

Total No. of Questions—8]

[Total No. of Printed Pages—4

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 -7.07A 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]

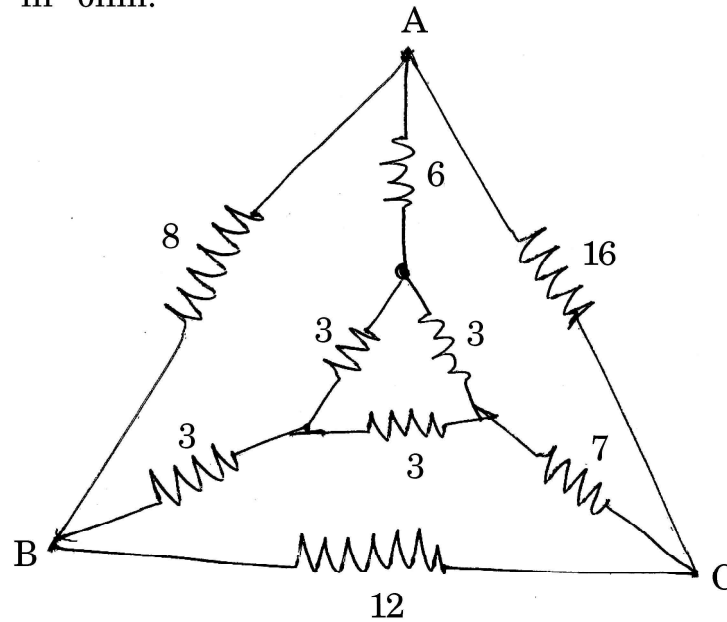
Or

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]

