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(Pages : 3) Name.....

Reg. No..... 63

FIFTH SEMESTER B.Sc. DEGREE EXAMINATION, NOVEMBER 2015

(U.G.—CCSS)

Core Course—Physics

PH 5B 12—ELECTRONICS (ANALOG AND DIGITAL)

(2013 Admissions)

Time : Three Hours Maximum : 30 Weightage

Section A (Objective type questions)

Answer all **twelve** *questions.*

I. Choose the correct answer :

1 Maximum efficiency of a half wave rectifier is :

(a) 40.6 %. (b) 81.2 %.

(c) 50 %. (d) 1.21 %.

2 The gain of a cascaded amplifier is equal to the :

(a) Product of individual gains. (b) Sum of individual gains.

(c) Ratio of stage gains. (d) None of these.

3 Transistor is a ——— operated device.

(a) Current. (b) Voltage.

(c) Both voltage and current. (d) None of these.

4 In an AM wave with 100 percent modulation, each side band carries ——— of the total transmitted power.

(a) One third. (b) Two third.

(c) One sixth. (d) One half.

II. Fill in the blanks with appropriate word or numerical value :

5 The condition $A\beta = 1$ for oscillations is known as the ——— criterion.

6 The percentage of regulation in an ideal rectifier is ———.

7 Binary equivalent of $A3D_{16}$ is ———.

8 In a Karnaugh map, four adjacent 1s are called ———.

Turn over

III. State whether the following statements are true or false :

9 The higher the frequency of the wave, the longer the length of the antenna.

10 The closed loop gain of an amplifier is always greater than the open loop gain.

11 A field effect transistor is basically a voltage controlled resistor.

12 Class C operation is most efficient because it hardly operates during the input cycles.

(12 × ¼ = 3 weigh

Section B (Short Answer type questions)

Answer all **nine** *questions.*

13 Define the unit decibel for expressing : (i) voltage ; (ii) current ; and (iii) power.

14 What is meant by the Beta cut off frequency ?

15 Explain the term PIV in connection with a half wave rectifier.

16 Why a capacitor filter is better than the inductor filter ?

17 What is a Darlington pair ?

18 Distinguish between oscillators and amplifiers.

19 What is regulated power supply ?

20 Implement the logic expression Y = (A + B) (A′ + B′) in a logic diagram. Construct the table and hence show that the logic diagram is equivalent to an XOR gate.

21 Discuss the operation of a Half adder.

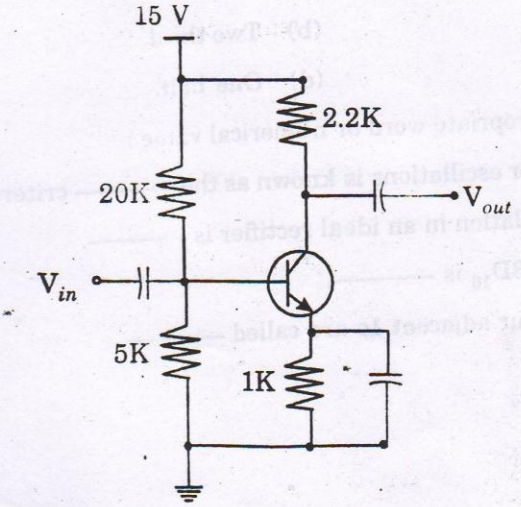
(9 × 1 = 9 weigh

Section C (Short Essay or Paragraph questions)

Answer any **five** *questions from seven.*

22 Why R-C coupling is the widely used coupling between the two stages of cascaded ampl

23 Find the values of V_{CE} and A_V for the transistor amplifier circuit shown below :



24 Draw the circuit diagram of a voltage tripler.

25 For a Zener regulator circuit, V_Z = 12 V, R_S = 4 KΩ, R_L = 6 KΩ and the input voltage varies from 30 V to 50 V. Find the maximum and minimum values of the Zener current.

26 Find the operating frequency of a Hartley oscillator if L_1 = 100 μH, L_2 = 1 mH, mutual inductance between the coils M = 20 μH and C = 20 μF.

27 The peak-to-peak value of an AM voltage has a maximum value of 8V and a minimum value of 2V. What is the percentage modulation and the amplitude of the unmodulated carrier ?

28 Discuss the functioning of a JK Flip Flop with the help of a logic circuit.

(5 × 2 = 10 weightage)

Section D (Essay questions)

Answer any **two** *questions from three.*

29 Describe the term feedback in amplifiers. Explain the principle of negative feedback and discuss the advantages of negative feedback.

30 What is modulation ? Discuss frequency modulation. Explain the term carrier swing.

31 What is an Op-Amp ? State the characteristics of an ideal Op-Amp. Describe the use of Op Amp as an adder.

(2 × 4 = 8 weightage)