STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI – 600 086.
(For candidates admitted during the academic year 2011-12 & thereafter)

SUBJECT CODE: 11PH/MC/SE64

B.Sc. DEGREE EXAMINATION APRIL 2017
BRANCH III - PHYSICS
SIXTH SEMESTER

REG. No._____

COURSE : MAJOR – CORE
PAPER : SEMICONDUCTOR ELECTRONICS
TIME : 30 MINS. MAX. MARKS: 30

SECTION – A
TO BE ANSWERED ON THE QUESTION PAPER ITSELF

ANSWER ALL QUESTIONS: (30 x 1 = 30)

I Choose the Correct Answer:

1. Transistors are made by _____
   a. superconductors b. conductors c. semiconductors d. insulators

2. The emitter of transistor is always _____ biased with respect to base
   a. forward b. reverse c. emitter d. base

3. The middle section of the transistor is _____
   a. emitter b. gate c. drain d. base

4. In a transistor, the relation among the terms I_B , I_C and I_E is
   a. $I_C=I_E+I_B$ b. $I_E=I_C+I_B$ c. $I_E=I_C-I_B$ d. $I_B=I_C+I_E$

5. The zero signal values of I_C and V_{CE} are known as the _____
   a. O point b. I point c. V point d. Q point

6. The base of transistor is _____ doped
   a. lightly b. moderately c. highly d. not

7. R.C. coupling is used to amplify _____
   a. current b. sound c. power d. voltage

8. A JFET device acts like a _____
   a. diode b. bipolar transistor c. vacuum tube d. triode

9. A JFET is characterized by _____ gain.
   a. power b. voltage c. current d. source

10. Unit of transconductance is _____
    a. mho b. ohm c. ampere d. volts

11. The device that exhibits negative resistance region is _____
    a. transistor b. FET c. UJT d. opamp

12. The output pin number of opamp IC 741 is _____
    a. 7 b. 6 c. 5 d. 4

..2

13. Find the value of $CMRR_{dB}$ equivalent to CMRR value of 10.
    a. 200 dB b. 100 dB c. 20 dB d. 10 dB

14. Find the closed loop gain of non-inverting amplifier, if R_{in}= 1 KΩ and R_f = 10 KΩ.
    a. 11 b. 10 c. 9 d. 0.1

15. _____ wave is an example of digital signal.
    a. Triangular b. Square c. Sinusoidal d. Saw tooth

II Fill in the blanks:

16. The function of transistor is _____.
17. A transistor circuit containing more than one stage of amplification is known as _____.
18. The bipolar transistor is a _____ controlled device.
19. The input impedance of opamp is _____.
20. The process of converting an analog voltage into digital signal is known as _____.

III State whether true or false:

21. An ideal value of stability factor is 0.
22. A transistor amplifier has high output impedance because collector has reverse biased.
23. A UJT has two pn junctions.
24. The operational amplifier is a versatile device.
25. A continuously varying signal is called an analog signal.

IV Answer briefly:

26. Define faithful amplification?

27. What is single stage transistor amplifier?

28. What is JFET?

29. Define differential amplifier.

30. What is digital to analog converter?

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SECTION – B

ANSWER ANY FIVE QUESTIONS: (5 x 5 = 25)

1. Describe base resistor method for transistor biasing.
2. Draw the circuit of a practical single stage transistor amplifier. Explain the function of each component.
3. When V_{GS} of a JFET changes from -3.1V to -3.0V, the drain current changes from 1 mA to 1.3 mA. What is the value of transconductance?
4. Find the intrinsic stand off ratio for a UJT. Given that R_{B1}= 3 KΩ and R_{B2}=2 KΩ.
5. A differential amplifier has an open circuit voltage gain of 100. The input signals are 3.25V and 3.15V. Determine the output voltage.
6. You have the following resistor values available: 1 KΩ, 5 KΩ, 10 KΩ and 20 KΩ. Design the opamp circuit to have a voltage gain of -4.
7. Explain digital to analog converter by using R-2R ladder method.

SECTION – C

ANSWER ANY THREE QUESTIONS: (3 X 15 = 45)

8. Describe the voltage divider biasing method in detail?
9. Explain transistor RC coupled amplifier with special reference to frequency response.
10. Explain the construction and working of a UJT.
11. Discuss th**e** following operation of an Opamp
    (i) subtrector (ii) differentiator and (iii) voltage follower
12. Explain analog to digital converter by using counter method.