

SL-228

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Seat No.	
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F.E. (All Branches) (Semester-I & II) (Revised)

Examination, May - 2017

BASIC ELECTRICAL ENGINEERING

Sub. Code : 59178

Day and Date : Thursday, 04-05-2017

Total Marks : 100

Time : 10.00 a.m. to 1.00 p.m.

- Instructions :**
- 1) All questions are compulsory.
 - 2) Figures to the right indicate full marks.
 - 3) Draw neat labeled diagrams as a part of explanation.
 - 4) In case of missing data, assume suitable value. State it clearly.

SECTION-I

Q1) Answer any TWO.

[2×9=18]

- a) State and explain Kirchhoff's laws with suitable example.
- b) An electrically driven pump lifts 0.8 m^3 of water per minute at a height of 12 m. The overall efficiency of motor and pump is 70%. Calculate motor input power. If the pump is operated for 2 hours per day for 30 days, calculate the energy consumption in Kwh and the energy cost at a rate of Rs 2 per Kwh. Assume 1 m^3 of water has mass of 1000 Kg.
- c) Draw a typical series magnetic circuit and obtain the mathematical expression for mmf in it. Also draw and write its electrical equivalent circuit and equation.

Q2) Answer any TWO.

[2×9=18]

- a) Explain how single phase sine wave AC voltage is generated.
- b) State the importance of power factor in AC system. Explain the method of power factor improvement by static capacitor.
- c) An inductor coil is connected across 250 volt, 50 Hz AC supply and it takes a current of 5 A. The coil dissipates 750 W. Calculate-Impedance, Power factor, Resistance of the coil, Inductance of the coil.

Q3) Answer any TWO.

[2×7=14]

- a) Draw the circuit of a Fluorescent tube for residential use. Explain the role of choke and glow type starter in its working.
- b) Describe the principle of producing light in LED. State advantages of LED lamps as compared to other lamps.

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- c) Draw the diagram and explain the working principle of single phase induction type Energymeter.

SECTION-II

Q4) Answer any TWO.

[2×7=14]

- When supply voltage is V , power taken by load is P and pf of load is $\cos \phi$, write the expression for line current (i) in a single phase system (ii) in a 3 phase 3 wire system. Hence comment on the copper required and copper loss in the two systems.
- Draw the circuit diagram of a star connected circuit and prove that in this balanced system, phase voltage = line voltage/ $\sqrt{3}$.
- Define and explain
3 phase balanced AC supply, phase sequence, 3 phase balanced load

Q5) Answer any TWO.

[2×9=18]

- State the advantages of a rotating field alternator over stationary field alternator. Write the emf equation and expression for frequency of emf in a single phase alternator.
- Draw figures and explain the construction of core and windings in a single phase shell type transformer.
- A 200V/400V, 4KVA single phase transformer delivers 5A to a 0.8 pf load at rated voltage. Find its efficiency. Given: Transformer Iron loss and copper loss at 10A current are 40W and 400W respectively.

Q6) Answer any TWO.

[2×9=18]

- Draw the circuit diagrams and voltage phasor and current phasors for four types of split phase induction motor.
- State the important features of a shaded pole induction motor. List its applications.
- Explain the operating principle of a universal motor with DC supply. How does the commutator affect the torque direction in the universal motor?

