

B.E. / B.Tech. Mechanical Engineering (Model Curriculum) Semester-IV
ESC-201 - Basic Electronics Engineering

P. Pages : 2

Time : Three Hours



GUG/S/25/14061

Max. Marks : 80

- Notes :
1. All questions carry marks as indicated.
 2. Due credit will be given to neatness and adequate dimensions.
 3. Assume suitable data wherever necessary.
 4. Illustrate your answers wherever necessary with the help of neat sketches.

1. a) What is Zener diode? Explain the V-I characteristic of Zener diode. 8
- b) Explain the working of full wave bridge rectifier along with circuit diagram and waveform. 8

OR

2. a) Explain the current gain of BJT in common base and common emitter configuration? Derive the relationship between them. 8
- b) Derive the equation of V_{dc} , I_{dc} , Ripple factor and Efficiency of Full wave bridge rectifier. 8
3. a) Draw the pin diagram of IC 741 and explain each pin. 6
- b) Explain Op Amp Ideal Integrator? Derive its Output Voltage (V_o) equation. What is the error encountered in Ideal Integrator? Explain practical integrator to overcome the error. 10

OR

4. a) Define the following for an Op-Amp (i) CMRR (ii) Skew Rate (iii) SVRR and (iv) Input offset Voltage. 8
- b) Enumerate Op Amp as Inverting and Non Inverting Summing amplifier. 8
5. What is Oscillator? State Barkhausen criteria for sustained Oscillation? Draw the circuit of RC phase shift oscillator. Derive the equation for frequency of Oscillation. 16

OR

6. a) Derive an expression for charge on a capacitor at any time during charging in a RC timing circuit. 8
- b) Illustrate mono stable Multivibrator using IC 555. 8
7. a) Simplify $f(A, B, C) = \pi M(0, 1, 4, 6)$ using K-Map. 4
- b) $Y = (A + B)(A' + C)(B + C)$ For the given Boolean expression draw the logic diagram, Minimize the expression using Boolean algebra and draw the modified logic diagram. 6
- c) What is Multiplexer? Draw 8:1 Multiplexer using 2:1 Multiplexer only. 6

OR

8. a) What is Half and Full subtractor? Draw the logic diagram? Show how full subtractor can be made using half subtractor. 8
- b) Explain JK Flip Flop give its characteristic table, characteristic equation and excitation table. 8
9. a) What is Amplitude modulation? Derive an expression for total power in Amplitude modulation. 8
- b) Draw time domain waveform of frequency modulation? Find carrier, modulating frequency, modulation index and maximum deviation of the FM wave represented by the equation $v = 12 \sin(6 \times 10^8 t + 5 \sin 1250 t)$. 8

OR

10. a) Write a short note on: 8
- i) IEEE spectrum ii) Unguided transmission media
- b) Draw and explain block diagram of GSM communication system? State its advantages and disadvantages. 8
