

SUBJECT CODE NO:- P-378
FACULTY OF ENGINEERING AND TECHNOLOGY
T.E.(EC/ECT/IEC/E&C) Examination MAY/JUNE-2016
Electronics System Design
(Revised)

[Time: Three Hours]

[Max Marks:80]

“Please check whether you have got the right question paper.”

N.B

- i) Q.No.1 and Q.No.6 are compulsory.
- ii) Solve any two questions from Q.2, Q.3, Q.4 and Q.5 in section A.
- iii) Solve any two questions from Q.7, Q.8, Q.9 and Q.10 in section B.
- iv) Figure to the right indicates full marks.
- v) Use standard 5% tolerance resistance value =(10, 11, 12, 13, 15, 16, 18, 20, 23, 24, 27, 30, 36, 39, 43, 47, 51, 56, 62, 68, 75, 82, 91) and standard cap. Value =(10, 12, 15, 18, 22, 27, 33, 39, 47, 56, 68, 82) in design.
- vi) Assume suitable components and data which is necessary.
- vii) Design linear power supply. Must include circuit diagram selection of transformer rectifier diode, filter capacitor, capacitor at i/p and o/p terminal of pin 3 regulators protection diode etc.

Section A

- | | | |
|-----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| Q.1 | Solve <u>any two</u> . | 10 |
| | <ol style="list-style-type: none">a) Draw and explain the block diagram of Mealy model for sequential circuit design.b) Explain the types and selection criteria in design for resistors.c) Enlist Op.Amp. Characteristics.d) Explain what is measurement and signal conditioning. | |
| Q.2 | <ol style="list-style-type: none">a) Design Regulated variable DC power supply using LM 3/7 with given specification:
$V_0 = 3V$ to $20V$
Load current = $0.5A$b) Design a monostable multivibrator using IC 741 Op.Amp for pulse duration of 100 msec. with reference voltage of 5V use $\pm VCC = \pm 15V$. | 08
07 |
| Q.3 | <ol style="list-style-type: none">a) Explain Op-Amp characteristics in detail with equivalent ckt of Op-Amp.b) Draw ckt diagram of instrumentation amplifier and its importance. | 08
07 |
| Q.4 | <ol style="list-style-type: none">a) List the features, absolute maximum rating and electrical characteristics of IC temperature sensor LM 35.b) Design circuit for light intensity measurement by using photo diode. | 08
07 |
| Q.5 | <ol style="list-style-type: none">a) Explain how component R_{INT}, C_{INT}, V_{REF}, C_{AZ}, R_{OSC}, C_{OSC} are selected in IC 7106/7107 design.b) Explain measurement of strain and working principle of strain gauge. | 08
07 |

Section B

- Q.6 Solve any two. 10
- a) Explain exponential law of reliability.
 - b) Explain PCB Design Rules for Analog circuits.
 - c) Explain PIN diagram of LM 565.
 - d) Explain features of IC 555.
- Q.7 a) Design IC based decade counter circuits using 7490. 07
- b) Design a Astable multivibrator using IC 555 with the following specifications 08
- Amplitude of square wave = 8V
- $f_0 = 4\text{KHz}$
- Duty cycle = 60%
- Draw the waveforms one below the other at pin nos. 2, 7, 3.
- Q.8 a) Draw and explain block diagram of LM 565. 07
- b) Explain interfacing of relay to digital circuits by drawing a neat circuit diagram. 08
- Q.9 a) Design a ICL 8038 based waveform generator to make the output frequency adjustable to the wide 08
- range while keeping value of capacitor C constant and equal to 3600pf. Also calculate the output frequency extremes with symmetrical triangular wave. The peak amplitude of the wave is 2.5V.
- b) Describe various design considerations to ensure reliability of an electronic product. 07
- Q.10 a) Explain Noise due to ground and supply line. 07
- b) Describe heat transfer fundamentals in context with electronics circuit design. 08