

**B.Tech. ELECTRICAL ENGINEERING
(BTELVI)****Term-End Examination****December, 2012****BIEEE-004 : MECHATRONICS***Time : 3 hours**Maximum Marks : 70*

Note : Attempt any seven questions. All question carry equal marks. Assume missing data, if any.

1. (a) Why is the frequency of excitation of the primary winding of LVDT kept very high as compared to frequency of the signal being detected ? 4
- (b) Explain the construction features of synchro-transmitters and synchro transformers. 6
2. Determine the input impedance, output impedance and voltage amplification for an inverting amplifier with $R_1 = 1M\Omega$ $R_f = 10M\Omega$. The parameters of the OPAMP are $r_{ia} = 100k\Omega$, $r_{oa} = 100\Omega$ and the open loop gain is 10^5 . 10

3. (a) Draw the ideal and practical characteristics of a low pass, high pass, band pass and band stop passive RC filters. 4
- (b) Describe at least two methods of Analog to digital (A/D) conversion. 6
4. (a) Explain kinematic chains, cams, and gear trains with suitable illustrations. 7
- (b) What are directional control valves and where are they used. 3
5. Describe working principle and construction of d.c. servo motor. Enumerate the differences between a normal d.c. motor and a d.c. servo motor. 10
6. Describe the Time Division Multiplexing (TDM) and Frequency Division Multiplexing (FDM). 10
7. (a) Describe the different registers of Intel 8085 Microprocessor. Are all the registers of 8 bit only ? 5
- (b) Write a program starting from memory location 2400H to subtract hexa-decimal number 48 stored in memory location 2421H from decimal number 99 stored in memory location 2420H. The answer should be in the decimal numbers and stored in memory location 2422H. 5

8. Describe Programmable logic controller with a block diagram. Give examples of popular PLC's in use. 10
9. Explain the Automobile Engine Control System. Explain its different components and specific criteria used for engine control. 10
10. Write short note on *any two* of the following : $2 \times 5 = 10$
- (a) VCR
 - (b) Fax machine
 - (c) NC machine
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