

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 micro phone 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
