R16

I B. Tech II Semester Supplementary Examinations, Nov/Dec - 2019
BASIC ELECTRICAL AND ELECTRONICS ENGINEERING
(Com. to ME, AE, AME, Min E, MET)

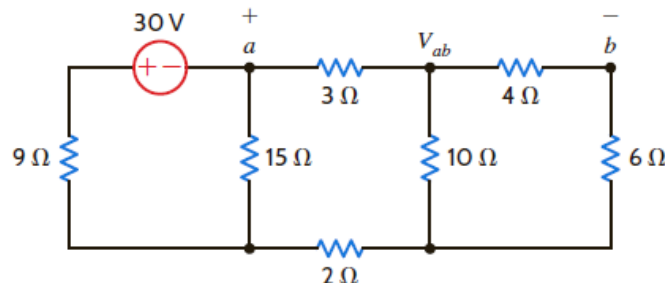Time: 3 hours   Max. Marks: 70

Note: 1. Question paper consists of two parts (**Part-A** and **Part-B**)
2. Answering the question in **Part-A** is Compulsory
3. Answer any **FOUR** Questions from **Part-B**

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PART –A
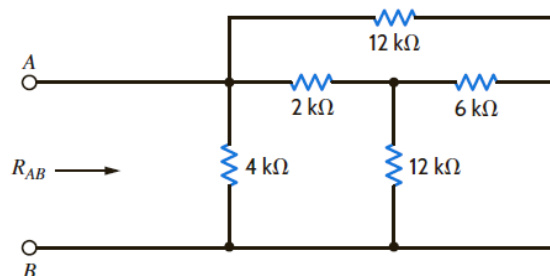
1. a) What is meant by unilateral and bilateral circuit?   (2M)

    b) What is the main necessity of using starter in the motor circuit?   (2M)

    c) What is the main purpose of conducting OC and SC tests in a transformer?   (2M)

    d) Why the synchronous motor is called as constant speed motor?   (2M)

    e) What are the losses in the induction motor?   (2M)

    f) In the full bridge diode circuit, if one diode is open what is the dc output voltage? (2M)

    g) A transistor has a collector current of 2 mA. If the current gain is 120 what is the (2M)
       base current?

PART -B

2. a) Using the KCL and KVL equations, find the V_{ab} in the following circuit.   (5M)

    b) Find R_{AB} in the following circuit using star-delta transformation.   (5M)

    c) Two 6 μF capacitors are connected in series with one having a capacitance of 12   (4M)
       μF. Find the total equivalent circuit capacitance. What capacitance must be added
       in series to obtain a capacitance of 1.2 μF?

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3. a) Describe how the speed of the dc motor can be controlled above rated speed. (7M)

b) A dc generator has an armature e.m.f of 100 V when the useful flux per pole is 20 (7M) mWb and the speed is 800 r.p.m. Calculate the generated e.m.f (i) with the same rated flux and a speed of 1000 r.p.m (ii) with a flux per pole of 25 mWb and a speed of 900 r.p.m.

4. a) Explain the various losses in a transformer. Describe how each loss varies with the (7M) load current, supply voltage and frequency.

b) A single-phase transformer has 500 turns in the primary winding. When it is (7M) connected to a 1-ϕ, 120 V, 60 Hz power supply, the no-load current is 1.6A and the no-load power is 80 W. Neglect the winding resistance and leakage reactance of the winding. Calculate
    (i) The core loss current, I_c.
    (ii) The magnetizing current, I_m.
    (iii) The peak value of the core flux, $\Phi_{max.}$
    (iv) The magnetizing impedance Z_m,

5. a) Give the constructional details of synchronous machine and then describe the (7M) machine principle to operate as a generator and motor.

b) Describe briefly torque-slip characteristics of induction motor. Based on these (7M) characteristics what are its applications?

6. a) Describe the operation of PN junction diode by including majority and minority (7M) carriers in your discussion.

b) Explain the operation of OPAMP as a non-inverting and inverting amplifier. (7M)

7. a) Describe the NPN transistor operation in the common base configuration. What (7M) are its operating regions?

b) An amplifier has mid-band voltage gain of 1000. If the cut-off frequencies are (7M) f_1=100 Hz and f_2=120 Hz, what does the frequency response look like? What is the voltage gain if the input frequency is 20 Hz and 300 kHz?

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