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Question Paper Code: 41335

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2016

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 forward current in an PN junction is of
 - A
 - mA
 - kA
 - μA
- LEDs have response time of the order of
 - 0.1ns
 - 1ns
 - 100ns
 - 1 μs
- In optocoupler, which allows a low voltage dc source to control high voltage circuit?
 - output detector
 - electric isolation
 - current transfer ratio
 - output isolation
- Optocouplers combine
 - SITs and BJTs
 - IGBTs and MOSFETS
 - power transformers and silicon transistors
 - Infrared light emitting diode and a silicon phototransistor

5. The JFET is also called as
 - (a) unipolar transistor
 - (b) unijunction transistor
 - (c) bipolar transistor
 - (d) none of the above
6. The dynamic drain resistance of MOSFET is of the order of
 - (a) $10\text{ K}\Omega$
 - (b) $500\text{ K}\Omega$
 - (c) $5\text{ M}\Omega$
 - (d) $100\text{ M}\Omega$
7. In Colpitts oscillator, the amplifier voltage gain usually has to be substantially larger than
 - (a) C_2
 - (b) C_1
 - (c) C_1/C_2
 - (d) C_2/C_1
8. To obtain very high input and output impedances in a feedback amplifier, the topology must be
 - (a) voltage series
 - (b) current series
 - (c) voltage shunt
 - (d) current shunt
9. In UJT, a 3-mil aluminum wire called the
 - (a) base B
 - (b) emitter E
 - (c) base B_1 and B_2
 - (d) all the above
10. The name of the circuit which is also known as amplitude limiter or slicer is
 - (a) Rectifier
 - (b) Clamper
 - (c) Chopper
 - (d) Clipper

PART - B (5 x 2 = 10 Marks)

11. A diode with $V_F = 0.7\text{V}$ is connected as a half wave rectifier. The load resistance is 500ohm , and the *rms* ac input is 22V . Determine the peak output voltage, the peak load current, and the diode peak reverse voltage.
12. Give the relationship between α and β .
13. Write a short note of JFET fabrication and packaging.
14. State the condition to produce oscillation.
15. Write a short note on UJT with equivalent circuit diagram.

PART - C (5 x 16 = 80 Marks)

16. (a) With neat diagram explain shunt and series regulators. (16)

Or

- (b) Summarize the operation of Zener diode and its applications. (16)
17. (a) Describe the construction, operation and characteristics of BJT in common base configuration. (16)

Or

- (b) Discuss in detail the analysis of BJT amplifier using h-parameters. (16)
18. (a) Discuss in detail about the fabrication, operation and characteristics of P and N-channel JFET. (16)

Or

- (b) Discuss the operation and characteristics of MOSFET with neat sketch. (16)
19. (a) Derive the input resistance and output resistance for voltage series and current series feedback amplifier. (16)

Or

- (b) (i) Extend the construction and operation of opamp Colpitts oscillator. (8)
- (ii) Distinguish the construction and operation of Wein bridge oscillators. (8)
20. (a) (i) Brief about Upper threshold point and Lower threshold point of Schmitt trigger. (8)
- (ii) Explain how saw tooth waveforms are generated using UJT. (8)

Or

- (b) Discuss the construction and operation of clamping circuits with appropriate diagrams. (16)
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