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Total Number of Pages : 02

B.TECH

B.TECH 2ND SEMESTER REGULAR EXAMINATIONS, MAY 2018

BASICS OF ELECTRONICS

Subject Code:BBSES1041

Time: 3 Hours

Max Marks : 100

- CO1 Understand & study the concept of semiconductor, diode and special purpose diode
 CO2 Discuss application of electronic circuits by using various type of transistors
 CO3 Examine and diagnose the various concept of combinational circuit of digital electronics in boolean analysis.
 CO4 Enhance technical skill in the fundamentals of Communication & Instrumentation Engineering

PART-A**(10X1 = 10 MARKS)****Answer All Questions.**

- The knee voltage of a crystal diode is approximately equal to [CO-1]
 (i) applied voltage (ii) breakdown voltage (iii) forward voltage (iv) barrier potential
- The maximum efficiency of a half-wave rectifier is [CO-1]
 (i) 40.6 % (ii) 81.2 % (iii) 50 % (iv) 25 %
- A _____ is commonly used to provide transient protection. [CO-1]
 (i) Eliminator (ii) clipper (iii) Clamper (iv) Multiplier
- A current ratio of I_C/I_E is usually less than one and is called: [CO-2]
 (i) β (ii) θ (iii) α (iv) Ω
- The pinch off voltage is the voltage [CO-2]
 (i) At which gate source junction breaks down (ii) Which causes depletion regions to meet
 (iii) The voltage applied between drain & source (iv) None of these
- In an Amplitude Modulation(AM). [CO-4]
 (i) Amplitude of the carrier varies (ii) Frequency of the carrier remains constant
 (iii) Phase of the carrier remains constant (iv) All of these
- The Lissajous patterns help in the measurement of [CO-4]
 (i) Amplitude (ii) Phase (iii) Frequency (iv) frequency and Phase
- The octal equivalent of the given binary number 001101011₂ [CO-3]
 (i) 153₈ (ii) 351₈ (iii) 253₈ (iv) 352₈
- The number of full and half adders are required to add 16-bit number is [CO-3]
 (i) 8 half adders, 8 full adders (ii) 1 half adders, 15 full adders
 (iii) 16 half adders, 0 full adders (iv) 4 half adders, 12 full adders
- Each term in the standard POS form is called as [CO-3]
 (i) minterm (ii) don't care (iii) maxterm (iv) truth table

PART-B**(15 x 2 = 30 MARKS)****Answer any fifteen questions from the following.**

- What is a p-n junction? [CO-1]
- Find out the average value of the full wave rectifier output if the input signal is $V_s = 50 \sin \omega t$. [CO-1]
- Draw the circuit diagram of a negative series clipper. [CO-1]
- What is a positive clamper? [CO-1]
- A HWR uses a diode with an resistance of 0.4Ω . if input ac voltage is 12V(r.m.s) and load resistance of 3Ω , Calculate the root mean square output current(I_{rms}). [CO-1]
- Sketch the output V-I Characteristics curve of a common emitter(CE) configuration of BJT. [CO-2]

7. Why a FET is called as voltage controlled device. [CO-2]
8. The reverse saturation current of an n-p-n transistor in CB configuration is $12.5\mu\text{A}$. For an emitter current of 2mA and collector current of 1.97mA . Determine the current amplification factor and base current. [CO-2]
9. What is the drain current equation of JFET. [CO-2]
10. Mention the three regions that are present in the drain source characteristics of JFET? [CO-2]
11. What is frequency modulation? [CO-4]
12. What is the use of output transducer in communication system? [CO-4]
13. If the two input waveforms of equal amplitude and 270° degree phase difference is applied to the CRO then Draw the shape of the Lissajous pattern. [CO-4]
14. Define a digital signal with suitable example? [CO-3]
15. State the distributive law of Boolean algebra. [CO-3]
16. How to represent a positive and negative sign in digital electronics? [CO-3]
17. What is the difference between half adder and full adder? [CO-3]
18. What is the decimal value of the hexadecimal number $(89)_{16}$? [CO-3]
19. What is the logic symbol of NOR gate? [CO-3]
20. Draw the truth table of OR gate? [CO-3]

PART-C

(6 x 5 = 30 MARKS)

Section-i

Answer any Six questions

1. With a neat sketch explain the concept of V-I characteristics of diode [CO-1]
2. Derive the I_{rms} value of half wave rectifier [CO-1]
3. What are the difference between n-channel JFET and p-channel JFET [CO-2]
4. What is amplification factor and derive the relationship between α , β and γ . [CO-2]
5. Explain about positive series clipper with suitable circuit diagram and wave form if the input to the clipper is a sinusoidal signal having maximum voltage is 15V . Consider the diode is an ideal one. [CO-1]
6. Design EX-OR and EX-NOR gate using NOR gate? [CO-3]
7. Convert the given number systems $(\text{CAD}.78)_{16} = (?)_{10}$, $(\text{EAD}.35)_{16} = (?)_2$ [CO-3]
8. Simplify the given expression $Y = AB + A(B+C) + B(B+C)$ using Boolean algebra. [CO-3]

Section-ii

Answer any Two questions

(2 x 15 = 30 MARKS)

- 1 a. Explain the operation and waveform of half wave rectifier with suitable circuit diagram [CO-1]
 b. In a half wave rectifier the input a.c supply voltage is 240V(rms) and the turn ratio of the transformer is $12:1$. Calculate
 (i) Maximum Current (I_m) (ii) Efficiency (iii) PIV [CO-1]
- 2.a. Explain the construction and operation of p-n-p transistor? [CO-3]
 b. Explain the construction and principle of working of n channel Depletion MOSFET [CO-3]
- 3.a. What is communication and explain the block diagram of amplitude modulation system? [CO-4]
 b. What is a CRO and explain the basic elements of a CRO with suitable block diagram. [CO-4]
- 4.a. What are the limitations of half adder and Design a full adder using two half adder along with OR gate. [CO-3]
 b. What is minterm and maxterm and represent the given Boolean expression $y = (A+B')(B'+C)(C+D)$ as a product of maxterms [CO-3]

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