

5th sem diploma question paper

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5th Semester Diploma Question Paper: A Comprehensive Q&A Guide

The fifth semester of a diploma program marks a crucial juncture, testing students' knowledge and skills acquired throughout the previous semesters. To assist students in their exam preparation, this article provides a comprehensive Q&A guide based on a sample question paper.

1. Introduction to Instrumentation

Question: Explain the principle of operation of a potentiometer.

Answer: A potentiometer measures an unknown voltage by comparing it to a known reference voltage. It consists of a resistive element and a sliding contact that can move along the resistor. When the sliding contact reaches a point where the unknown voltage equals the reference voltage, the galvanometer connected to the circuit reads zero.

2. Control Systems Engineering

Question: Derive the transfer function of a closed-loop control system.

Answer: The transfer function of a closed-loop system is derived by combining the transfer functions of the forward path and feedback path. The formula for the transfer function is:

Transfer function = (Forward path transfer function) / (1 + (Forward path transfer function) * (Feedback path transfer function))

3. Electrical Machines

Question: Discuss the construction and working of a synchronous generator.

Answer: A synchronous generator is an electrical machine that converts mechanical energy into electrical energy. It consists of a rotating armature winding and a stationary field winding. When the armature rotates in the magnetic field, an alternating current is induced in the armature winding.

4. Mechanical Engineering

Question: Calculate the torque on a hollow shaft subjected to twisting moment.

Answer: The torque on a hollow shaft can be calculated using the following formula:

$$\text{Torque} = (\text{Polar moment of inertia}) * (\text{Angular acceleration})$$

For a hollow shaft, the polar moment of inertia is given by:

$$\text{Polar moment of inertia} = (\pi/32) * (\text{Outer diameter}^4 - \text{Inner diameter}^4)$$

5. Computer Science

Question: Write a Java program to find the largest element in an array.

Answer:

```
import java.util.Scanner;

public class LargestElement {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        int[] arr = new int[10];

        System.out.println("Enter 10 integers:");
        for (int i = 0; i < 10; i++) {
            arr[i] = sc.nextInt();
        }

        int largest = arr[0];
        for (int i = 1; i < 10; i++) {
            if (arr[i] > largest) {
                largest = arr[i];
            }
        }
    }
}
```

```

        System.out.println("The largest element in the array is: " + larg
    }
}

```

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