

C 30816

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Name.....

Reg. No.....

**FIFTH SEMESTER B.Sc. DEGREE (SUPPLEMENTARY) EXAMINATION  
NOVEMBER 2017**

(UG—CCSS)

PH 5B 12—ELECTRONICS (Analog and Digital)

(2013 Admissions)

Time : Three Hours

Maximum : 30 Weightage

**Section A**

*Answer all questions.*

*Twelve objectives types questions, in bunches of four questions.*

*Each bunch carries a weightage of 1.*

1. For a transistor :

- (a) The emitter is lightly doped.      (b) The base is heavily doped.  
(c) The emitter is heavily doped.      (d) Emitter is moderately doped.

2. An FET is driven by :

- (a) Current.      (b) Charge.  
(c) Voltage.      (d) Junction.

3. The output logic is complement to input logic and viceversa in a :

- (a) NOT gate.      (b) OR gate.  
(c) AND gate.      (d) NOR gate.

4. The 2's complement of 001 is :

- (a) 110.      (b) 000.  
(c) 111.      (d) 010.

5. Ripple factor for a fullwave rectifier is :

- (a) 50.      (b) 0.48.  
(c) 0.048.      (d) 0.0048.

6. Output  $Y = A + B$ , satisfies the condition of :

- (a) OR gate.      (b) AND gate.  
(c) NOT gate.      (d) NOR gate.

Turn over

7. For a transistor if  $\beta = 50$ ,  $I_B = 20\mu\text{A}$ , then  $I_C =$  :
- (a) 1 mA. (b)  $1\mu\text{A}$ .  
 (c) 100 A. (d) 100 mA.
8. To control the channel current, a MOSFET uses :
- (a) Electric field of a capacitor. (b) Inductance of an inductor.  
 (c) Gate current. (d) Source current.
9. Convert the binary 11.0111 to decimal.
10. In fullwave rectification, if the input frequency is 50Hz, then the output frequency is :
- (a) 50. (b) 100.  
 (c) 500. (d) 5.
11. If  $f_c$  is the frequency of a carrier wave, then the frequency of the AM wave is ?
- (a)  $2 f_c$ . (b)  $f_c/2$ .  
 (c)  $f_c$ . (d)  $f_c/4$ .
12. The noise level of FET is ———, when compared to ordinary transistors.
- (a) Equal. (b) Less.  
 (c) More. (d) Negligible.

(12  $\times$   $\frac{1}{4}$  = 3 weightage)

### Section B

Answer all questions.  
 Each has a weightage 1.

13. What is 'faithful amplification' ?
14. What are the advantages of negative feed back ?
15. Draw the block diagram of a straight radio receiver.
16. What are the difference between FET and UJT ?
17. What do you mean by a voltage multiplier ?
18. Explain d.c loadline.
19. What do you mean by flipflop ?
20. Explain the three parameters of FET.
21. What is meant by modulation ?

(9  $\times$  1 = 9 weightage)

**Section C**

*Answer any five questions.*

*Each has a weightage 2.*

22. Realise the Boolean expression  $Y = A + B$  using NAND gate only.
23. A power supply A delivers 10V dc with a ripple of 0.5V rms while the power supply B delivers 25V dc with a ripple of 1mV. Which is the best power supply among the two ?
24. Explain how a transistor works as an amplifier.
25. Explain amplitude modulation. What are the advantages of FM over AM ?
26. How an op-amp works as a differentiator ?
27. Explain the frequency response of an RC coupled transistor amplifier.
28. For a transistor amplifier, if  $V_{cc} = 12V$ ,  $R_c = 6K\Omega$ , draw the d.c loadline. What will be the Q point if the zero signal base current is  $20\mu A$  and  $\beta = 50$  ?
29. Derive the expression for collector current in a CE connection.

(5 × 2 = 10 weightage)

**Section D**

*Answer any two questions.*

*Each has weightage 4.*

30. Explain the operation of a Collpitt's oscillator. Find the operating frequency of a transistor Collpitts oscillator if  $C_1 = 0.001\mu F$ ,  $C_2 = 0.01\mu F$  and  $L = 15\mu H$ .
31. The four diodes used in a bridge rectifier circuit have forward resistances which may be considered constant at  $1\Omega$  and an infinite reverse resistance. The alternating supply voltage is 240V rms and load resistance is  $480\Omega$ . Calculate the :
  - (i) mean load current
  - (ii) power dissipated in each diode.
32. Derive an expression for power carried by the sidebands of an AM wave. An audio signal of 1KHz is used to modulate a carrier of 500 KHz. Determine the bandwidth required.

(2 × 4 = 8 weightage)