Total Number of Pages : 03   **B.Tech.**
                                                                              PEN2B101

2nd Semester Regular / Back Examination 2017-18
ELECTRICAL & ELECTRONICS ENGINEERING
BRANCH : AEIE, AERO, AUTO, BIOMED, BIOTECH,
CHEM, CIVIL, CSE, ECE, EEE, EIE, ELECTRICAL, ENV, ETC, FAT, IEE, IT, MANUFAC,
MANUTECH, MECH, METTA, MINERAL, MINING, MME, PE, PLASTIC, PT, TEXTILE
Time : 3 Hours
Max Marks : 100
Q.CODE : C705
Answer Part-A which is compulsory and any four from Part-B.
The figures in the right hand margin indicate marks.
Answer all parts of a question at a place.

Part – A (Answer all the questions)

Q1   Answer the following questions:*multiple choice and fill in the blanks:*   **(2 x 10)**

a) The resistance of a copper wire is R ohm. This wire is stretched to its double length. The new resistance is,
(i) RΩ   (ii) 4R Ω   (iii) 2RΩ   (iv) R/2 Ω

b) The average power in purely inductive circuit for one complete cycle is
(i)$E_{rms}I_{rms}$ (ii) zero   (iii)$E_{max} I_{max}$ (iv) $(E_{max}I_{ma})/2$

c) Binary representation of the decimal number 25 is
(i) 10001   (ii)11001   (iii)11101   (iv)10110

d) The current gain of BJT in common base is
(i) α   (ii)β   (iii) γ   (iv) none of these.

e) The rms value of 200 V DC supply is _____ .

f) The ripple factor of half wave rectifier is _____ and for full wave rectifier is _____

g) The mobility of electrons in a materials is expressed in unit of _____

h) A three Phase balanced delta connected load is connected to symmetrical three phase 440 V balanced supply. The current in each phase is 15 A and leads 60 degree ahead of the corresponding phase voltage. Then line current will be ___

i) A two pole DC generator running at 1500 rpm has 40 conductors. The flux per pole is 1mWb. The induced emf if the armature winding is _____ for lap connected and _____ for wave connected.

j) According to 1oolean law: A + 1 = _____ and A + 0 =_____

Q2   Answer the following questions: *Short answer type:*   **(2 x 10)**

a) Three resistor of resistance   (R_1=10 Ω, R_2=5 Ω and R_3=3 Ω) are connected in star network, convert it into delta network and find out its equivalent delta resistance .

b) Define Unilateral and bilateral elements.

c) Convert following number into decimal number (i) 34.85_8 (ii) 110.10101_2

d) Draw the circuit diagram of half wave rectifier.

e) State De morgen's theorem.

f) Calculate the time taken by a capacitor of 1 µF in series with a 1M Ω resistance to be charged up to 80% of the final value.

g) What is apparent power, active power and reactive power?

h) What is P and N type semiconductor?

i) A zener diode acts as a voltage regulator. Explain the meaning of the statement.

j) What is the working principle of DC machines?

Part – B (Answer any four questions)

Q3 **a)** Find the current through 40 Ω resistor using superposition theorem for the circuit shown in figure 1. **(5)**
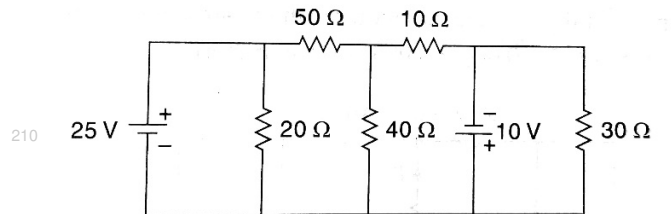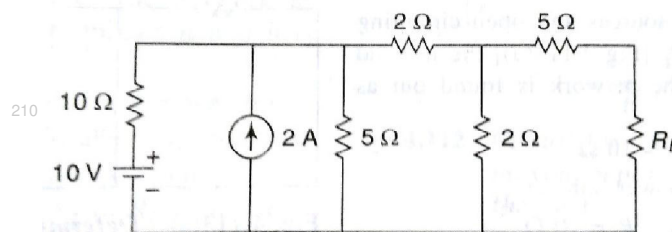

Figure 1

Figure 2

b) State the maximum power transfer theorem and obtain the maximum power transferred to R_L in the circuit shown in Figure 2. And also find the value of R_L **(10)**

Q4 **a)** Explain the principle of operation of a transformer in detail and Derive the Emf equation of single phase transformer. **(5)**

b) Draw the phase voltage and line voltage phasor diagram for 3-phase star connected balanced system. A 3-phase 230 V load has power factor of 0.7. Two wattmeter are connected to measure the power which shows the input to be 10 kW. Find the readings of each wattmeter. **(10)**

Q5 **a)** Explain the operation of a full wave bridge rectifier with relevant waveforms. **(5)**

b) Explain the V-I characteristics of a P-N junction diode when it is connected in forward bias and reverse bias. A PN junction diode gives a current of 50 mA at a room temperature of 20 dergee C when the forward bias voltage is 200mV. Determine (a) the saturation current with a negative bias (b) the diode current when room temperature is 30 degree C , and (c) diode current at a forward bias voltage. **(10)**

Q6 **a)** Explain the full adder circuit with its expression and truth table. **(5)**

b) List out all the basic logic gates and universal gateswith its logic symbols and truth table. And generate AND function, OR function and NOT function using any one Universal gate. **(10)**

Q7 **a)** A series circuit has R= 5 Ω, L= 13 mH and C=140 µF and is supplied with 230 v, 50 Hz single phase. Find (i) Impedance (ii) current (iii) power (iv) power factor of the circuit. **(8)**

b) An iron ring made up of three parts, l_1=12cm, a_1=6 cm^2, l_2 =10 cm, a_2=5 cm^2, l_3=8 cm and a_3 = 4 cm^2. It is surrounded by a coil of 200 turns. Determine the exciting current required to create a flux of 0.5 mwb in the iron ring .[Given µ1=2670, µ2= 1055, µ3= 680] **(7)**

Q8 **a)** Simplify the function Y = (A+B)($\overline{A}$ +C)(B+C) and design the circuit for simplified function using basic logic gates. **(8)**

b) Determine (i) $I_{C(sat)}$ (ii) I_C (iii) V_C(iv)V_E and (v)V_{CE} for the circuit shown in figure 3 . **(7)**
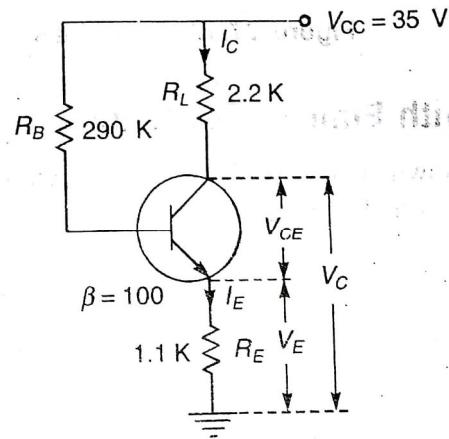

Figure 3

Q9 **Write a short note on any THREE :** **(5 x 3)**

a) Magnetic material and B-H curve
b) Different methods of transistor biasing.
c) Generation and distribution of AC Power
d) Transients in RL circuit with DC excitation
e) circuit elements and their characteristics