Q. P. Code : 26299

(3 Hours) **(Total 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. What is the source of the leakage current in a transistor?

If the emitter current of a transistor is 8 mA and I_B is 1/100 of I_C, determine the levels of I_C and I_B. **5**

B. Explain the concept of virtual ground in operational amplifiers. **5**

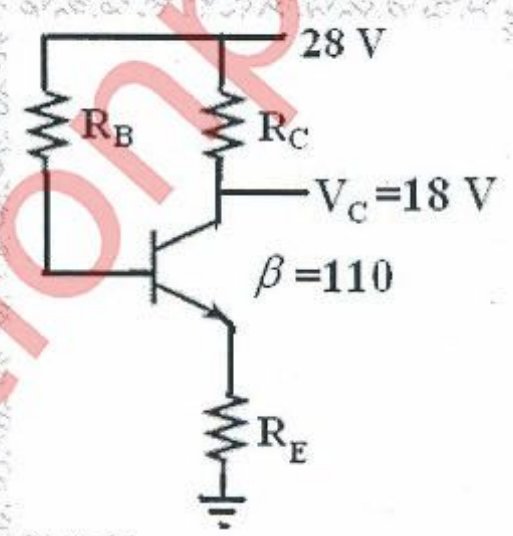
C. Draw the spectrum of amplitude modulated wave and explain its components. **5**

D. Explain adaptive delta modulation. **5**

Q. 2 A. The emitter bias configuration as shown in following figure has the specifications:

$I_{CQ} = \frac{1}{2} I_{Csat}$ $I_{Csat} = 8\,mA$ $V_C = 18\,V$ and $\beta = 110$

Determine R_C, R_E and R_B. **10**



B. Explain the following parameters and their values for 741 opamp

CMRR, Slew Rate, Gain Bandwidth Product, Input Offset Voltage and Output Resistance. **10**

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Q. 3 A. Given β=120 and I_E= 3.2 mA for a common-emitter configuration with r_0=∞ Ω, determine:

(a) Z_i

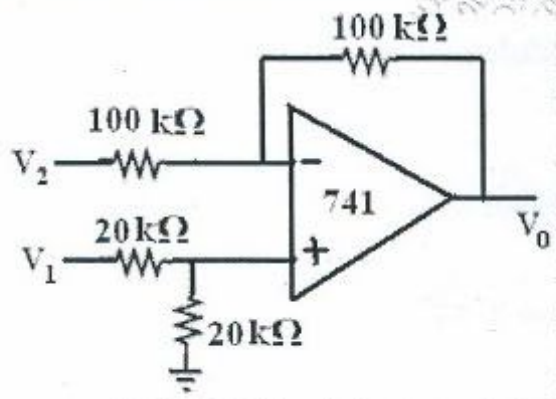
(b) A_v if a load of 2 kΩ is applied.

(c) A_i with the 2 kΩ load. **5**

B. State and explain Barkhausens criteria for oscillations. **5**

C. Explain principle of TDM. **5**

D. Determine the output voltage for the circuit if V_1=5V and V_2=3V. **5**



Q. 4 A. Draw the block diagram of phase cancellation SSB generation and explain how the carrier and unwanted sidebands are suppressed . **10**

B. Draw the PAM, PPM and PWM waveforms in time domain assuming a sinusoidal modulating signal. Explain them in brief. **10**

Q. 5 A. State Shannon's theorem on channel capacity.

What is the maximum capacity of a perfectly noiseless channel whose bandwidth is 120 Hz, in which the values of the data transmitted may be indicated by any one of the 10 different amplitudes? **10**

B. With respect to neat diagram explain the elements of analog communication system. **10**

Q. 6 A. What is Nyquist Criteria? What is its significance? **5**

B. Give the proper definition for entropy and information rate. **5**

C. Write short note on op-amp as comparator. **5**

D. Differentiate between Class A and Class C power amplifiers with respect to circuit diagram, operating cycle and power efficiency. **5**
