b>CO1/K2</b>	<b>6</b>
C) <b>Discuss</b> the insulating materials class based on thermal consideration.	<b>CO1/K2</b>	<b>6</b>
 <b>Q. 2 Solve Any Two of the following.</b>		 <b>12</b>
A) <b>Illustrate</b> a design procedure for choke (coil) design with relevant formulae.	<b>CO2/K3</b>	<b>6</b>
B) A 250 V, 37 kW, DC shunt motor has to exert a maximum torque of 150% of full load torque during the starting period. The resistance of the armature circuit is 0.2 Ohm, and the full load efficiency is 84%. The number of studs is 8. <b>Determine</b> ;	<b>CO2/K3</b>	<b>6</b>
a) The upper and lower limits of current during the starting		
b) The resistance of each section		
C) <b>Show</b> the simplex lap-wound armature with a winding table of a 4-pole generator with 24 conductors.	<b>CO2/K3</b>	<b>6</b>
 <b>Q. 3 Solve Any Two of the following.</b>		 <b>12</b>
A) <b>Model</b> an output equation for the three-phase induction motor.	<b>CO3/K3</b>	<b>6</b>
B) <b>Compute</b> the main dimensions of the of a 5 h.p., 400 V, 3-phase, 4-pole squirrel cage induction motor using star-delta starter. Assume the following data:	<b>CO3/K3</b>	<b>6</b>
Average flux density in the air gap = 0.46 Wb/m <sup>2</sup>		
Ampere conductors per meter of armature periphery = 22000		
Full load efficiency = 83%		
Full load p.f. = 0.84 lag		

Winding factor = 0.955

Stacking factor = 0.9

Current density = 4 A /mm<sup>2</sup>

No. of slots per poles per phase = 3

L / t = 1.5

- C) **Illustrate** the procedure of computation of losses in rotor bars and end ring of inductor machine. **CO4/K3** **6**
- Q. 4 Solve Any Two of the following.** **12**
- A) The thermal conductivity of assembled armature laminations is 20 times as great along the direction of laminations as in the direction across the laminations. **Calculate** the loss that will be conducted across the laminations in a stack 40 mm thick and 6000 mm<sup>2</sup> in cross- section with a difference of 20°C. Given that a difference of 5°C will cause 25 W to be conducted through a cross-section of 2500 mm<sup>2</sup> in area and 20 mm thick measured along the laminations. **CO5/K3** **6**
- B) A 50 MVA turbo-alternator has a total loss of 1500 kW. **Calculate** the volume of air required per second and also the fan power if the temperature rise in the machine is to be limited to 30 °C. The other data given is;
- Inlet temperature of air = 25 °C,  
Barometric = 760 mm of mercury,  
Pressure = 2 kN/m<sup>2</sup>,  
Fan efficiency = 0.4.
- C) **Show** various types of ventilating systems in accordance with the provision of cooling ducts and how the air passes over the heated part of the machine. **CO5/K3** **6**
- Q. 5 Solve Any Two of the following.** **12**
- A) **Illustrate** the types of tests performed on transformers as per the Standards for estimation of leakage reactance, resistance of winding, no load current, and losses. **CO6/K3** **6**
- B) **Determine** winding parameters for a 100 kVA, 11 kV/415 V, 50 Hz, three-phase delta/star core type distribution transformer. Assume flux density = 1.2 T, current density = 2.5 A/mm<sup>2</sup>, window space factor = 0.28, and constant K = 0.45 for three-phase core-type distribution transformers. Use a four-step core. **CO6/K3** **6**
- C) **Illustrate** the step-by-step design procedure for the magnetic frame of a three-phase power transformer with relevant formulas. **CO6/K3** **6**

\*\*\* End \*\*\*