

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

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

**APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY**  
**FIRST SEMESTER B.TECH DEGREE EXAMINATION, DECEMBER 2019**

**Course Code: EST 130**

**Course Name: BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING**

**PART I: BASIC ELECTRICAL ENGINEERING**

**(2019-Scheme)**

Max. Marks:50

Duration: 90 min

**PART A**

*Answer all questions, each carries 4 marks.*

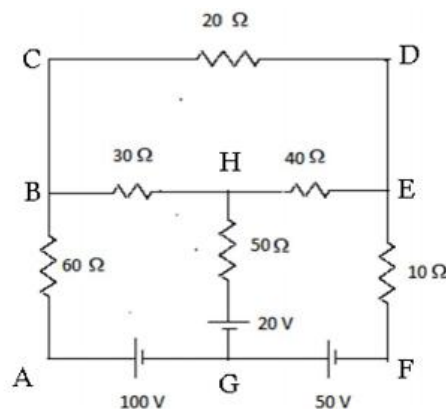
- 1 Define the terms i) mmf ii) magnetic field strength iii) magnetic flux and iv) magnetic flux density.
- 2 State and explain i) Faraday's laws and ii) Lenz's law.
- 3 State and explain Kirchhoff's laws with examples
- 4 Explain the advantage of three phase system of power supply compared to single phase system of power supply.
- 5 When an alternating voltage of  $(80+j60)$  V is applied to a circuit, the resulting current flow is  $(-4+j10)$ A. Find the impedance, power consumed and the phase angle of the circuit. (5x4=20)

**PART B**

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

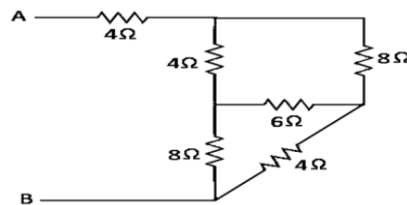
**Module-I**

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



**OR**

- 7 Using star-delta transformation, determine the equivalent resistance  $R_{AB}$  (10)

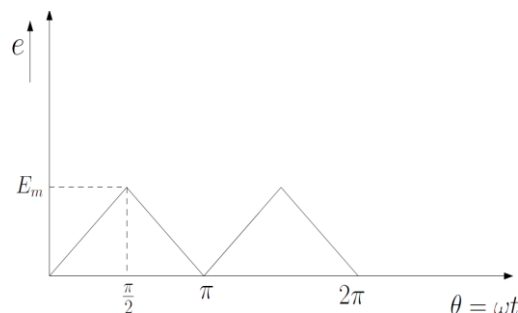


### Module-II

- 8 An alternating current varying sinusoidally with a frequency of 50Hz has an rms value of 20A.
- Write down the equation for the instantaneous current
  - Find the instantaneous value of current at 0.0025s.
  - Find the instantaneous value of current 0.125s after passing through a positive maximum value
  - At what time, measured from a positive maximum value, will the instantaneous current be 14.14 A?
- (10)

**OR**

- 9 Determine the average and rms values of the triangular voltage wave having maximum value  $E_m$  volt as shown in figure.



(10)

### Module-III

- 10 Two impedances  $Z_1$  and  $Z_2$  when connected separately across a 220V, 50 Hz supply, consume 300W and 150W at a power factor of 0.4 lagging and 0.7 leading respectively. When the two impedances are connected in series across the same supply, find total power consumed and overall power factor.
- (10)

**OR**

- 11 A balanced three phase load has per phase impedance of  $(30+j50) \Omega$ . If the load is connected across 400V, 3 phase supply, find (i) phase current (ii) line current and (iii) power supplied to load when it is connected in (a) star (b) delta.
- (10)

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**PART II: BASIC ELECTRONICS ENGINEERING**

**(2019-Scheme)**

Max. Marks: 50

Duration: 90 min

**PART A**

*Answer all questions, each carries 4 marks.*

- 1 What are the different types of capacitors? Give any two applications of capacitors.
- 2 Describe the forward characteristics of a diode?
- 3 Draw the block diagram of a public address system and write the role of each block.
- 4 Explain the working of a bridge rectifier.
- 5 Explain the concept of cells in cellular communication. (5x4=20)

**PART B**

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

**Module-IV**

- 6 a) Explain the formation of potential barrier in a PN junction diode. (4)
- b) What do you understand by Avalanche breakdown? Draw and explain the reverse V-I characteristics of a diode. (6)

**OR**

- 7 Explain the working of an NPN transistor. Describe with suitable sketches the input and output characteristics of an NPN transistor. (10)

**Module-V**

- 8 a) Draw the circuit diagram of an RC coupled amplifier and explain its frequency response. (6)
- b) Narrate how capacitor filter eliminate ripples from the output of a rectifier. (4)

**OR**

- 9 a) What is the need of biasing? Draw the potential divider biasing circuit? (4)
- b) Explain the working of a simple zener voltage regulator. (6)

**Module-VI**

- 10 a) What are the merits of AM compared to FM. The carrier amplitude of a given AM wave is 5V and the message signal amplitude is 3V. Find the modulation index. (5)
- b) Explain the block diagram of a super heterodyne receiver. (5)

**OR**

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- 11 a) Describe the principle of an antenna. (3)
- b) With necessary block diagram explain the working of a GSM system (7)

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