

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

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

**APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY**  
**FIFTH SEMESTER B.TECH DEGREE EXAMINATION(S), MAY 2019**

**Course Code: EC307**

**Course Name: POWER ELECTRONICS & INSTRUMENTATION**

Max. Marks: 100

Duration: 3 Hours

**PART A**

*Answer any two full questions, each carries 15 marks.*

Marks

- 1 a) Draw the structure of a power BJT and explain its static and dynamic characteristics. Explain the phenomenon of quasi saturation in power BJTs. (12)
- b) Distinguish between linear electronics and power electronics. (3)
- 2 a) Draw the circuit of a Buck Boost converter and explain its various modes of operation with relevant waveforms. Also write the expression for output voltage, voltage and current ripple under continuous conduction mode. (9)
- b) With a neat circuit diagram, explain the operation of a push pull converter circuit with all relevant waveforms. (6)
- 3 Draw the structure of a power MOSFET and explain its operation. Also explain the static and switching characteristics. Mention a few advantages of power MOSFETs compared to power BJTs. (15)

**PART B**

*Answer any two full questions, each carries 15 marks.*

- 4 Write notes on: (15)
  - (i) Principle of switched mode inverters.
  - (ii) Space vector modulation.
  - (iii) Push pull single phase inverters.
- 5 a) Explain the various classification of instruments with suitable examples. (10)
- b) Distinguish between static characteristics and dynamic characteristics of an instrument? (5)
- 6 a) Draw a bridge circuit for measuring capacitance and derive the balance condition of the bridge for determining unknown capacitance value. (8)
- b) For a Maxwell's bridge, given  $R_1 = 10 \text{ kohm}$ ,  $C_1 = 10 \text{ micro Farad}$ ,  $R_2 = R_3 = 1 \text{ kOhm}$ , find unknown  $R_x$  and  $L_x$ . (7)

**PART C**

*Answer any two full questions, each carries 20 marks.*

- 7 a) How the transducers are classified? Explain the working principle of a strain (10)

gauge.

- b) Explain the working of a capacitor microphone with relevant figures. (10)
- 8 a) Explain: (12)
- (a) Frequency synthesizer
  - (b) Electronic multimeter
- b) What is the principle of operation of proximity transducers? Explain inductive and capacitive type proximity transducers. (8)
- 9 a) With a neat sketch, explain the working principle of a digital storage oscilloscope? List a few applications. (10)
- b) Explain the operating principle of the following transducers: (10)
- (i) Hall effect transducers
  - (ii) LVDT

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