

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

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

**APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY**  
FIRST SEMESTER B.TECH DEGREE EXAMINATION, DECEMBER 2017

**Course Code: EC100**

**Course Name: BASICS OF ELECTRONICS ENGINEERING**

Max. Marks: 100

Duration: 3 Hours

**PART A**

*Answer all questions, each carries 5 marks.*

- |   |  | Marks |
|---|--|-------|
| 1 | With the help of neat diagram, explain the construction and working of electrolytic capacitor.   | (5)   |
| 2 | With the help of energy band diagram explain insulators, conductors and semiconductors.  | (5)   |
| 3 | Draw the block diagram of a DC power supply and mention the functions of each block.   | (5)   |
| 4 | Why are universal gates called so? Realize a two input OR gate using any one of the universal gates.   | (5)   |
| 5 | Write main features of the orbit of a geo stationary satellite.  | (5)   |
| 6 | Draw the frequency spectrum of an amplitude modulated (AM) wave. Given that modulating signal is of frequency $f_m$ , amplitude $V_m$ and carrier of frequency $f_c$ , amplitude $V_c$ . Take modulation index as $m$ . What is the bandwidth requirement of this AM wave? | (5)   |
| 7 | Draw and explain the structure of an optical fiber cable.  | (5)   |
| 8 | With supporting diagram explain frequency reuse done in cellular communication.  | (5)   |

**PART B**

*Answer six questions, one full question from each module and carries 10 marks.*

**Module I**

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|---|---|-----|
| 9 | a) Write the significance of specifying tolerance value of a component. A ceramic capacitor has got the following code marked on its surface. Identify the capacitance value. (i) 103J (ii) 2n2 | (5) |
|   | b) Explain the basic working principle of transformer. Write the equation relating primary and secondary voltages to turns ratio.   | (5) |

**OR**

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|----|--|-----|
| 10 | a) Explain the working of electromagnetic relays.                      | (5) |
|    | b) Write and explain any five applications of Electronics in industry. | (5) |

**Module II**

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|----|--|------|
| 11 | With neat diagrams, explain the input and output characteristics of a common emitter NPN transistor. | (10) |
|----|--|------|

**OR**

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|----|---|-----|
| 12 | a) Derive the relation between $\alpha$ and $\beta$ for a transistor. For an npn transistor, $\alpha =$ | (5) |
|----|---|-----|

0.995 and  $I_E = 10\text{mA}$ . Find  $I_B$  and  $I_C$ .

- b) Explain the diode equation. The forward current flowing through a diode at room temperature is  $1\text{mA}$  when the forward bias applied is  $0.2\text{V}$ . The reverse saturation current through the diode is  $0.45\mu\text{A}$  at room temperature. Determine whether the diode is made up of Silicon or Germanium. (5)

**Module III**

- 13 a) Draw the block diagram of a public-address system and specify the functions of each. (5)  
b) Draw the circuit diagram of an RC phase shift oscillator and explain the need of each component. (5)

**OR**

- 14 With suitable circuit diagram explain how a Zener diode can be used as a voltage regulator. Differentiate between line regulation and load regulation. (10)

**Module IV**

- 15 a) Draw the functional block diagram of an operational amplifier. Define any two parameters and specify its ideal values. (5)  
b) Draw circuit diagram and derive expressions for gain of inverting and non-inverting amplifier using Op-Amp. (5)

**OR**

- 16 a) Explain the working of digital multimeter with a block diagram. (5)  
b) Draw the block diagram of Digital Storage Oscilloscope and explain the working (5)

**Module V**

- 17 a) Explain satellite communication system with block diagram. (5)  
b) Explain advantages and disadvantages of satellite communication. Specify one frequency band used for satellite communication. (5)

**OR**

- 18 a) Draw block diagram and explain functioning of superheterodyne receiver. (5)  
b) Write the principle of frequency modulation and list the advantages of FM over AM. (5)

**Module VI**

- 19 a) What is meant by critical angle? What is its significance in optical fiber communication? (5)  
b) Draw and explain functional block diagram of cellular communication system (5)

**OR**

- 20 a) Use block diagram representation to explain the functioning of DTH. (5)  
b) With the help of suitable diagrams, explain the working of CCTV. Give one application. (5)

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