RAN-1013

T.Y.B.Sc (PHYSICS) SEM: V (ID.) Examination

March / April - 2019

General Elective- Electronics (Can)

(Old or New to be mentioned where necessary)

[Total Marks: 50

સૂચના : / **Instructions**

(1)

નીચે દર્શાવેલ ☛ નિશાનીવાળી વિગતો ઉત્તરવહી પર અવશ્ય લખવી.
Fill up strictly the details of ☛ signs on your answer book

Name of the Examination:

☛ **T.Y.B.Sc (PHYSICS) SEM: V (ID.)**

Name of the Subject :

☛ **General Elective- Electronics (Can)**

Subject Code No.: | 1 | 0 | 1 | 3 |

Seat No.:

Student's Signature

(2)   The Marks shown on right is the full marks of Question.

(3)   The symbols used in the question paper have their usual meaning.

Q-l   **Give short answer of the following.**   **8**

1   When the maximum power is transferred?

2   The energy of wave is directly proportional to its _____ .

3   A differential amplifier does not amplify _____ signals.

4   Modulation factor m is the ratio of _____ .

5   Side band power depends upon the _____ . (m, fc, fs).

6   A differential amplifier is sometimes called _____ .

[A] short-tail pair   [B] long - tail pair

[C] open-tail pair   [D] close-tail pair

7   Write the conditions to find d.c. equivalent circuit for transistor amplifier circuit.

8   What is the ideal value of CMRR?

Q.2 **A** For CE transistor amplifier circuit, explain phase reversal process at the collector w.r.t. input signal at base. Also explain it with graphical demonstration.   **10**

OR

A Draw the circuit diagram of a two-stage RC coupled transistor amplifier. Explain the working and operation of the circuit in detail. Explain the frequency response and disadvantages.   **10**

B If the overall gain of the two-stage RC coupled transistor amplifier is 80 dB and the voltage gain of second stage is 150, calculate the voltage gain of first stage in dB.   **4**

OR

B Determine the transformer turn ratio for transforming maximum, power to 10 Ω load from source that has, output impedance of lkΩ. Also calculate the voltage across the external load if the terminal voltage is 10 V_{rms}.   **4**

Q.3 **A** Explain differential amplifier. Explain working of differential inputs to get differential output.   **10**

Explain **non inverting** input with differential type output and single ended type output.

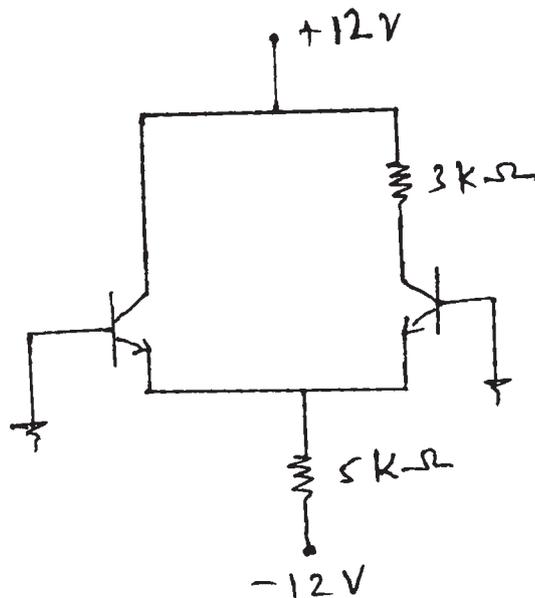Explain **inverting** input with differential type output and single ended type output.

OR

A Explain AC analysis of differential amp. for non inverting input, single ended output. Derive the equation for voltage gain.   **10**

B Explain common mode gain and CMRR.   **4**

OR

B What are the currents and voltages in the single ended output circuit. Ignore V_{BE}.   **4**

+12V

3kΩ

5kΩ

−12V

Q.4 A What is AM? With analysis of AM wave, show that AM wave contains three frequencies viz. fc, fc+fs and fc-fs. Write down important points. **10**

OR

A Explain the power in AM wave, deriving the necessary equations. Explain limitations of Amplitude Modulation. **10**

B A carrier of 140V and 320 kHz is modulated by 70V, 300 Hz sine wave 4 signal. Find modulation index, side-band frequencies and bandwidth.

OR

B A 50 kW carrier wave is to be modulated to a level of (i)80% and (ii)10%. What is the total sideband power in each case? **4**

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