

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

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|---|--|-----|
| 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) |
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**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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