

Total No. of Questions—8]

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Seat No.	
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**[4956]-104**

**F.E. EXAMINATION, 2016**  
**BASIC ELECTRICAL ENGINEERING**  
**(2012 PATTERN)**

**Time : Three Hours**

**Maximum Marks : 100**

- N.B. :—** (i) Solve Q. No. 1 or Q. No. 2, Q. No. 3 or Q. No. 4, Q. No. 5 or Q. No. 6, Q. No. 7 or Q. No. 8.
- (ii) Figures to the right indicate full marks.
- (iii) Neat diagrams must be drawn wherever necessary.
- (iv) Use of electronic pocket calculator is allowed.
- (v) Assume suitable data, if necessary.

**SECTION I**

1. (a) What is insulation resistance ? Obtain an expression for insulation resistance of single core cable. [6]
- (b) If a coil of 150 turns is linked with a flux of 0.01 wb when carrying a current of 10A, calculate
- (i) Self inductance of the coil
- (ii) If this current is uniformly reversed in 0.1 sec, calculate induced emf.
- (iii) If a second coil of 100 turns is uniformly wound over the first coil, find mutual inductance between them. [6]

P.T.O.

*Or*

2. (a) Obtain the expression for co-efficient of coupling between two magnetically coupled coils. [6]
- (b) Find the current flowing at the instant of switching 40 W Lamp on 240 V supply. Given that working temperature of filament is 2000°C and temp. co-efficient of resistance of filament at 15°C is  $0.005 \text{ } ^\circ\text{C}^{-1}$ . [6]
3. (a) Obtain the expression for composite capacitor having three dielectric materials. [6]
- (b) Obtain the expression for r.m.s. value of current in terms of its peak value. [6]

*Or*

4. (a) Draw the neat connection diagram and explain the procedure for finding voltage regulation and efficiency by direct loading method for transformer having ratings 1 KVA, 230/115 V, 1-ph, 50 Hz. Also write the proper ranges of meters. [6]
- (b) A 50 Hz alternating current having rms value 10A has instantaneous value of  $-7.07\text{A}$  at  $t = 0$ . Write down the equation for current and sketch the waveform stating all currents and phase angle. [6]

5. (a) What is series resonance ? Obtain the expression for resonant frequency. Also draw the phasor diagram. [6]
- (b) Three identical impedances each of  $6 + j8 \Omega$  are connected in delta across 3-ph, 400 V, 50 Hz ac supply. Calculate
- (i) Line current
  - (ii) Power factor
  - (iii) Active power
  - (iv) Reactive power. [7]

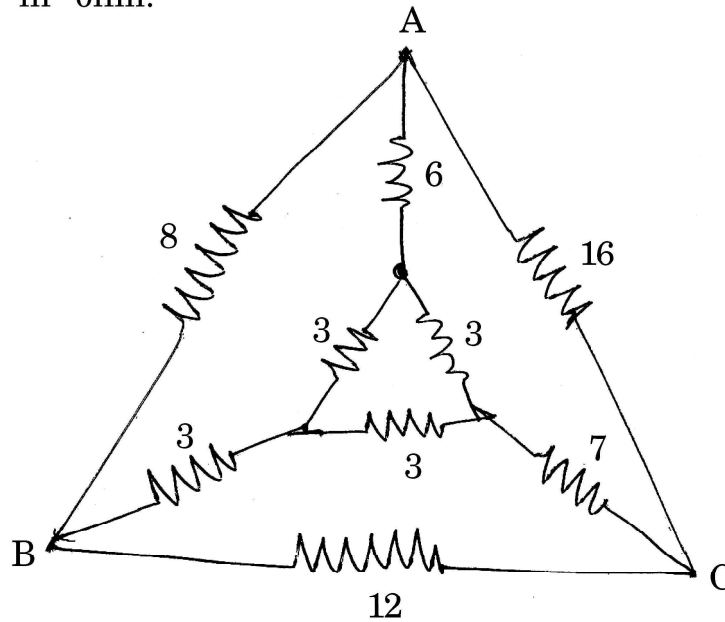
*Or*

6. (a) Define and explain following terms.
- (i) Admittance
  - (ii) Phase sequence
  - (iii) Balanced and unbalanced load. [6]
- (b) Find the expression for current when  $v = 282.84 \sin(314 t)$  V is applied to coil having resistance 10 ohm and inductance 0.1 H. Also calculate the power consumed. [7]

## SECTION II

7. (a) State and explain Kirchhoff's Laws. [6]

- (b) Find the resistance between B and C. All the resistance values are in ohm. [7]



Or

8. (a) State and explain the Verins theorem. [6]  
 (b) Using Superposition Theorem, find current flowing through AB. All resistance values are in ohm. [7]

