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Total Number of Pages:

B.TECH
BE2102

2nd Semester Back Examination 2016-17
BASIC ELECTRICAL ENGINEERING

BRANCH(S): ALL

Time: 3 Hours

Max Marks: 70

Q.CODE: Z1146

Answer Question No.1 which is compulsory and any five from the rest.
The figures in the right hand margin indicate marks.

Q1 Answer the following questions:

(2X10)

- a) What are the conventional ways of electrical power generation?
- b) Define ideal voltage and current source?
- c) A resistor of 5Ω is connected across a potential difference of 100V. Calculate the power dissipated and energy transferred to heat in 2 minutes?
- d) Two impedances of value $(3+j4) \Omega$ and $(8-j12) \Omega$ are connected in parallel. What would be the resulting power factor of the combination?
- e) A three phase balanced load supplied from 440 V, 50Hz supply takes a current of 20A & draws a power of 10KW. What is the p. f of the circuit?
- f) What do you understand by resonance in AC circuit?
- g) List any two advantages of 3-phase system over 1-phase system.
- h) Find the probable number of poles of an induction motor having no load speed of 980 rpm when supplied from a three phase 50Hz supply?
- i) Why the cores used in a transformer are laminated?
- j) Write the principle of DC motor & the equation of back emf explaining each term associated with it?

Q2 a) A series circuit has $R=10\Omega$, $L=50\text{mH}$, and $C=100\mu\text{F}$ and is supplied with 200V, 50Hz AC supply Find

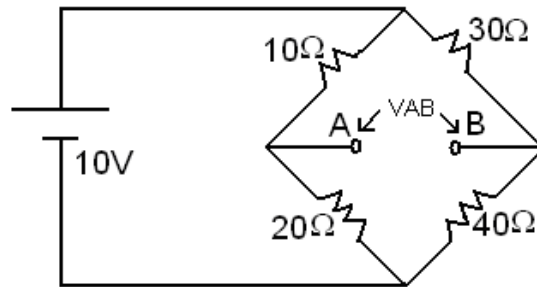
(5)

- (i) Impedance ?
- (ii) Current ?
- (iii) Power ?
- (iv) Power factor ?
- (v) Voltage drop across the each element?

b) State & Explain maximum power transform Theorem by giving a suitable example?

(5)

- Q3 a)** A 220V, 100Hz ac source supplies a series RLC circuit of $50\text{m}\Omega$ resistance and 5mH inductance. Find the value of 'C' such that the circuit will resonate at supply frequency. Also calculate the Q-factor and half power frequencies of the circuit. (5)
- b)** Find the voltage V_{AB} in the circuit shown in below? (5)



- Q4 a)** Derive the e.m.f equation of single phase two winding transformer from first principle? (5)
- b)** An iron ring has a mean diameter of 25cm and a cross sectional area of 6cm^2 . It is wound with a coil of 1500 turns. An air gap 2mm width is cut in the ring. Determine the current required in the coil to produce a flux of 0.5mWb in the air gap. If the relative permeability of iron is 800 ? (neglect magnetic leakage and fringing) Given $\mu_0 = 4\pi \times 10^{-7}\text{H/m}$ (5)
- Q5 a)** Explain how the operating speed of a DC shunt motor can be changed by varying the field flux. What is the limitation of this method? (5)
- b)** A resistance of $1000\ \Omega$ and a capacitor of $100\ \mu\text{F}$ are connected in series to a 200V DC . Find the initial current, Final Current, time taken to reach 80% of steady state value and also the value of current after 5 seconds? (5)
- Q6 a)** A 4 pole DC shunt generator with wave connected armature has 41 slots and 12 conductors per slot. The shunt field resistance and armature resistance of $200\ \Omega$ and $0.5\ \Omega$ respectively, the flux per pole is 0.125 Weber . When the generator is driven at 1000 RPM calculate the voltage across the load having resistance $10\ \Omega$. Also determine load current, Armature current and output power. (5)
- b)** State and explain working principle of a poly phase induction motor. (5)
- Q7 a)** Explain the principle of operation of a dynamo meter type wattmeter by drawing a neat diagram? Also write down its merits & demerits? (5)
- b)** Three identical impedances having resistance of $10\ \Omega$ inductance of 25mH and capacitance of $50\ \mu\text{F}$ per phase is connected in star to a three phase supply of 400V , 50Hz . Find the Line current, phase current, power factor and total power of the network? (5)
- Q8 Answer any Two (5X2)**
- a)** B-H Curves
- b)** Series resonance
- c)** Thermal Power Plant