Model Question Paper

Reg. No:

Name:

RAJAGIRI SCHOOL OF ENGINEERING & TECHNOLOGY

(AUTONOMOUS)

FIRST SEMESTER B.TECH DEGREE EXAMINATION, APRIL 2021

100908/CO900F BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING

Max. Marks: 100 **Duration: 3 hours**

Answer both Part I and Part 2 in separate Answer Booklets

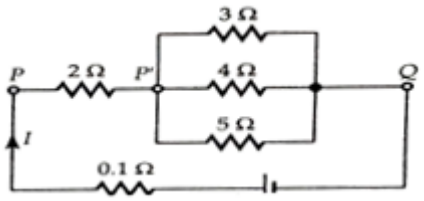
Section 1

BASIC ELECTRICAL ENGINEERING

PART A

(Answer all questions, each question carries 4 marks)

1. Calculate the current through the 4 Ω resistor in the circuit shown, applying current division rule:



2. Calculate the RMS and average values of a purely sinusoidal current having peak value 15A.

3. An alternating voltage of (80+j60)V is applied to an RX circuit and the current flowing through the circuit is (-4+j10)A. Calculate the impedance of the circuit in rectangular and polar forms. Also determine if X is inductive or capacitive.

4. Derive the relation between line and phase values of voltage in a three phase star connected system.

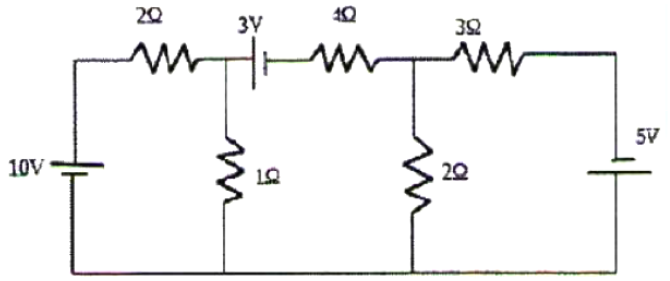
5. Compare electric and magnetic circuits

PART B

(Answer one question from each module; Each question carries 10 marks.)

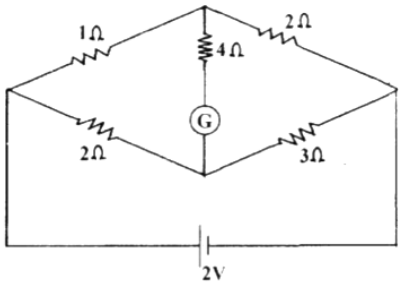
Module 1

6. Calculate the node voltages in the circuit shown, applying node analysis:



7. (a) State and explain Kirchhoff's laws. (4 Marks)

   (b) Calculate the current through the galvanometer (G) in the circuit shown: (6 Marks)



Module 2

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

   (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 600 to the direction of field. (6 marks)

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

(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 marks)

Module 3

10. Draw the power triangle and define active, reactive and apparent powers in ac circuits. Two coils A and B are connected in series across a 240V, 50Hz supply. The resistance of A is 5Ω and the inductance of B is 0.015H. If the input from the supply is 3kW and 2kVAR, find the inductance of A and the resistance of B. Also calculate the voltage across each coil.

11. A balanced three phase load consists of three coils each having resistance of 4Ω and inductance 0.02H. It is connected to a 415V, 50Hz, 3-phase ac supply. Determine the phase voltage, phase current, power factor and active power when the loads are connected in (i) star (ii) delta.

Section 2

BASIC ELECTRONICS ENGINEERING

PART A

(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

(Answer one question from each module; Each question carries 10 marks.)

Module 4

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

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

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

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

Module 5

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

   (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 Marks)

9. (a) With the help of block diagram, explain how an electronic instrumentation system. (6)

   (b) Explain the principle of an antenna. (4 Marks)

Module 6

10. (a) With the help of a block diagram, explain the working of Super heterodyne receiver. (6 Marks)

    (b) Explain the importance of antenna in a communication system. (4 Marks)

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

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