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Roll No. | | | | | | | | | | |

B.TECH
(SEM III) THEORY EXAMINATION 2017-18
ANALOG AND DIGITAL ELECTRONICS

Time: 3 Hours **Total Marks: 100**

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

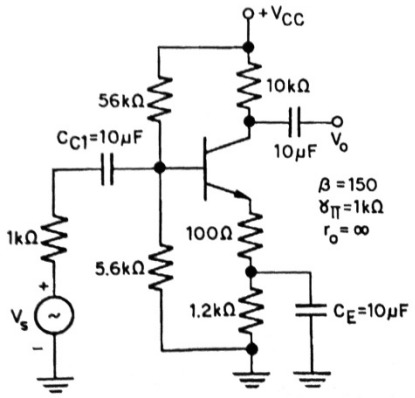
1. Attempt all questions in brief. **2 x10 = 20**

a. Draw the characteristic of a diode.
b. What do you mean by doping in diodes?
c. Why we use feedback in amplifier.
d. What is the effect of coupling capacitor in low frequency response?
e. What is Barkhausen condition for oscillation?
f. What are the applications of oscillator?
g. What is the difference between encoder and decoder?
h. Draw the pin diagram of IC555 timer.
i. Draw the block diagram of a sequential circuit.
j. What is a basic memory cell explain.

SECTION B

2. Attempt any three of the following: **10 x 3 = 30**

a. Explain tunnel diode and schottky diode draw their characteristic and diagram
b. For the BJT amplifier circuit shown in figure determine:
   (i) The lower half frequency due to coupling capacitor (i) C_{c1} (ii) C_E
   (ii) the overall lower cut off frequency of the amplifier circuit



c. Derive the relation for oscillation frequency and oscillation condition for Wien Bridge and Colpitts oscillator.
d. What is shift registers? Explain any two types of shift registers with their wave diagram, table and applications.
e. Explain and derive the relations for DAC. What is a R-2R ladder network, explain in detail.

SECTION C

3. Attempt any one part of the following: **10 x 1 = 10**

(a) Explain varactor diode ,its characteristics and applications
(b) What is a photodiode? Explain its characteristic and applications. Explain how a photodiode works as photo resister.

4. Attempt any one part of the following: **10 x 1 = 10**

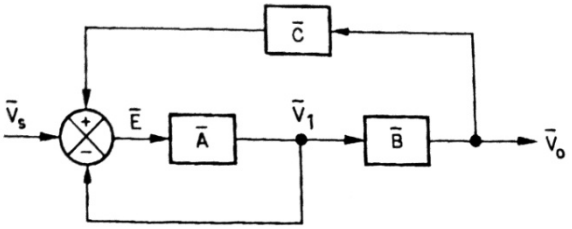
(a) Explain voltage series and voltage shunt feedback with the help of circuit and block diagram and derive the relation for gain and input/output impedance with and without feedback.

(b) Explain properties of negative feedback. A power amplifier with a gain of 100 $<0^o$ has an output of 12V at 1.5 khz along with a second harmonic content of 25%. A negative feedback is to be provided to reduce the harmonic content of the output to 2.5%. What should be the gain of the feedback path and the level of signal input to the overall system?

5. Attempt any two parts of the following: 5 x 2 = 10

(a) Explain the working of Hartley Oscillator with suitable diagrarn. Give its expression for frequency of oscillation.

(b) For the block diagram given $\overline{A} = 60 < 90^o$, and $\overline{B} = 30 < 90^o$ at a certain frequency. Find the value of $\overline{C}$ for the system to be oscillatory.

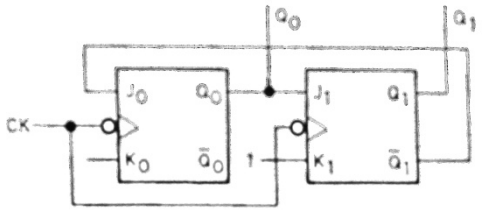


(c) Explain phase shift oscillator and derive the relation for the frequency of oscillation.

6. Attempt any two parts of the following: 5 x 2 = 10

(a) Realize a JK flip flop using AND and NOR gate only.

(b) Design a mod- 9 counter by cascading two mod-3 counter of given figure. Give the table showing the sequence of state.



(c) Explain multiplexer and demultiplexer with their block diagram, logic diagram and truth table.

7. Attempt any two parts of the following: 5 x 2 = 10

(a) Explain ROM with the help of block diagram. Also show the array of diodes.

(b) Explain monostable multivibrator and derive the relation for pulse width and restoration time and output characteristic.

(c) Write a short note on Switch Mode power Supply (SMPS).