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Question Paper Code: 41335

B.E. / B.Tech. DEGREE EXAMINATION, MAY 2017

Third Semester

Electrical and Electronics Engineering

14UEE305 - SEMICONDUCTOR DEVICES AND CIRCUITS

(Regulation 2014)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

- The theoretical maximum conversion efficiency of full wave rectifier is
(a) 81.2% (b) 76% (c) 67% (d) 40.6%
- LEDs have response time of the order of
(a) 0.1ns (b) 1ns (c) 100ns (d) 1μs
- Calculate beta (β) of a transistor when alpha (α) = 0.98
(a) 49 (b) 37 (c) 97 (d) 51
- When does a transistor act as a switch?
(a) Operated in linear region (b) Operated in cut off region
(c) Operated in saturation region (d) Operated in cut off and saturated region
- For the operation of N channel E-MOSFET it is necessary that gate voltage is
(a) highly negative (b) highly positive
(c) low positive (d) zero
- The dynamic drain resistance of MOSFET is of the order of
(a) 10 KΩ (b) 500 KΩ (c) 5 MΩ (d) 100 MΩ

7. The effect of current shunt feedback in an amplifier is
- Increase the input resistance and decrease the output resistance
 - Increase both input and output resistance
 - Decrease both input and output resistance
 - Decrease the input resistance and increase the output resistance
8. Negative feedback in amplifiers results in
- Reduced voltage gain
 - Increase in signal to noise ratio
 - Reduced bandwidth
 - reduced distortion
9. A clamper circuit affects the peak to peak and rms vale of waveform in
- Increases both
 - Decreases both
 - No change
 - Increases peak to peak value and decreases rms value
10. Effect of hysteresis is to
- Improve noise immunity
 - Increase response time
 - Reduce noise immunity
 - High sensitivity

PART - B (5 x 2 = 10 Marks)

- What is diffusion current in p-n junction diode?
- What is thermal runaway in a transistor?
- What is the advantage of Darlington connection?
- State Barkhausen's criterion for oscillation.
- State the applications of Schmitt trigger.

PART - C (5 x 16 = 80 Marks)

16. (a) Draw the circuit diagram of half wave rectifier and explain its operation with necessary waveforms. Also derive the expression for rectification, efficiency and transformer utilization factor. (16)

Or

- (b) Summarize the operation of Zener diode and its applications. (16)
17. (a) Sketch and explain the input, output and transfer characteristics of npn transistor in common emitter mode. (16)

Or

- (b) Discuss in detail the analysis of BJT amplifier using h-parameters. (16)
18. (a) Explain with a neat circuit diagram JFET as an amplifier in common source mode. Sketch the V-I characteristics. Also draw its low frequency a.c. equivalent circuit. (16)

Or

- (b) Explain the construction, operation and characteristics of n channel enhancement type MOSFET. (16)
19. (a) Explain the different methods of coupling multistage amplifiers. (16)

Or

- (b) Explain R-C phase oscillator with a neat circuit diagram. Also derive the expression for its feedback network. (16)
20. (a) Explain positive and negative clamper with suitable circuit diagrams and waveforms. (16)

Or

- (b) Explain with a neat circuit diagram and sketch the waveform of Bistable multivibrator using transistor. (16)
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