Time:-3 Hrs   **Marks: 80**

N.B. :   1. Question **ONE** is **compulsory**

2. Solve any **THREE** out of remaining questions

3. Draw neat and clean diagrams

4. Assume suitable data if required.

Q. 1.   A. Give reasons for the following   5

I. JFET can be used as a Voltage Variable Resistor

II. JFET is not operated with Forward V_{GS} voltage in an amplifier

B. A difference amplifier is to be designed to amplify the difference between two voltages by a
factor of 10. The inputs each approximately equal to 1V. Determine suitable resistor values for the
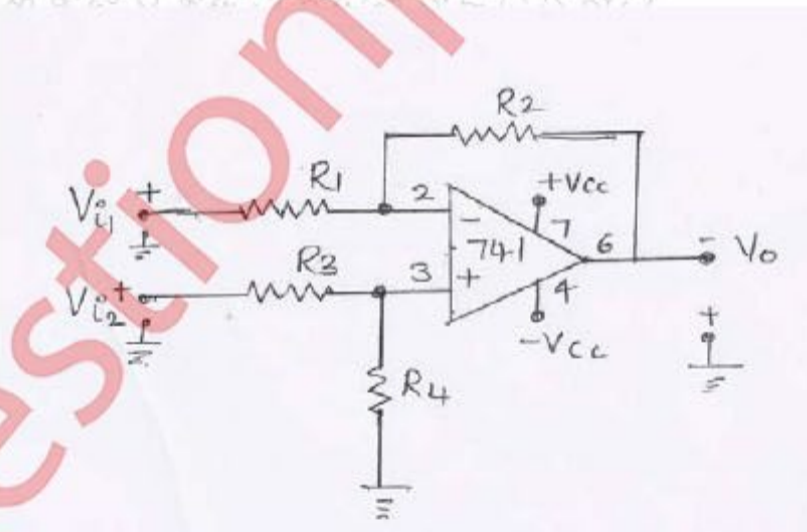circuit shown in fig.1 using a 741 opamp.   5

Fig.1

C. With neat block diagram explain how PLL can be used to generate large number of frequencies
from a single reference frequency.   5

D. Explain the detection of pulse code modulation.   5

[TURN OVER]

Q. 2   A. For the common source circuit shown in fig.2. Calculate the gate input impedance, the drain

output impedance, the circuit input and output impedance and the voltage gain. Use the typical

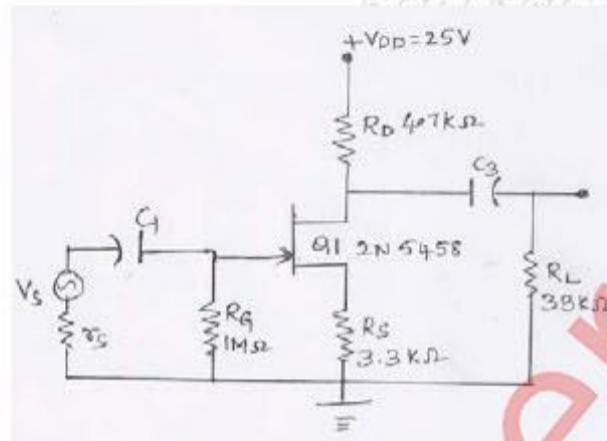parameters for the FET.   **10**

fig 2.

B. List down various parameters of Opamp along with their typical values for IC741. Also explain

what is the significance of CMRR and Slew Rate?   **10**

Q. 3   A. With neat diagram explain any one application of Op-amp based Comparator.   **5**

B. Differentiate between BJT based Class A and Class C power amplifiers.   **5**

C. Compare various pulse modulation techniques.   **5**

D. Describe Shockley's equation and explain it with the relevant characteristics for JFET. **5**

Q. 4   A. Explain the generation of DSBSC using balanced modulator.   **10**

B. Discuss the operating principle of PLL and explain its use as FM detector.   **10**

Q. 5   A. Discuss the principle of operation of super heterodyne receiver in detail along with the

waveforms at each stage.   **10**

B. One input to a conventional AM modulator is a 500 KHz carrier with an amplitude of 20 Vp.

The second input is 10 KHz modulating signal that is of sufficient amplitude to cause a change in

the output wave of ±7.5 Vp. Determine:

(i) upper and lower side frequencies

(ii) modulation coefficient and percentage modulation

(iii) peak amplitude of the modulated carrier and upper and lower side frequency voltages

(iv) expression for the modulated wave

(v) draw the output spectrum   **10**

[TURN OVER]

Q. 6   A. Write short note on generation of FM by Armstrong method.   5

B. Mention important specifications of ADC and DAC required for communication.   5

C. Explain the necessity and significance of modulation in communication.   5

D. Compare n-channel and p-channel JFET with respect to their device features and voltage-current characteristics.   5