Q. P. Code : 26300

(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. Explain the concept and significance of CMRR and Slew Rate in case of op-amps. **5**

B. 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**

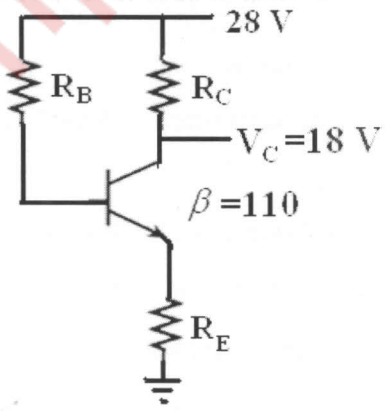
C. Discuss the factors that influence modulation index of an FM wave. **5**

D. Justify that adaptive delta modulation superior to delta modulation. **5**

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

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

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



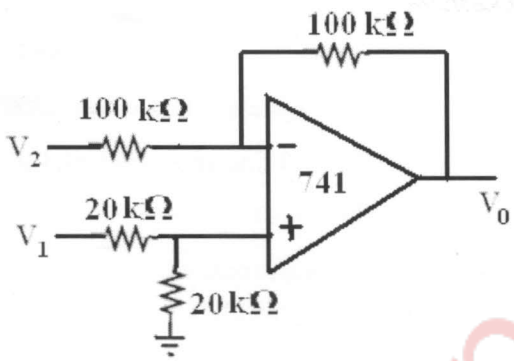
B. Explain how op-am can be used comparator and zero crossing detector. **10**

Q. 3 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. Draw and explain Colpitts oscillator. 5

C. Explain principle of FDM. 5

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



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Q. 4 A. What is DSBSC wave and explain its generation using balanced modulator. 10

B. What is multiplexing in communication system? Draw block diagram of TDM-PCM system and explain. 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 meant by Nyquist rate in sampling and explain its significance. 5

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

C. Write short note on op-amp as differentiator. 5

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