REG.NO.:

VIT
Vellore Institute of Technology

SCHOOL OF ELECTRICAL ENGINEERING
CONTINUOUS ASSESSMENT TEST - II
FALL SEMESTER 2024-2025

SLOT: C1+ TC1

**Programme Name & Branch** : B.Tech Computer Science Engineering

**Course Code and Course Name** : BEEE102L and Basic Electrical and Electronics Engineering

**Faculty Name(s)** :

10162 - ANBARASAN P, 21278 - INDUMATHI S, 19613 - MALLIKARJUNA GOLLA, 16177 - SONAM SHRIVASTAVA, 10304 - RANI C , 15301 - RAJA SINGH R , 14793 - INDRAGANDHI V, 14775 - CHILUKURI VENKATA MAHENDRA, 16357 - MADDELA CHINNA OBAIAH , 12480 - VIDHYA SAGAR G, 12486 - JANAKI M, 12216 - VIJAYAKUMAR D , 11080- SUDHAKAR N

**Class Number(s)** :
VL2024250106433, VL2024250109151, VL2024250106965, VL2024250106428, VL2024250106988, VL2024250106921, VL2024250106430, VL2024250106431, VL2024250106432, VL2024250107063, VL2024250106429, VL2024250106951, 7048

**Date of Examination** : 15.10.24 FN

**Exam Duration** : 90 minutes **Maximum Marks: 50**

General instruction(s):

- Answer All Questions

| Q. No | Question | M | CO | BL |
|---|---|---|---|---|
| 1. | Consider a three-phase star connected and balanced load. It is connected to a three-phase, 440 V supply with a 314 rad/sec frequency. The current in each phase is 30 A and lags 30° behind the phase voltage. Calculate (a) Resistance per phase, (b) Reactance per phase and find the load is more inductive or capacitive, (c) power factor, (d) total kVA, (e) active power and (f) reactive power. | 10 | 2 | 3 |
| 2. | A chemical reactor has three sensors indicating the following conditions<br>i) Pressure (P) is low or high<br>ii) Temperature (T) is low or high<br>iii) Liquid level (L) is low or high<br>If the two controls: Heater (H), which is either ON or OFF, and an inlet valve (V), which is either OPEN or CLOSED. The controls are operated as per the condition given below (a) Using the convention HIGH=1, LOW=0, ON=1, OFF=0, OPEN =1, CLOSED=0, draw the Karnaugh maps for H and V . Obtain the minimal SOP expressions for H and V. Also, draw the logic diagram using gates.<br><br>Condition 1(Heater ON): | 10 | 5 | 4 |



$\omega = 2\pi f$

$314$

$100\pi = 2\pi f$

$\pi = 3.14$

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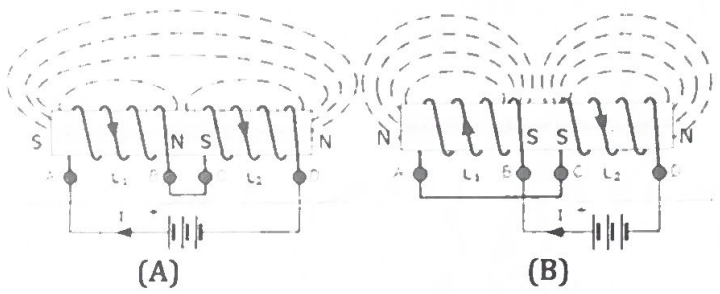
| | | | | |
|---|---|---|---|---|
| | when P and T are low, L is high Or Low<br>also, the heater is ON when all sensors are high<br>Condition 2(VALVE OPEN):<br>when P and T are High, L is high Or Low<br>also, Valve is Open when all sensors are low | | | |
| 3. | An iron ring of mean circumferential length 30 cm and cross-section 1 $cm^2$ is wound uniformly with 300 turns of wire. When a current of 0.032 A flows in the windings, flux in the ring $2\times10^{-6}$ Wb, find the flux density in the ring, magnetizing field intensity, reluctance and relative permeability of iron. | 10 | 3 | 3 |
| 4. | a. An ideal transformer primary is connected to a 480V, 50 Hz supply; the transformer delivers 50kW to a resistive load with a load current of 20.833A. Calculate turns ratio, primary current, and secondary voltage. | 5 | | |
| | b. Two identical coupled coils in series have an equivalent inductance of 0.08H and 0.035 H when connected, as per Figure A and Figure B, respectively. Find the value of overall inductance, mutual inductance, and coefficient of coupling.<br>  <br>(A) (B) | 5 | 3 | 3 |
| 5. | a. Prove that $(a+b)\ (\bar{a}+c)\ (b+c) = (a+b)(\bar{a}+c)$<br>b. $(34.79)_{10}$ convert to octal , binary and hexadecimal | 4+6 | 5 | 2 |