

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

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

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

**Course Code: EC307**

**Course Name: POWER ELECTRONICS & INSTRUMENTATION (EC)**

Max. Marks: 100

Duration: 3 Hours

**PART A**

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

- |   |   | Marks |
|---|---|-------|
| 1 | a) Explain in details the static characteristics of Power BJT. Compare the I-V characteristics of Power BJT with low signal BJT.  | (8)   |
|   | b) What is meant by a boost converter? Explain using relevant circuit diagram and waveforms. Write down the expression for output ripple voltage.   | (7)   |
| 2 | Describe the structure of Power MOSFET by explaining channel formation. Draw its I-V characteristics labelling different voltages as well as regions of operation. Also draw the switching characteristics. | (15)  |
| 3 | a) Describe Forward converter including its circuit, wave forms and expressions.  | (5)   |
|   | b) Explain Push-pull converter including its circuit, wave forms and expressions.   | (5)   |
|   | c) Explain full bridge DC-DC converter with the help of circuit diagram and suitable waveforms.   | (5)   |

**PART B**

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

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|---|---|------|
| 4 | a) What is the general arrangement of an online UPS system? Explain with the help of block diagram.       | (5)  |
|   | b) How to measure resistance using Wheatstone's bridge?   | (5)  |
|   | c) With neat block diagram explain functional elements of measuring instruments.                          | (5)  |
| 5 | a) Describesingle phase half bridge inverter explaining the principle of sinusoidal PWM switching scheme. | (7)  |
|   | b) Explain the concept of space vector modulation?  | (8)  |
| 6 | a) Define the following Static Characteristics:   | (10) |
|   | i) Resolution ii) Precision iii) Repeatability iv) Linearity v) Sensitivity                               |      |
|   | b) How to measure inductance using Maxwell-Wein's Bridge.   | (5)  |

**PART C**

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

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|---|--|-----|
| 7 | a) What is the principle of operation of a resistance transducer? Explain the working of strain gauge. | (8) |
|   | b) Draw and explain the block diagram of Frequency synthesizer.  | (6) |
|   | c) What is RF power meter? Explain its working.  | (6) |
| 8 | a) What is a transducer? Explain the classification of transducers.                                    | (7) |
|   | b) Describe the Construction and working of LVDT with neat schematic.                                  | (8) |
|   | c) Explain the working of a Hall effect transducer.  | (5) |
| 9 | a) Discuss DSO with the help of a block diagram.   | (8) |
|   | b) Draw and explain the block diagram of Spectrum Analyzer.  | (6) |
|   | c) Describe digital voltmeter with neat block diagram.   | (6) |

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