TB153460A **Reg. No: …….**

Name: ……....

B. Sc. DEGREE (C.B.C.S.S.) EXAMINATION, OCTOBER 2016

SEMESTER III – CORE COURSE (PHYSICS)

PH3B03TB - ELECTRONICS

Time: Three Hours **Maximum Marks: 60**

PART A

I. Answer all questions. Each question carries 1 mark

1. Draw the circuit of a voltage tripler.
2. What is meant by leakage current in a transistor?
3. Define stability factor of a transistor. What can we infer from its value?
4. What are the important factors affecting stability of Q point?
5. What is meant by Barkhausen criterion?

(5 x 1 = 5)

PART B

II. Answer any five questions. Each question carries 2 marks

6. Distinguish between static and dynamic resistance of a diode.
7. Draw the circuit of a π filter and explain the action of its components.
8. Deduce the relation between the current gains α and β of a transistor.
9. How do we classify power amplifiers based on transistor biasing condition. Explain
10. Draw the circuit of an emitter follower. What are its applications?
11. Explain qualitatively how a LC tank circuit produces electrical oscillations
12. What are the characteristics of an ideal op-amp?
13. Briefly explain the disadvantages of amplitude modulation.

(5 x 2 = 10)

PART C

III. Answer any five questions. Each question carries 5 marks

14. A half-wave rectifier is used to supply 30V dc to a resistive load of 600Ω. The diode has a forward resistance of 25Ω. Find the maximum value of ac voltage required at the input.
15. A voltage regulator has a line regulation of 1.4μV/V. Determine the change in its output voltage if the input voltage changes by 10V
16. A transistor has β = 150. Calculate the collector and base currents, if the emitter current is 10 mA
17. Determine the value of collector current and collector to emitter voltage for the voltage divider bias circuit with the following values V_{CC} = 10V, R_C = 1kΩ, R_E = 500Ω, R_1 = 10kΩ, R_2 = 5kΩ, V_{BE} = 0.7V
18. A transistor connected in CE configuration has the following h-parameters. h_{ie} =1.1kΩ, h_{re} = $2.5x10^{-4}$, h_{fe} = 50, h_{oe} = 25 μ mho and r_L = 1kΩ. Calculate the current gain, input impedance and voltage gain.

19. The tank circuit of a Colpitt's oscillator has capacitances 0.01μF and 0.001μF and an inductance of 15μH. Calculate the operating frequency and feedback fraction.
20. Calculate the output voltage of a three input summing amplifier. Given R_1 = 200kΩ, R_2 = 250kΩ, R_3 = 500kΩ, R_f = 1mΩ, V_1 = -2V, V_2 = +2V, V_3 = +1V
21. A carrier wave of 500 watt is subjected to 100% amplitude modulation. Determine a) power in side bands b) power of modulated wave

(5 x 5 = 25)

PART D

IV. Answer any two questions. Each question carries 10 marks

22. Explain with working of a *full wave diode bridge rectifier* and derive expressions for average values of dc output voltage and current. What is the efficiency of this circuit?
23. Explain how a *zener diode shunt regulator* provides line regulation and load regulation? How do we calculate the optimum value of current limiting resistor in this circuit?
24. Explain with circuit diagram the experiment to determine the characteristics of a transistor in *Common emitter* configuration. Explain the input and output characteristics obtained.
25. Explain with a block diagram, the principle of *negative voltage feedback amplifier*. Obtain an expression for its voltage gain. Explain four advantages of negative voltage feedback.

(2 x 10 = 20)