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Kharghar, Navi Mumbai - 410 210.

Science & Humanities

Vision: - "To excel in the field of technology by creating technocrats with value-based professionalism"

Mission: - To provide technical expertise to fulfill the needs of the industry.

To impact ethical values & professional responsibilities.

To achieve excellence in academics.

Subject: - EEC **Date:-**

Topic Name:- Magnetic Circuit(CO1)

Assignment No:-1

1. Compare magnetic circuits with electric circuits.
2. Describe the concept of magnetic flux and its units of measurement
3. Explain the role of magnetic permeability in magnetic circuits

4. A magnetic circuit consists of an iron core with a cross-sectional area of 0.02 m^2 and a length of 0.5 m. The relative permeability of the iron core material is 500. If a magnetic field of 800 A/m is applied to the core, calculate the magnetic flux.
5. A coil has 500 turns and carries a current of 2 A. The coil is wound on a magnetic core with a magnetic permeability of 1000. Calculate the magnetic flux in the core.
6. Two magnetic circuits have the same coil with 1000 turns and current of 5 A. The first core is made of iron with a relative permeability of 1000, while the second core is made of steel with a relative permeability of 200. Calculate the reluctance of each core and determine which one will have a higher magnetic flux
   Explain the concept of magnetic hysteresis and its significance in magnetic circuits
7. A solenoid has 1000 turns and carries a current of 3 A. The magnetic field in the core is 0.6 T, and the core has a relative permeability of 2000. Calculate the magnetic flux in the solenoid.
8. State Faraday's Law

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Topic Name:- AC Fundamentals(CO2)

Assignment No:-2

1. A coil with an inductance of 5 mH is connected to an AC voltage source with a frequency of 1 kHz. Calculate the inductive reactance.
2. Describe the concept of impedance in AC circuits and how it accounts for resistance, capacitive reactance, and inductive reactance.
3. Two AC waveforms have the same frequency, but one waveform has a peak voltage of 150V, and the other has a peak-to-peak voltage of 600V. Calculate the RMS voltage for each waveform.
4. How does a phase difference of 180 degrees between voltage and current affect the power factor and power consumption in an AC circuit?
5. A sinusoidal AC current with a frequency of 50 Hz flows through a coil with an inductive reactance of 30 ohms. Calculate the peak current of the waveform.
6. Describe the waveform of a sinusoidal AC voltage and mention its mathematical representation.
7. What is the peak value, RMS value, and average value of an AC voltage with a sinusoidal waveform?
8. How is the frequency of an AC waveform related to its time period? Provide the formula.
9. A sinusoidal voltage has a peak value of 220V. Calculate its RMS value.
10. Explain the concept of phase in AC circuits and how it influences the behavior of AC voltages and currents.
11. In an AC circuit, if the current and voltage waveforms are perfectly in phase, what is the power factor of the circuit?
12. A resistive load is connected to a sinusoidal voltage source with a frequency of 50 Hz and a peak value of 240V. Calculate the RMS voltage across the load.
13. Describe the working principle of a transformer and explain how it can step up or step down AC voltages.

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Topic Name:- Poly phase AC circuits(CO3)

Assignment No:-3

1. In a star-connected three-phase system, if the phase voltage is 230V, what is the line voltage?
2. In a delta-connected three-phase system, if the line current is 50A, what is the phase current?
3. Calculate the power factor of a balanced three-phase system if the phase angle between the line voltage and line current is 30 degrees.
   Compare single-phase and poly phase AC circuits in terms of advantages and applications
4. In a three-phase AC system, if the line voltage between any two phases is 400V, what is the phase voltage?
5. Calculate the line current in a balanced three-phase system with a phase current of 20A
6. A three-phase induction motor is connected in a star configuration. The line voltage is 440V, and the phase current is 30A. Calculate the current in each motor winding.

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Subject: - EEC **Date:-**

Topic Name:-Transformer(CO4)

Assignment No:-4

1. Explain the basic principle of operation of a transformer.
2. What is the difference between a step-up transformer and a step-down transformer? Provide examples of their applications.
3. A transformer has a primary voltage of 240V and a secondary voltage of 24V. Calculate the turn's ratio of the transformer.
4. Describe the significance of the transformer core and the materials used for its construction.
5. What are the losses that occur in a transformer during its operation? How can these losses be minimized?
6. A 500 kVA transformer has an efficiency of 98% when operating at full load. Calculate the input power and the losses at full load.
7. Explain the concept of voltage regulation in a transformer and how it affects the output voltage.

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Subject: - EEC **Date:-**

Topic Name:-DC Motors(CO4)

Assignment No:-5

1. What are the main components of a DC motor, and what are their functions?
2. Describe the difference between a shunt-wound DC motor and a series-wound DC motor.
3. A 24V DC motor draws a current of 10A when running at full load. Calculate its power rating.
4. What are the advantages and disadvantages of using a DC motor over an AC motor in specific applications?
5. A series-wound DC motor has an armature resistance of 0.4 ohms and draws a current of 20A. Calculate the voltage drop across the armature.
6. A DC motor has a speed of 1200 RPM when connected to a 120V supply. If the armature resistance is 2 ohms, calculate the back EMF.
7. What is the back EMF (electromotive force) in a DC motor, and how does it affect motor performance?

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Topic Name:- Fractional Horse Power Motor(FHP)(CO5)

Assignment No:-6

1. Define a fractional horsepower motor and explain why it is called "fractional horsepower."
2. Describe the construction of a fractional horsepower motor and the materials used for its components.
   How fractional horsepower motors are typically started and controlled? Describe the starting methods and speed control techniques
3. A fractional horsepower motor has a synchronous speed of 1800 RPM and operates at 1750 RPM under load conditions. Calculate its slip.
   What are the future trends and developments in fractional horsepower motors, especially with regard to energy efficiency and sustainability?
4. How do fractional horsepower motors contribute to energy efficiency in household appliances and other small devices?
5. Describe the role of fractional horsepower motors in automotive applications and their contribution to fuel efficiency.

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Topic Name:- Protective Devices and switch gear(CO6)

Assignment No:-7

1. Explain the importance of protective devices in electrical systems and their role in preventing electrical accidents and equipment damage.
2. Describe the working principle of a circuit breaker and its different types based on operating mechanisms.
3. What is the difference between a fuse and a circuit breaker? Discuss their advantages and disadvantages.
1. Define switchgear and describe its role in controlling and protecting electrical circuits and equipment.
2. What is the difference between indoor switchgear and outdoor switchgear, and what factors influence their selection?
1. Describe the protection scheme used for an electrical substation, including the different protective devices and their settings.
2. Explain how a busbar differential relay works and its application in protecting busbar systems.
3. Describe the application of protective devices and switchgear in a motor control center (MCC).
4. Explain the working principle of a differential current relay and how it is used for line protection in transmission systems.
5. Compare MCB,MCCB and ELCB switches
6. Explain fuse switch and switch fuse.

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