Registration No :

Total Number of Pages : 02   **B.Tech**
                                                                                             PEN2B101

2nd Semester Back Examination 2018-19
ELECTRICAL & ELECTRONICS ENGINEERING
BRANCH : AEIE, AERO, AUTO, BIOTECH, CHEM, CIVIL, CSE, ECE, EEE, EIE, ELECTRICAL, ETC, IT, MANUTECH, MECH, METTA, MINERAL, MINING, MME, PE, PLASTIC, PT, TEXTILE
Max Marks : 100
Time : 3 Hours
Q.CODE : F1012
Answer Question No.1 (Part-1) which is compulsory, any eight from Part-II and any two from Part-III.
The figures in the right-hand margin indicate marks.

Part- I

Q1   Only Short Answer Type Questions (Answer All-10)   **(2 x 10)**

a) What are the internal resistances of an ideal (i)10v voltage source and (ii) 7.5A current source?

b) What is duality principle? Give two examples.

c) What is the relation between the line voltage and phase voltage of a 3-phase delta connection circuit?

d) How diode can be used as a linear element in a circuit?

e) What is slew rate of an op-amp?

f) Draw the energy band diagram of a n-type semiconductor

g) What do you mean by 'ratio correction factor' in an Instrument Transformer?

h) Find the percentage of error for a reading of 25 mA of an ammeter provided the ammeter range is 0-50mA has an error 0f 2%.

i) Find the resolution of a voltmeter for a voltage measurement of $4\frac{1}{2}$ digits.

j) What is the semiconductor material used for the LED and how the different colors are obtained?

Part- II

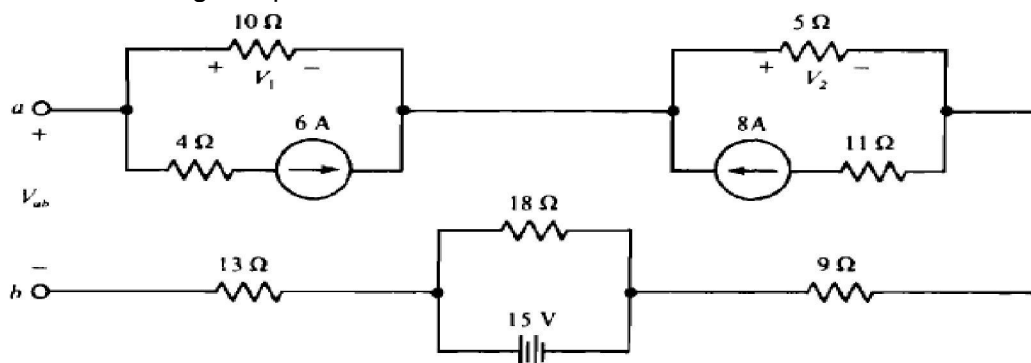**Q2   Only Focused-Short Answer Type Questions-   (Answer Any Eight out of Twelve)   (6 x 8)**

a) For the circuit given below what is the value of R_L for which maximum power transfer will be there and how much?
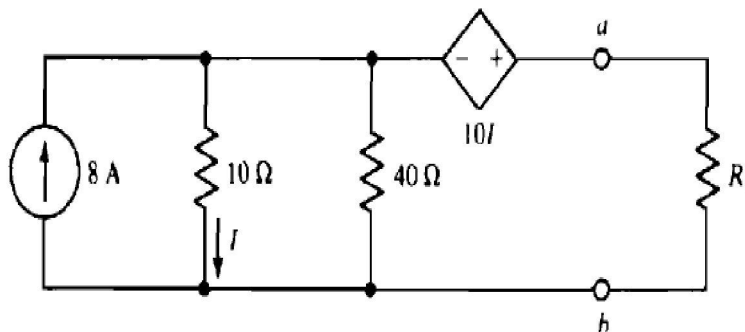
b) Draw the simplified hybrid π model of a common emitter configuration of BJT and find out the different h-parameters.

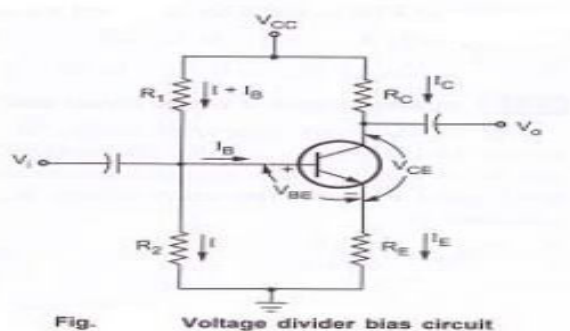**c)** Determine the voltage drop across terminals a and b

d) A PMMC instrument has a coil of dimension 10mm X 8mm. The flux density in airgap is 1×10^{-3}wb/m^2 and spring constant is 0.3×10^{-16}N-m/rad. Determine the number of turns required to produce angular deflection of 45^0 when 4A current is flowing through the coil.

e) Prove that (i) A+AB=A (ii) A+ $\overline{A}$ B =A+B

f) Minimize the following expression using Boolean Algebra

$F(A,B,C,D)= \sum(1,3,4,6,7,10,11,12,14)$

g) What is the working principle of a current transformer? Draw and explain its phasor diagram.

h) Realize a full adder using half adders with truth table.

i) Explain the working of Single-phase transformer.

j) Discuss briefly about the Magnetic materials and B-H curves.

k) How the 3-phase power is measured by 3 wattmeter method?

l) Draw the diagram of Instrumentation amplifier and explain its working.

Part-III
Only Long Answer Type Questions (Answer Any Two out of Four)

Q3 For the circuit given below R$_1$=39KΩ, R$_2$=6.8KΩ, R$_C$=5.6KΩ, R$_E$=1.2KΩ, VCC=12V, β=120. **(16)** Find the I$_{BQ}$, I$_{CQ}$, I$_{EQ}$, V$_{CEQ}$, V$_{BQ}$, V$_{CQ}$, and V$_{BC}$.

Fig. Voltage divider bias circuit

Q4 Draw the phase voltage and line voltage phasor diagram of a 3-phase delta connected **(16)** balanced system. A 3 phase 230V load with a power factor of 0.5. Two wattmeters are connected to measure the power showing the input to be 7KW. Find the rating of each wattmeter.

Q5 Discuss the special diodes. **(16)**

Q6 Derive the expression for the impulse response and step response of a second order **(16)** circuit.