Model Question Paper

Reg No:
Name:

RAJAGIRI SCHOOL OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

FIRST SEMESTER B.TECH DEGREE EXAMINATION
Course Code: 101908/CO900F

Course Name: Basics of Electrical & Electronics Engineering

Section I: Basics of Electrical Engineering

Max.Mark:50 **Duration: 3 hours (For sections I & II)**

PART A
Answer all questions

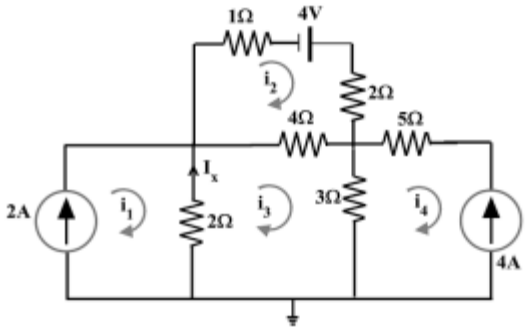
(Answer **all** questions, **each** question carries 4 marks)

1. Differentiate between inductance and capacitance parameters.
2. Explain statically and dynamically induced E.M.F.
3. With the help of equations and the waveform show that the power consumed by a pure capacitor is zero.
4. A conductor of length 1 metre moves at right angles to a uniform magnetic field of flux density 1.5 Wb/m2 with a velocity of 50 m/s. Calculate the E.M.F induced in it. Find also the value of induced E.M.F. when the conductor moves at an angle of 30° to the direction of the field.
5. Three resistors R1= 30Ω, R2=60 Ω and R3=20Ω are connected in the star. Draw the equivalent delta circuit.

PART B

Each question carries 10 marks

6. By using mesh analysis, find the current I_X and voltage across the 4Ω resistor of the circuit shown in the figure and also calculate the power associated with the 4V voltage source.



OR

7. Write the nodal equations in terms of node to datum voltages V_1 and V_2. Solve for V_1 and V_2. Also determine the current through the 5 Ω resistor.

8. (a) State and explain Faraday's laws of electromagnetic induction with examples. (4)

   (b) Differentiate between statically and dynamically induced emf. A conductor of length 0.5m moves in a uniform magnetic field of flux density 1.1T at a velocity of 30m/s. Calculate the emf induced in the conductor if the direction of motion of the conductor is inclined at 60^0 to the direction of the field. (6)

OR

9. (a) Derive the amplitude factor and form factor of a purely sinusoidal waveform. (5)

   (b) A current wave is made up of two components-a 5A dc component and a 50Hz ac component, which is a sinusoidal wave with a peak value of 5A. Sketch the resultant waveform and determine its RMS and average values. (5)

10. (a) Give the equations, waveforms and phasor diagram of three phase voltages. (6)
    (b) Enumerate the advantages of a three phase system over the single phase system. (4)

OR

11. (a) A resistance of 10 Ω, inductance of 0.4 H and capacitance of 120 μF are connected in series and are fed by a 230 V, 50 Hz supply.
    Find i) inductive reactance ii) capacitive reactance iii) impedance of the circuit iv) admittance of the circuit v) power factor vi) active and reactive power. (6)

(b) Illustrate the Power generation, transmission and distribution with a one line diagram . (4)

Section II: Basics of Electronics Engineering

PART A
Answer all questions

(Answer **all** questions, **each** question carries 4 marks)

1. Give the specifications of a resistor. The colour bands marked on a resistor are Blue, Grey, Yellow and Gold. What are the minimum and maximum resistance values expected from that resistance?
2. What is meant by avalanche breakdown?
3. Explain the working of a full-wave bridge rectifier.
4. Discuss the role of coupling and bypass capacitors in a single stage RC coupled amplifier.
5. Differentiate AM and FM communication systems.

PART B

Each question carries 10 marks

6. (a) Explain with diagram the principle of operation of an NPN transistor. (5)

   (b) Sketch and explain the typical input-output characteristics of a BJT when connected in common emitter configuration. (5)

OR

7. (a) Explain the formation of a potential barrier in a P-N junction diode. (5)

   (b) What do you understand by Avalanche breakdown? Draw and explain the V-I characteristics of a P-N junction and Zener diode. (5)

8. (a) With a neat circuit diagram, explain the working of an RC coupled amplifier. (6)

   (b) Draw the frequency response characteristics of an RC coupled amplifier and state the reasons for the reduction of gain at lower and higher frequencies. (4)

OR

9. With the help of block diagram, explain how an electronic instrumentation system. (10)

10. With the help of block diagram, explain the working of Super heterodyne receiver (10)

OR

11. (a) With neat sketches explain a cellular communication system. (5)

    (b) Explain GSM communication with the help of a block diagram (5)