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Register Number: ……………………..

B.E DEGREE EXAMINATIONS: DEC 2014

(Regulation 2009)

Third Semester

ELECTRICAL AND ELECTRONICS ENGINEERING

EEE104: Electronic Devices and Circuits

Time: Three Hours **Maximum Marks: 100**

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. A silicon pn junction in forward condition has a voltage drop closer to
   - a) 0.1 V
   - b) 0.7 V
   - c) 1.7 V
   - d) 2.1 V
2. In LED light is emitted because
   - a) Recombination of charge carriers take place
   - b) Diode gets heated up
   - c) Light falling on gets amplified
   - d) Light gets reflected due to lens action
3. The silicon transistor are more widely used than germanium transistors because
   - a) They have smaller leakage current.
   - b) They have better ability to dissipate heat
   - c) They have smaller depletion layer
   - d) They have larger current carrying capacity
4. An n-channel JFET has I_{DSS}=2mA, and Vp= - 4V. Its transconductance gm=(in mA/V) for an applied gate to source voltage VGS=-2V is
   - a) 0.25
   - b) 0.5
   - c) 0.75
   - d) 1
5. For a large values of (V_{DS}), a FET – behaves as
   - a) Voltage controlled resistor
   - b) Current controlled current source
   - c) Voltage controlled current source
   - d) Current controlled resistor
6. A source follower using a FET usually has a voltage gain which is
   - a) greater than +100
   - b) slightly less than unity but positive
   - c) exactly unity but negative
   - d) about -10

7. A differential amplifier has a differential gain of 20,000. CMRR=80 dB. The common mode gain is given by

a) 2 b) 1

c) 1/2 d) 0

8. The bandwidth of an RF tuned amplifier is dependent on

a) Quiescent operating point b) Q –factor of the tuned i/p circuit

c) Q –factor of the tuned o/p circuit d) Q-factor of the o/p and i/p circuits as well as quiescent operating point

9. Negative feedback in an amplifier

a) Increase frequency &phase distortion b) Reduces gain

c) Reduces bandwidth d) Increases noise

10. In a full-wave rectifier without filter, the ripple factor is

a) 0.482 b) 1.21

c) 1.79 d) 2.05

PART B (10 x 2 = 20 Marks)

11. Define barrier potential.
12. What are the limitations of LCD?
13. Differentiate JFET & BJT.
14. Write down the current amplification factor for a CE transistor.
15. Draw a source follower circuit.
16. How are amplifiers classified according to the transistor configuration?
17. Mention the advantages of Push pull amplifier.
18. List the efficiencies of power amplifiers.
19. Which feedback increases the gain of the amplifier? How?
20. State the frequency for RC phase shift oscillator.

PART C (5 x 14 = 70 Marks)

21. a) (i) With neat diagram explain the construction and working of LED. (10)

(ii) How does the zener diode act as a voltage regulator? (4)

(OR)

b) An abrupt silicon p-n junction consists of a *p*-type region containing 2 x 10^{16} cm^{-3} acceptors and an *n*-type region containing also 10^{16} cm^{-3} acceptors in addition to 10^{17} cm^{-3} donors.

(i) Calculate the thermal equilibrium density of electrons and holes in the *p*-type region as well as both densities in the *n*-type region.

(ii) Calculate the built-in potential of the p-n junction

(iii) Calculate the built-in potential of the p-n junction at 400 K.

22. a) Explain the principle of operation and UJT and mention its applications.

(OR)

b) (i) What are the applications of JFET? Explain JFET as VVR**.** (7)

(ii) Explain the biasing technique for enhancement MOSFET. (7)

23. a) Derive the expression for current gain, input impedance and voltage gain of a CE Transistor Amplifier.

(OR)

b) Explain and analyse the low frequency response of RC coupled amplifiers.

24. a) (i) How can a cross over distortion be reduced? (2)

(ii) Explain the working of differential amplifier and derive expression for CMRR. (12)

(OR)

b) Draw a neat circuit diagram and explain working of cascade amplifier and derive the expression for gain and frequency response.

25. a) (i) Calculate the gain without and with feedback for the FET amplifier circuit of Fig. 1 and the following circuit values: R1 = 80 k Ω, R2= 20 k Ω, Ro= 10 k Ω, R D = 10 k Ω and g_m = 4000 μS. (7)

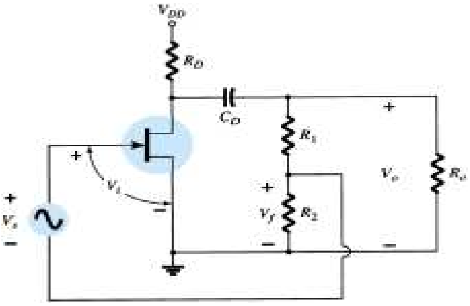

Fig 1

(ii) Describe the operation of wein bridge oscillator. (7)

(OR)

b) Explain the principle of operation and derive the expression for the output in colpitts oscillator.

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