

II SEMESTER BCA(AI) EXAMINATION - MAY/JUNE 2026

SCHEME: Revised CBCS

BCA (Artificial Intelligence)

Introduction to Robot Components

Time: 3 Hours

Max. Marks: 80

Instructions to Candidate: Answer both Part A and Part B.

PART - A

1. Answer ALL the questions.

8x2=16

- a. A 12-V electrical device is specified as consuming 100 W of power.
How much current does it draw? CO1 LL1
- b. Write an equation for instantaneous current. CO1 LL1
- c. Name the types of BJT with their schematics. CO2 LL1
- d. List any four types of Primary Batteries. CO2 LL1
- e. Write a short note on micro python method *Pin.low()* CO3 LL1
- f. Explain the machine module methods *PWM.duty_u16([value])* CO3 LL1
- g. Describe one application of a line-following robot. CO4 LL1
- h. What is meant by flame detection precision? CO4 LL1

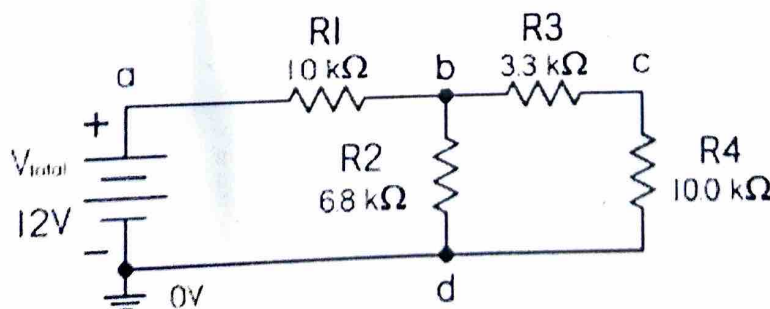
PART - B

Answer any TWO questions from each main.

4x16=64

2. a) Find the equivalent resistance of the following network, along with the total current flow, the individual current flows, and individual voltage drops across the resistors.

Note: $R_1 = 1\text{K}\Omega$, $R_2 = 6.8\text{K}\Omega$, $R_3 = 3.3\text{K}\Omega$, $R_4 = 10\text{K}\Omega$.

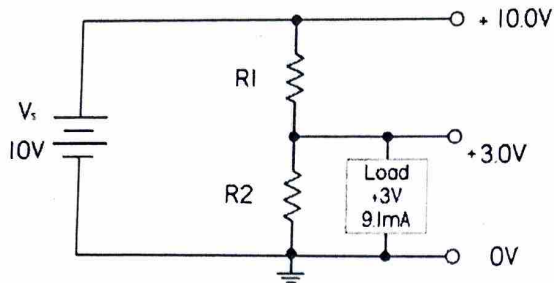


CO1 LL2

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- b) You have a 10-V supply, but a device that is to be connected to the supply is rated at 3 V and draws 9.1 mA. Design a voltage divider for the load device.

CO1 LL3



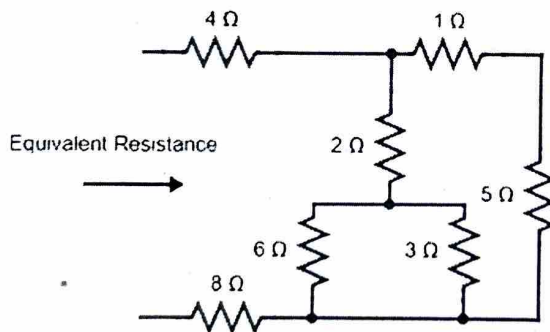
- c) Explain the following with an example.

CO1 LL2

- i. Ohms Law
- ii. Kirchhoff's Voltage Law
- iii. Kirchhoff's Current Law
- iv. Capacitance of a Capacitor

- d) Find the equivalent resistance of the below circuit.

CO1 LL2



3. a) With a neat diagram explain the following.

CO2 LL2

- i. Reed Relays
- ii. Solid-State Relays

- b) With a neat diagram explain the basic operation of a Transformers.

CO2 LL2

- c) Write a note on IC Voltage Regulators.

CO2 LL2

- d) With a neat diagram explain different types of fuses and circuit breakers.

CO2 LL2

PTO

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4. a. With a neat pinout diagram, explain the key on-board wireless module features of the Raspberry Pi Pico 2 W 2W CO3 LL2
- b. Show the interfacing of the HC-SR04 ultrasonic sensor and a buzzer with the Raspberry Pi Pico 2 using a neat circuit diagram. Write a program to implement a Social Distancing Monitoring System. CO3 LL3
- c. Show the interfacing of two IR sensors with the Raspberry Pi Pico 2 using a neat circuit diagram. Write a program to count the number of persons entering and exiting a room based on the sequence of sensor detection, and display the updated count accordingly. CO3 LL3
- d. Show the interfacing of an IR sensor module and a buzzer with Raspberry Pi Pico 2W using a neat circuit diagram. Write a program to detect an intruder using the IR sensor and activate the buzzer when an obstacle is detected. CO3 LL3

5. a. With a neat circuit diagram to interface two line sensors with pico 2. Write a micro python program for a 2WD robot to follow the line. CO4 LL3
- b. With a neat schematic, interface temperature sensor LM35 with pico board. Write the micro python code to read and display the temperature on the console. CO4 LL3
- c. With a circuit schematic, write micro python code to interface MX2125 with Raspberry Pi Pico. CO4 LL3
- d. Show the interfacing of MFRC522 RFID reader with Raspberry Pi Pico board using a neat schematic. Write a micro python code to read the RFID tags. CO4 LL3

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