D 50732 (Pages : 2) Name.....

Reg. No.....

FIFTH SEMESTER B.Sc. DEGREE EXAMINATION, NOVEMBER 2013

(UG-CCSS)

Physics—Core Course

PH5 B12—ELECTRONICS (ANALOG AND DIGITAL)

Time : Three Hours Maximum : 30 Weightage

I. Answer *all* questions :

1 The efficiency of a half-wave rectifier is :

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

(c) 100 %. (d) 50 %.

2 Which of the following configuration is used for impedance matching ?

(a) CB. (b) CE.

(c) CC. (d) All.

3 The condition for sustained oscillation in the case of a feedback amplfier is :

(a) $A_{vf} < A_v$. (b) $A_{vf} > A_v$.

(c) $A_{vf} = \infty$. (d) $A_{vf} = 0$.

4 $(1011.1101)_2$ = ———.

(a) 11.8125_{10}. (b) 11.6825_{10}.

(c) 13.8125_{10}. (d) 13.8825_{10}.

Fill in the blanks :

5 The maximum efficiency of a full-wave rectifier is ———.

6 A JFET has the disadvantages of ———.

7 A full adder has ——— inputs and two outputs.

8 The ——— gate is also called "Any or All gate".

Give one word answers :

9 Write the name of any one of the universal gates

10 How the amplitude and intensity of a sound wave are related ?

11 Write the decimal equivalent of $(1101101)_2$.

12 How negative feedback in amplifier circuits affect noise ?

(12 × ¼ = 3 weightage)

Turn over

II. Answer *all* questions :

13 What are voltage multipliers ?

14 Draw the circuit diagram of a choke-input filter circuit.

15 What is meant by d.c. loadline ?

16 Write De Morgan's theorem.

17 Write the relation between α and γ of a common-collector transistor configuration.

18 Draw the circuit diagram of an *op-amp* differentiator.

19 How negative numbers are represented in binary system ?

20 Explain the principle of light emitting diode.

21 Write the Boolean expression for X-OR gate.

(9 × 1 = 9 weightage)

III. Answer any *five* questions :

22 In a common-base transistor configuration, current gain is 0.9. If the emitter current is 1 mA, calculate the base current.

23 A half-wave rectifier uses a diode with r_p = 300 Ω. If the input ac is 200 V (rms) and load is a resistance of 1200 Ω, calculate I_{dc}, I_{rms} and rectification efficiency.

24 Discuss the method of biasing a transistor with feedback resistor. Explain its advantages.

25 Simplify the Boolean expression :

(i) $AB\overline{C} + A\overline{B}\overline{C} + \overline{A}BC + ABC + A\overline{B}C$.

(ii) $(AB + C)(AB + D)$.

26 In a transistor CE amplifier, V_{CC} = 12.5 V, collector load R_c = 2.5 kΩ. Draw the DC load line.

27 (a) What is meant by amplitude modulation ?

(b) An audio signal of 1 kHz is used to modulate a carrier of 500 kHz. Determine the sideband frequencies.

28 (a) Define decibel gain. What are the advantages of using decibel units ?

(b) Find the gain in dB for a voltage gain of 3D.

(5 × 2 = 10 weightage)

IV. Answer any *two* questions :

29 (a) Explain the principle of a Full wave bridge rectifier.

(b) Derive the expression for efficiency of the Fullwave Bridge rectifier.

30 (a) With a neat circuit diagram, explain the working of a transformer coupled class a amplifier.

(b) Discuss its advantages and disadvantages.

31 (a) With the help of the truth table, explain the functions of full-adder.

(b) Using examples, illustrate the addition of 3-bits by full-adder.

(2 × 4 = 8 weightage)