Register Number: ………………..

B.E DEGREE EXAMINATIONS: JUNE 2015

(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.   LEDs made from GaAs emit

    a)   Infrared radiation   b)   Colour

    c)   Voltage   d)   Current

2.   The LASER diode sources require

    a)   Spontaneous emission   b)   Absorptio

    c)   Stimulated emission   d)   Mono

3.   The input impedance of an FET is of the order of

    a) 10^{20} ohm   b)   Hundreds of mega ohm

    c)   Hundred ohm   d)   A few ohm

4.   A transistor when connected in CE mode has

    a)   a low input resistance and a low output resistance   b)   a high input resistance and high output resistance

    c)   a high input resistance and low output resistance   d)   a medium input resistance and high output resistance

5.   The ideal value of stability factor of a biasing circuit is

    a)   1   b)   5

    c)   10   d)   100

6.   A source follower has a voltage gain of

    a) $g_m r_d$ b) $g_m r_s$

    c) $g_m r_{s\,(1+\,g_m r_s)}$ d) $g_m r_{d\,(1+\,g_m r_d)}$

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 cascade amplifier is a multistage configuration of
   a) CC-CB   b) CE-CB
   c) CB-CC   d) CE-CC

9. When negative voltage feedback is applied to an amplifier, its voltage gain ....
   a) is increased   b) is reduced
   c) remains the same   d) zero

10. The PIV rating of the diodes in a full-wave rectifier must be larger than _____ V_m.
    a) 0.318   b) 0.636
    c) 2   d) 1

PART B (10 x 2 = 20 Marks)

11. Define peak inverse voltage.

12. Give the applications of zener diode.

13. Mention the operating modes of MOSFET.

14. Write down the expression that relates saturation current and pinch off voltage.

15. Define amplification factors.

16. Draw a source follower circuit.

17. What are the advantages of class C push-pull amplifier?

18. Define the term CMRR.

19. In an amplifier with negative feedback, the gain of the basic amplifier is 100 and it employs a feedback factor of 0.02. If the input signal is 40m V, determine voltage gain with feedback.

20. Mention any two high frequency LC oscillators.

PART C (5 x 14 = 70 Marks)

21. a) (i) List and explain the applications of LED and LCD.   (4)
       (ii) With suitable diagrams, explain the operation of a laser diode.   (10)

(OR)

    b) (i) Discribe the different types of junction breakdown that can occur in a reverse (4)
            biased diode.
       (ii) How is a PN junction diode working? Explain the V – I characteristics of PN   (10)
            diode with diagrams.

22. a) (i) Calculate I_c and I_E for a transistor that has $\alpha_{dc} = 0.98$ and IB = 100 = 0.98 and (4)
            IB = 100μA. Determine the value of βdc for the transistor.

| | (ii) | Sketch a typical JFET switching circuit and explain its operation also define r_{DS} (on) and V_{DS} (on). | (10) |

(OR)

| | b) | (i) | Compare BJT and UJT. | (4) |
| | | (ii) | Explain BJT Common base configuration and draw a circuit for determining common base characteristics. | (10) |

| 23. | a) | (i) | How are amplifiers classified according to the input? | (2) |
| | | (ii) | Derive the expression for current gain, input impedance and voltage gain of a CE Transistor Amplifier. | (12) |

(OR)

| | b) | (i) | Why do we choose Q point at the center of the load line? | (2) |
| | | (ii) | Sketch a gate bias circuit using an n-channel JFET. Identify the polarities of V_{DD}, V_{DS}, V_G and V_{GS}. Show the I_D direction. Briefly explain the circuit operation. | (12) |

| 24. | a) | (i) | Describe the cross over efficiency of class B push-pull amplifier. How it can be minimized? | (4) |
| | | (ii) | Make complete analysis of tuned amplifier &derive the necessary expressions. | (10) |

(OR)

| | b) | (i) | Why is the gain of the second amplifier in case of two-stage amplifier, is low. | (2) |
| | | (ii) | Derive the equation for differential mode gain and common mode gain of a differential amplifier | (12) |

| 25. | a) | (i) | Distinguish between positive and negative feedback. | (4) |
| | | (ii) | With a neat diagram explain the action of phase shift oscillator. Write the disadvantages of phase shift oscillator. | (10) |

(OR)

| | b) | (i) | Which feedback increases the gain of the amplifier? | (2) |
| | | (ii) | Explian full wave rectifier with the help of circuit diagram. Derive expressions for (i) I_{dc} (ii) I_{rms} (iii) V_{dc} (iv) Ripple Factor (v) Rectifier Efficiency. | (12) |

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