

NB: 1. **Q.1 is compulsory**

- 2. Answer **any three** out of remaining **five** questions
- 3. Assumptions made should be clearly stated
- 4. Assume any suitable data wherever required but justify the same

- 1 A) Discuss the architectural details of TMS320VC33 with the help of suitable figures also identify the following details for it. **12**
 - (i) On chip RAM memory size (ii) Interrupts (iii) MIPS
 - (iv) Number of ADC (v) Number of timers (vi) GPIO
- B) Answer the following **8**
 - (i) What is the decimal fraction represented by Q-15 number 0x2400?
 - (ii) Represent +25 in 32 bit floating point representation
- 2 A) Explain the fixed point and floating point number representation with the help of suitable examples. **8**
- B) What is the Q-23 number representation of the decimal fraction +0.3525? **6**
- C) What is the importance of numerical integration and its use in power system applications based on DSP processor? **6**
- 3 A) What is the impact instruction cycle time and MIPS of the chosen DSP processor on its suitability in any power electronics control application. **8**
- B) Explain the process of coding to executable file creation in context of digital signal processors. Also explain the COFF file structure in detail. **12**
- 4 A) Explain the Euler's forward method of integration and how it can be used to implement the first order low pass RC filter. **10**
- B) Compare Heun's method, Euler's backward method and Trapezoidal methods of numerical integration. **10**
- 5 A) Explain any typical scheme of active filtering implemented under balanced voltage conditions. **10**
- B) Explain the operation and implementation of a 3- ϕ Phase Locked Loop (PLL) with the help of block diagram and waveforms. **10**
- 6 Write a detailed note, on design of DSP controlled standalone Solar Photovoltaic based converter/ inverter system for solar water pump application. Clearly specify all the aspects of design with reference to following points: **20**
 - (i) Power circuits (ii) Sensor circuits (iii) Requirements of DSP in terms of ADCs, PWMs. GPIO, speed etc.
