

B.Sc. DEGREE EXAMINATION APRIL 2022

BRANCH III - PHYSICS

SIXTH SEMESTER

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

MAX. MARKS :100

SECTION – A

ANSWER ALL QUESTIONS:

(25 MARKS)

I. CHOOSE THE CORRECT ANSWER:

(10 X 1 = 10)

1. The internal resistance of an ideal voltage source is
a.) small b.) large c.) infinite d.) zero
2. To get Thevenin voltage, you have to
a) short the load resistor b.) open the load resistor c.) short the voltage source d.) open the voltage source
- 3) The phase difference between the output and input voltage a CE amplifier is
a.) 180° b.) 0° c.) 90° d.) 270°
- 4) The upper or lower cutoff frequency in amplifier is called
a.) Resonant frequency b.) sideband c.) 3dBfrequency d.) none of the above
- 5) Thermal runaway is not possible in FET because as the temperature of FET increases
a.) the mobility decreases b.) the transconductance increases c.) the drain current increases d.) the mobility increases
- 6) UJT may be used as
a.) an amplifier b.) a sawtooth generator c.) a rectifier d.) none of the above
- 7) Op-Amp can amplify
a.) a.c signals only b.) d.c signals only c.) both a.c and d.c signals d.) neither d.c nor a.c signal
- 8) The common mode gain is
a) very high b.) very low c.) always unity d.) unpredictable
- 9) The resolution of an 8 bit DAC will be
a) 1/64 b) 1/255 c) 1/8 d) 1/24
- 10) Which A/D converter is considered to be simplest, fastest and most expensive?
a) Servo converter b) Counter type ADC c) Flash type ADC d) All of the mentioned

II. FILL IN THE BLANKS:

(5 X 1 = 5)

- 11) The efficiency at maximum power transfer is _____.
- 12) If a three stage amplifier has individual stage gains of 10 dB, 5 dB, and 10 dB then total gain in dB is _____.

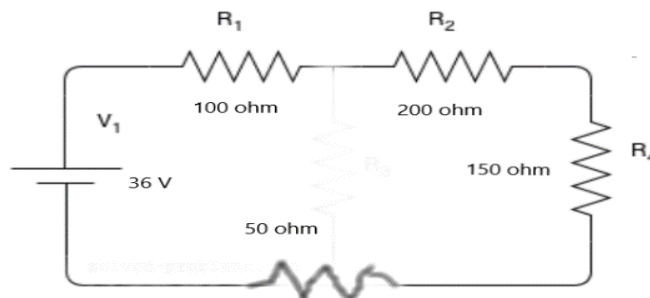
- 13) The JET is a _____ device.
 14) The input stage of an Op-amp is usually a _____.
 15) A 4-bit R/2R digital-to-analog (DAC) converter has a reference of 5 volts and the input code 0101, the corresponding analog output is _____.

III. ANSWER BRIEFLY:**(5 X 2 =10)**

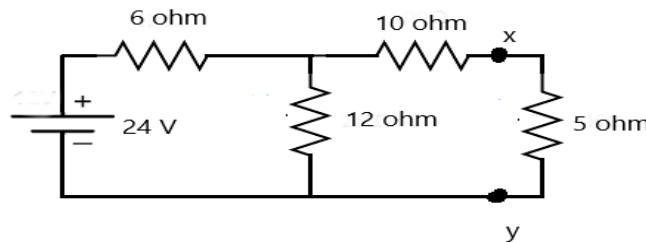
- 16) What are short and open circuit?
 17) The voltage gain of an amplifier is 73. Find its voltage gain in dB.
 18) Calculate the amplification factor of a FET if drain resistance is 30 K Ω and transconductance is 3000 μ mho.
 19) Define CMRR.
 20) Where is DAC used?

SECTION – B**ANSWER ANY FIVE QUESTIONS:****(5 X 6 = 30)**

- 21) Using the voltage divider rule, find the voltage across 200 Ω resistor in the following circuit.



- 22) Find the Thevenin's equivalent circuit at the terminals x-y of the following circuit.



- 23) Discuss thermal runaway and stability factor in BJT.
 24) A single stage amplifier has a voltage gain of 60. The collector load $R_c = 500 \Omega$ and the input impedance is 1K Ω . Calculate the overall gain when two such stage are cascaded through R-C coupling. Comment on the result.
 25) A JFET has a drain current of 5 mA. If $I_{DSS} = 10$ mA and $V_{GS(OFF)} = -6$ V. Find the value of i) V_{GS} and ii) V_P
 26) What are characteristics of an ideal op-amp.

- 27) For a 5-bit binary weighted resistor D/A converter, determine the following.
- The weight assigned to the LSB
 - change in output voltage when only the LSB changes
 - full scale voltage
 - output voltage for a digital input of 10111, assume 0 = 0 volt and 1=10 volts.

SECTION – C

ANSWER ANY THREE QUESTIONS:

(3 X 15 = 45)

- State super position theorem. Illustrate the principle of super position theorem by a suitable example.
- What do you understand by multistage transistor amplifier? Explain the multistage transistor amplifier with special reference to frequency response, decibel gain and bandwidth.
- Explain the working principle of UJT with neat diagram. How UJT can be used as a relaxation oscillator?
- Draw the circuit symbol of an op-amp and indicate the terminals. Explain op-amp as integrator and differentiator.
- With the block diagram, explain the principle of D / A converter. Explain with circuit, the working of a 4- bit binary weighted D/A converter. Give necessary theory.
