STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI – 600 086.
(For candidates admitted during the academic year 2015-16 and thereafter)

SUBJECT CODE :15PH/MC/EL64

B.Sc. DEGREE EXAMINATION APRIL 2019
BRANCH III - PHYSICS
SIXTH SEMESTER

COURSE : MAJOR – CORE
PAPER : ELECTRONICS II
TIME : 3 HOURS. MAX. MARKS :100

SECTION – A

ANSWER ALL QUESTIONS: (30X1=30)

I. CHOOSE THE CORRECT ANSWER:

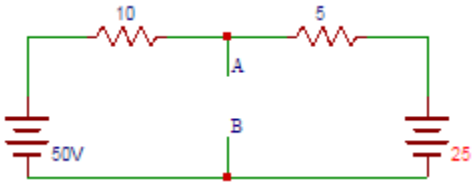
1. A battery has a short-circuit current of 30 A and an open circuit voltage of 24 V. If the battery is connected to an electric bulb of resistance 2 ohm^{-1}, the power dissipated by the bulb is

   a) 80 W b) 1800 W c) 112.5 W d) 228 W

2. Which of these is the equation for current divider?

   a) $I2= (R_1/R_1+R_2) \times I$ b)V = IR c)R = IV d)PE = mgh

3. Determine the equivalent thevenin's voltage between terminals A and B in the circuit shown below.



   a) 0.333 b) 3.33 c) 33.3 d) 333

4. The relation between α and β is _____

   a) β=α/(1-α) b) α= β/(1+β) c) β=α/(1+α) d) α= β/(1- β)

5. The collector current is 2.945A and α=0.98. The leakage current is 2μA. What is the emitter current and base current?

   a) 3mA and 55μA b) 2.945mA and 55μA
   c) 3.64mA and 33μA d) 5.89mA and 65μA

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6. Transistor biasing is done to keep _____ in the circuit

a) Proper direct current b) Proper alternating current
b) The base current small d) Collector current small

7. A single stage transistor amplifier contains _____ and associated circuitr

a) Two transistors b) One transistor
b) Three transistor d) None of the above

8. It is generally desired that a transistor should have _____input impedance

a) Low b)Very low c)High d) Very high

9. If a transistor amplifier draws 2mA when input voltage is 10 V, then its input impedance is _____

a) 20 kΩ b)2 kΩ c)10 kΩ d)5 Kω

10. Junction Field Effect Transistors (JFET) contain how many diodes?

a) 4 b) 3 c) 2 d) 1

11. Compared to a bipolar transistor, the JFET has a much higher

a) Voltage gain b) Input resistance
b) Supply voltage d) Current

12. Basis of a relaxation oscillator is charging and discharging of a

a) capacitor b) inductor
b) resistor d) supply

13. Which of the following is a combination of inverting and non-inverting amplifier?

a)Differential amplifier with one op-amp b)Differential amplifier with two op-amps
c)Differential amplifier with three op-amps d)Differential amplifier with four op-amps

14. The common-mode gain is _____

a) very high b) very low
b) always unity d) unpredictable

15. The use of negative feedback _____

a) reduces the voltage gain of an Op-amp b) makes the Op-amp oscillate
c) makes linear operation possible d) answers (1)and (2)

II. FILL IN THE BLANKS:

16. Norton's current is equal to the current passing through the _____ circuited _____ terminals.
17. If I_C is held constant and temperature is varied, current gain will_____
18. In an RC coupled amplifier, the voltage gain over mid-frequency range_____
19. The peak and valley currents of the PUT are typically _____ those of a similarly rated UJT.
20. The carry look ahead adder is based on the principle of looking at the lower order bits of _____ and _____ if a high order carry is generated.

III. STATE WHETHER TRUE OR FALSE:

21. A resistor is a device that controls current in electric circuits.
22. If biasing is not done in an amplifier circuit, it results in Unfaithful amplification
23. One characteristic of amplifiers is that the sum of the voltage gain and the bandwidth is always constant when the roll-off is –20 dB/decade.
24. The channel of a JFET is between the drain and source
25. An op-amp integrator uses a capacitor as the feedback element.

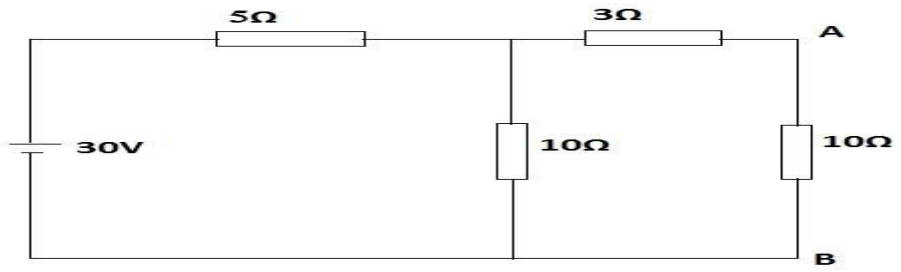
IV.ANSWER BRIEFLY:

26. State Thevenin's**.** theorem
27. What is operating point?
28. What is an amplifier?
29. Define pinch off voltage in FET**.**
30. What is an operational amplifier?

SECTION – B

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

31.Find the Norton's equivalent circuit across A-B terminals for the circuit shown in figure

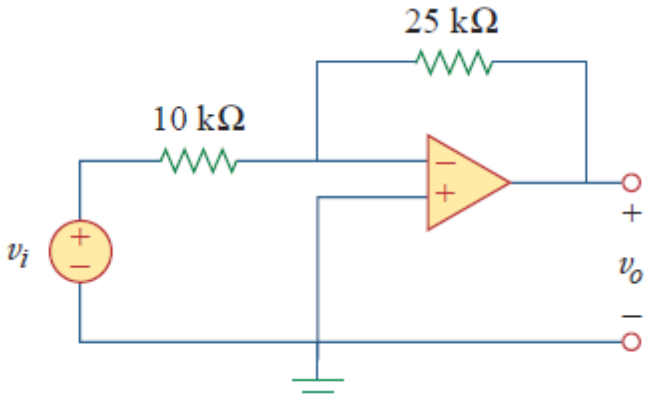


32. Explain the DC load line.

33.A two stage RC coupled amplifier uses transistor having h-parameters h_{ie} = 1 K ohm, h_{fe}= 100. If the load resistance is 2.2 k ohm calculate the overall midfrequency gain. Neglect the effect of source resistance and biasing resistance.

34. Calculate the drain current level of a JFET when the gate voltage V_{GS} is equal to one half of the pinch-off value. Assume I_{DSS} = 16 mA.

35. Consider the op amp in Fig. If *vi*= 0.5 V, calculate: (a) the output voltage *vo*, and (b) the current in the 10-kΩ resistor.



36. Design an op amp circuit with inputs v1 and v2 such that V_O= -5V_1+3V_2

37. Explain the Voltage follower

SECTION C

ANSWER ANY THREE QUESTIONS: **(3X15= 45)**

38. Explain voltage and current divider.

39. Briefly explain any three type transistor bias.

40. Write short notes on multistage amplifier and explain type of coupling.

41. Briefly explain working JFET with neat diagram.

42. Write and explain any three application of op-amp.

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