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**UNIVERSITY**

(Karunya Institute of Technology & Sciences)

(Declared as Deemed-to-be University under Sec.3 of the UGC Act, 1956)

Reg.No. \_\_\_\_\_\_\_\_\_\_\_\_\_

**End Semester Examination – Nov/Dec - 2016**

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|  |  | **Semester :** | **2016-17 ODD** |
| **Code :** | **12EC212** | **Duration :** | **3 hrs** |
| **Sub. Name :** | **PULSE AND WAVE SHAPING CIRCUITS** | **Max. marks :** | **100** |

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| **Q. No** | **Questions** | **Marks** |
| **PART-A(10X1=10 MARKS)** | | |
| 1. | Limiting and slicing operations are performed by   1. Clamping circuits (b) clipping circuits (c) Compensated attenuator | (1) |
| 2. | A square wave of peak-to-peak amplitude of 25V is passed through a good RC differentiator. The peak-to-peak amplitude of the output is   1. Nearly 25V (b) Nearly 50V (c) Nearly 75V | (1) |
| 3. | Identify the Multivibrator that can be used as a memory element as well as counting element in digital circuits. | (1) |
| 4. | List any one application of the Schmitt trigger circuit. | (1) |
| 5. | Write an expression for gate width T of a collector coupled astable multivibrator. | (1) |
| 6. | How do you justify that a one-shot Multivibrator is also called a gating circuit? | (1) |
| 7. | What is meant by Restoration time?. | (1) |
| 8. | Mention any one method of generating a time base waveform. | (1) |
| 9. | The blocking oscillator as a low impedance switch used to discharge a capacitor quickly.[True/False] | (1) |
| 10. | What is meant by an ideal sampling gate? | (1) |

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| **PART B(5 X 3= 15 MARKS)** | | |
| 11. | For a high pass RC circuit, it is desired to pass a 2msec sweep for a ramp input with less than 0.5% transmission error. Determine the highest possible value of the lower 3dB frequency. | (3) |
| 12. | Mention the methods for triggering bistable multivibrator and distinguish between them. | (3) |
| 13. | List the advantages of emitter-coupled astable Multivibrator over collector coupled astable Multivibrator. | (3) |
| 14. | Obtain expressions for slope error and sweep speed in the miller sweep voltage waveform generator. | (3) |
| 15. | Sketch the bi-directional diode sampling gate and also mention its advantages over a unidirectional diode gate. | (3) |

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| **PART C(5 X 15= 75 MARKS)** | | | |
| 16. |  | A symmetrical square wave of peak-to-peak amplitude V and frequency f is applied to a high pass RC circuit. Show that the percentage tilt is given by  P = T x 100 %  2RC | 15 |
| (OR) | | | |
| 17. | a. | Explain the working principle of positive and negative clampers with circuit diagram and sketch the output waveforms. | 8 |
| b. | State Clamping circuit theorem and mathematically prove it. | 7 |
| 18. |  | Calculate the stable state currents and voltages for the fixed bias bistable multivibrator consisting of cross coupled inverter circuits given below. Assume that the transistors have a minimum hFE value of 20, VCEsat= 0.15 V and VBEsat = 0.7V. (Q1- OFF; Q2-ON) | 15 |
| (OR) | | | |
| 19. |  | With a help of circuit diagram, make a quantitative analysis of the transistor Schmitt trigger to obtain an expression for the critical voltages VUTP and VLTP. | 15 |
| 20. |  | Consider an emitter coupled monostable multivibrator using NPN transistors. The circuit and device parameters are VCC = 18V, R = 100kΩ, RC1 = 6kΩ, RC2 = 5kΩ, V= 5V, RE = 4kΩ, hFE = 50, rbb’ =200Ω. Assume germanium transistor for which VBE(sat)  = 0.3V, VCE(sat)  = 0.1V and cut-in voltage = 0.1V Calculate the voltages at the base B2, collector C1, C2 and common emitter E. | 15 |
| (OR) | | | |
| 21. |  | Explain the operation of collector coupled astable multivibrator with neat circuit diagram and derive an expression for Time period T. | 15 |
| 22. |  | Derive the relationship between displacement error (ed), transmission error (et) and slope error (es). | 15 |
| (OR) | | | |
| 23. |  | Describe the principle of transistor current sweep circuit with neat diagram | 15 |
| 24. |  | Make use of neat sketches of circuits and analyse the triggered transistor monostable blocking oscillator with base timing to obtain an expression for the pulse width tp. | 15 |
| (OR) | | | |
| 25. | a. | With the help of equivalent circuit of Bidirectional diode sampling gate, derive an expression for Gain (A), control voltage (VCmin)and control voltage (VNmin). | 12 |
|  | b. | In the circuit of bidirectional diode sampling gate, assume that RL=RC= 100kΩ,  R2= 50kΩ and that the signal has a peak value of 20 V. Find A, (VNmin), (VCmin). Assume that diodes are perfect. | 3 |

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