*Seat No.: _____* *Enrolment No._____*

# GUJARAT TECHNOLOGICAL UNIVERSITY

**B. E. V$^{th}$ Semester–Examination – Nov-Dec- 2011**

**Subject code: 152403**

**Subject Name: Applied Power Electronics**

**Date:26/11/2011** **Time: 02:30 pm – 05:00 pm**

**Total Marks: 70**

## Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Notations/symbols used have usual meanings.**

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|---|---|---|---|
| **Q.1** | **(a)** | Draw astable multivibrator using IC 555. Determine the frequency and duty cycle for the IC 555 astable multivibrator output for C=0.01μF, $R_A$=2KΩ and $R_B$=100KΩ. | **07** |
| | **(b)** | Describe R-2R ladder network for analog to digital conversion. | **07** |
| **Q.2** | **(a)** | Define PLL. Explain operation of PLL using block diagram .State its applications. | **07** |
| | **(b)** | Draw and explain 1$^{st}$ order low-pass filter using necessary diagrams. | **07** |
| | | **OR** | |
| | **(b)** | Define power electronics. State its requirements and enlist various application areas of the power electronics field. | **07** |
| **Q.3** | **(a)** | With the help of basic power diagram, explain working of an inverter. Where inverter circuits are used practically? | **07** |
| | **(b)** | Define filter. Describe state variable filter with necessary diagrams. | **07** |
| | | **OR** | |
| **Q.3** | **(a)** | Write a detailed note on :- HVDC Transmission. | **07** |
| | **(b)** | What is Pulse Width Modulation? Explain pulse width modulator using necessary diagram and waveforms. | **07** |
| **Q.4** | **(a)** | Classify methods of heating. Explain the principal of Induction Heating. | **07** |
| | **(b)** | Describe with block diagram SMPS. State difference between SMPS and UPS , also. | **07** |
| | | **OR** | |
| **Q.4** | **(a)** | Discuss the applications of ultrasonic as (i) soldering (ii) cutting of hard materials. | **07** |
| | **(b)** | With neat diagram, explain construction and working of a battery. | **07** |
| **Q.5** | **(a)** | Discuss working principle of DC motor drives in detail. | **07** |
| | **(b)** | Write short note on:- Air- Conditioning System. | **07** |
| | | **OR** | |
| **Q.5** | **(a)** | Enlist applications of motor drive and explain any two of them in detail. | **07** |
| | **(b)** | Discuss the concept of simulation of Power Electronics System. | **07** |

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