

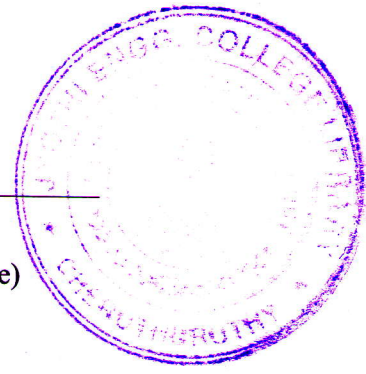
Reg No.: \_\_\_\_\_

Name: \_\_\_\_\_

00EST130121904

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Second Semester B.Tech Degree Examination July 2021 (2019 scheme)



Course Code: EST130

Course Name: BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING  
(2019 Scheme)

**PART I: BASIC ELECTRICAL ENGINEERING**

Max. Marks:50

Duration:90min

**PART A**

Answer all questions, each carries 4 marks.

Marks

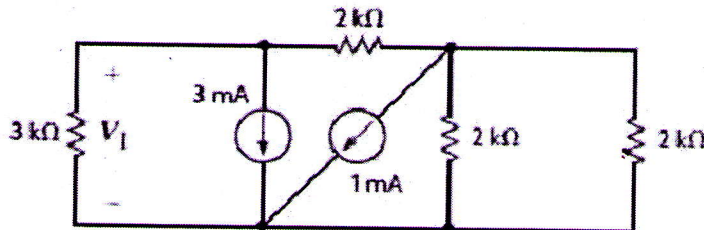
- 1 A conductor of length 0.5m kept at right angles to a uniform magnetic field of flux density  $2\text{Wb/m}^2$  moves with a velocity of 75 m/s at an angle of  $60^\circ$  to the field. Calculate the emf induced in the conductor. (4)
- 2 Define mutual inductance. Two coupled coils of self inductance 0.8H and 0.35H have a coefficient of coupling 0.9. Find the mutual inductance between the coils. (4)
- 3 State and explain Kirchhoff's laws with examples (4)
- 4 Find the trigonometrical, exponential and polar forms of the vector  $8+j6$ . (4)
- 5 Define (i) active power, (ii) reactive power, (iii) apparent power and (iv) power factor of an ac circuit. (4)

**PART B**

Answer one full question from each module, each question carries 10 marks

**Module-I**

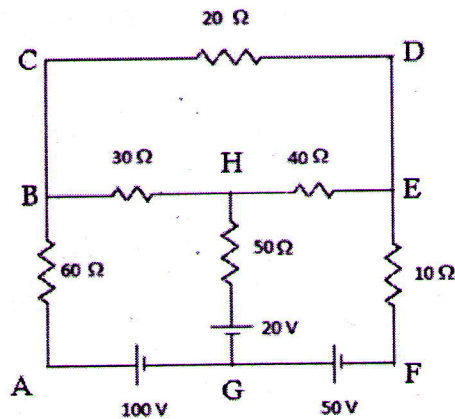
- 6 Use nodal analysis to find  $V_1$  in the given circuit. (10)



OR

- 7 Find the current in each branch of the following circuit using mesh analysis? (10)

00EST130121904

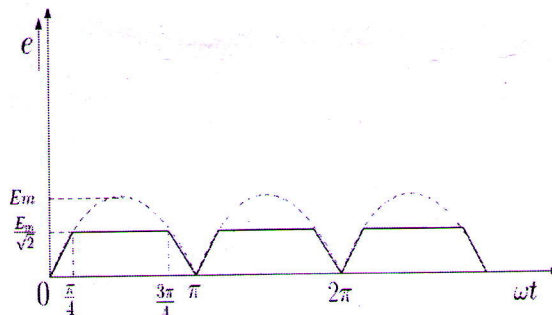


Module-II

- 8 An iron ring of cross sectional area  $1\text{cm}^2$  is wound with a coil of 2000 turns. Calculate the magnetising current required to produce a flux of 0.1 mWb in the iron path if mean length of the path is 30cm and relative permeability of iron is 2500. Neglect magnetic leakages and fringing. (10)

OR

- 9 A full wave rectified sine function is clipped at 0.707 of its maximum value as shown in figure. Find the average and rms values of the function. (10)



Module-III

- 10 A sinusoidal voltage  $V=230\angle 15^\circ$  of frequency 50 Hz is applied to a series RL circuit consisting of  $R=5\ \Omega$  and  $L=0.1\ \text{H}$ . Calculate (i) rms current and its phase angle (ii) power factor (iii) average power (iv) reactive power and (v) apparent power drawn by the circuit. (10)

OR

- 11 A balanced 3 phase load consists of 3 coils each of resistance  $6\ \Omega$  and inductive reactance of  $8\ \Omega$ . Determine the line current and power absorbed when the coils are (i) star connected (ii) delta connected across 400V, 3 phase supply. (10)

\*\*\*\*\*

00EST130121904

**PART II: BASIC ELECTRONICS ENGINEERING**

Max. Marks: 50

Duration: 90 min

**PART A**

*Answer all questions, each carries 4 marks.*

Marks

- 12 In a 4 band resistor the last colour in the colour band is gold. If the upper range of resistance is  $3.465\Omega$  find its colour code. (4)
- 13 Differentiate between Avalanche breakdown and Zener breakdown? (4)
- 14 Draw and explain the block diagram of a public address system. (4)
- 15 Give reasons for decrease in transistor amplifier gain at low frequencies and high frequencies. (4)
- 16 Explain the relevance of Intermediate Frequency in a superheterodyne receiver. (4)

**PART B**

*Answer one full question from each module, each question carries 10 marks*

**Module-IV**

- 17 a) What are the different types of inductors? Give two typical applications of inductor. (5)
- b) Describe the VI characteristics of PN junction diode. (5)

**OR**

- 18 a) Derive the relation between common base current gain and common emitter current gain, (4)
- b) Sketch the output characteristic of a transistor and explain different regions of operation. (6)

**Module-V**

- 19 a) Explain the working of a full wave bridge rectifier. (5)
- b) Explain the working of an RC coupled amplifier. (5)

**OR**

- 20 a) Describe the working of a zener diode voltage regulator. (5)
- b) Draw and explain the frequency response of an RC coupled amplifier. (5)

**Module-VI**

- 21 a) Draw the frequency spectrum of an amplitude modulated (AM) wave. Given that modulating signal is of frequency  $f_m$  and amplitude  $V_m$  and carrier is of frequency  $f_c$  and amplitude  $V_c$ . Take modulation index as  $m$ . What is the bandwidth requirement of this AM wave? (5)
- b) With a neat sketch explain AM super heterodyne receiver. (5)

**OR**

- 22 a) Describe the principle and block diagram of a GSM system. (5)
- b) Explain the concept of cells and frequency reuse in cellular communication. (5)

\*\*\*\*\*