Reg. No……. Name……

B. Sc. DEGREE END SEMESTER EXAMINATION OCTOBER 2017

SEMESTER – 3 : PHYSICS (Core Course)

COURSE: 15U3CRPHY3, ELECTRONICS

(For Regular - 2016 Admission and Supplementary / Improvement 2015 & 2014 Admission)

Time: Three Hours Max. Marks: 60

PART A (Very short answer questions)

(Answer all questions) Each question carries 1 Mark

1. Write diode equation, explain the different letters used.
2. Explain the non-linear behavior of PN-junction diode.
3. What is meant by static and dynamic resistance of a diode?
4. What is the role of filters in rectifier circuit?
5. Write the DC load line equation of a CE amplifier and explain the letters used.
6. What is stability factor of a transistor circuit?
7. What type of feedback is used in transistor amplifier circuit?
8. Explain the concept of virtual ground in op-Amp
9. In amplitude modulation, the modulation index is 150%, it means
   (i) No modulation
   (ii) Perfect modulation
   (iii) Under modulation
   (iv) Over modulation
10. In FM modulation what property of carrier wave is modified according to signal?
    (i) Frequency
    (ii) Phase
    (iii) Amplitude
    (iv) No change (1 x 10 = 10)

PART B (Short answer questions)

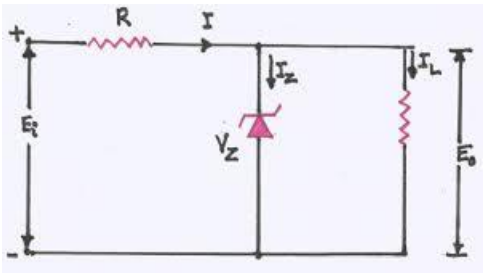
(Answer any 7 questions) Each question carries 2 Marks

11. Define the term ripple factor of a rectifier. If the ripple factor of rectifier A is larger than that of B, which one is the preferred choice, why?
12. What is meant by positive and biased clipper, draw the shape of output wave form for a given input sine wave?
13. Explain the term pinch off region and pinch off voltage of FET
14. What is the relevance of fixing the operating point at the centre of DC load line in the case of a transistor amplifier?
15. Explain how negative feedback improves the stability of an amplifier circuit.
16. What is an op-Amp; write four important characteristic of an ideal op-Amp.
17. What is modulation; why it is needed?
18. What is side band and band width in modulation?
19. Briefly explain diode detector circuit in amplitude modulation. (7 X 2 = 14)

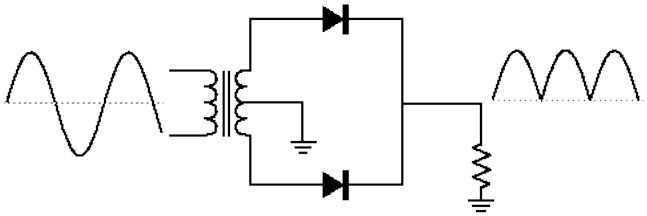
PART C (Problem/Derivations)

(Answer any 4 question) Each question carries 4 Marks

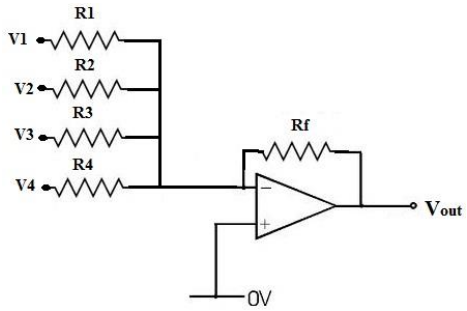
20. Derive the relation $I_C=\beta I_B+(\beta+1)\, I_{CBO}$, of a CE transistor circuit; where I_C,I_B and I_{CBO} are the collector current, base current and collector to base leakage current with emitter open.
21. Calculate the current I, I_L and I_Z in the circuit for the maximum and minimum values of E_i. Neglect the Zener resistance. Given E_i varies between 40 and 70, R=3K, R_L=2K and V_Z=10V.



22. The load resistance of a centre- tapped full wave rectifier is 500 Ω and the necessary secondary voltage of the transformer (end to end) is 60 sin(100πt). Calculate the ripple factor and efficiency of the rectifier. Given that the resistance of the diode equals 50 Ω.



23. The characteristic of certain audio amplifier is such that it gives a voltage amplification of 10 at 100 Hz, 30 at 3kHz and 60 at 10 kHz. Taking the amplification at 3kHz as the reference level, calculate the loss or gain in decibel.
24. The output of the op-amp adder circuit is $V_o=-V_1+2V_2-3V_3$. Find R_1,R_2,R_3 if R_f=6kΩ



25. Total power content of an AM wave is 1500 W. For 100% modulation determines the power transmitted by the (i) Carrier (ii) each side band. (4 x 4 = 16)

Part D (Long answer questions

(Answer any 2 question) Each question carries 10 Marks

26. With neat diagram describe the voltage divider method in detail. How stabilization of operating point is achieved in this method.
27. What is an oscillator? Discuss the essentials of a transistor oscillator. Draw the circuit diagram and explain the action of a Hertley oscillator.
28. What is modulation index? What do you understand by frequency modulation? Explain the advantage of frequency modulation over amplitude modulation.
29. Discuss the theory of negative feedback in amplifier circuit. Explain the negative feedback circuit in CE transistor amplifier circuit. (2 x 10 = 20)