

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
II B.TECH II SEM-REGULAR/SUPPLEMENTARY EXAMINATIONS MAY - 2010
ELECTRICAL AND ELECTRONICS ENGINEERING
(AERONAUTICAL ENGINEERING)

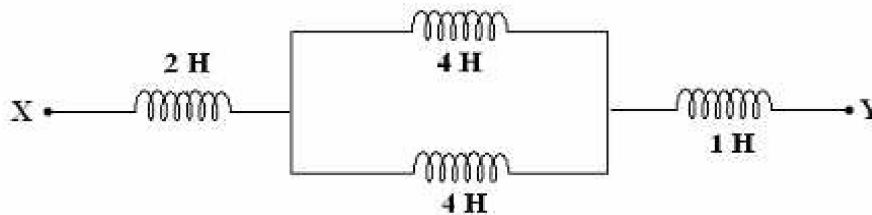
Time: 3hours

Max.Marks:80

Answer any FIVE questions
 All questions carry equal marks

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- 1.a) Find the equivalent inductance of the combination shown figure below across X and Y.



- b) When two capacitances of values C_1 & C_2 Farads are connected in parallel, prove the $C_{eqv} = C_1 + C_2$. [8+8]
- 2.a) Write down the similarities and dissimilarities between motors and generators in principle of operation & applications point of view.
- b) The power input to a 230V dc shunt motor is 8477 KW. The field resistance is 230 ohms and armature resistance is 0.28 ohms. Find the input current, armature current and back EMF. [8+8]
3. The primary and secondary windings of a 40 KVA, 6600/250 V Single phase transformer has resistances of 10 ohms and 0.02 ohms respectively. The total leakage reactance is 35 ohms as referred to the primary winding. Find full load regulation at a Power factor of 0.8 lagging. [16]
- 4.a) List the advantages and dis-advantages of synchronous motors.
- b) Calculate the distribution factor of a 3-phase winding with 120° phase spread when the winding is:
- i) Uniformly distributed
 - ii) Occupies 6 slots per pole. [8+8]
- 5.a) List the advantages of gravity control over spring control.
- b) List the different types of materials used in components of spring and gravity control. [8+8]
- 6.a) Derive the conductivity equation for an N-type and P-type semiconductor.
- b) In an N-type semiconductor, the Fermi level lies 0.4 eV below the conduction band at 300°K . Determine the new position of the Fermi level if
- i) The temperature is increased to 400°K and
 - ii) The concentration of donor atoms is increased by a factor of 6. Assume $kT = 0.03$ eV. [8+8]

7. The brightness of a 100 W, 110 V lamp is to be varied by controlling firing angle of SCR full wave circuit. The RMS value of A.C. voltage appearing across each SCR is 110 V. Find the RMS voltage and current in the lamp at firing angle of 60° . [16]
- 8.a) How many types of deflection systems are possible in CRO? Name them.
- b) An electron with a velocity of 3×10^5 m/sec enters an electric field of 910V/m making an angle of 60° in the positive direction. Calculate the time required to reach its maximum height. [8+8]
