

**B.TECH.**  
**(SEM IV) THEORY EXAMINATION 2018-19**  
**ANALOG & DIGITAL ELECTRONICS**

**Time: 3 Hours****Total Marks: 100****Note:** Attempt all Sections. If require any missing data; then choose suitably.**SECTION A**

- 1. Attempt all questions in brief. 2 x 10 = 20**
- Define delay time, storage time, rise time and fall time with respect to transistor?
  - If a LED is forward biased for a supply of 10V with a series resistance of 680Ω, calculate the LED current?
  - What is negative feedback? Write the advantage of negative feedback?
  - What do you mean by voltage amplifier and current amplifier? Give their equivalent circuit?
  - A crystal has  $L=0.1\text{H}$ ,  $C=0.01\text{pf}$ ,  $R=10\text{K}\Omega$  and  $C_M=1\text{ pf}$  find (i) Series resonance frequency (ii) Q factor?
  - In a Hartley oscillator  $L_1=20\mu\text{H}$ ,  $L_2=2\text{mH}$  and  $C$  is variable. Find the range of  $C$  if frequency is to be varied from 1Mhz to 2.5Mhz neglect mutual inductance?
  - What is multiplexer? Draw the logic diagram of 8:1line multiplexer?
  - Draw a four stage ring counter and explain its operation?
  - Explain the function of pins of IC 555 timer?
  - What voltage options are available in 78xx and 79xx voltage regulators?

**SECTION B**

- 2. Attempt any three of the following: 10x3=30**
- What are the voltage regulators? Discuss the working of shunt and series op-amp based voltage regulators. Also describe the switching regulators.
  - What is Barkhausen criterion for the feedback oscillator? Draw a neat diagram of a phase-shift oscillator using BJT? Derive an expression for its frequency of oscillation?
  - Calculate the voltage gain, input and output resistances of a voltage series feedback amplifier having  $A_v = 300$ ,  $R_i = 1.5\text{ k}\Omega$ ,  $R_o = 50\text{ k}\Omega$  and  $B = \frac{1}{15}$ .
  - Sketch the circuit diagram for universal shift register and explain its working?
  - How the construction of the schottky barrier diode is different from conventional semiconductor diode significantly and describe its mode of operation?

**SECTION C**

- 3. Attempt any one part of the following: 10X1=10**
- Discuss how the variable capacitance is achieved in Varactor diode? Determine the transition capacitance of a diffused junction Varactor diode at a reverse bias voltage of 4.2v If  $(t_0) = 80\text{pf}$  and junction potential of 0.7v also calculate constant  $k$  for diode?
  - Why photodiode is used in reverse bias conditions? Give any two applications of it.
- 4. Attempt any one part of the following: 10X1=10**
- List five characteristic of an amplifier which are modified by negative feedback and describe the properties of series-shunt and shunt-shunt feedback amplifier?
  - Draw the high frequency equivalent circuit for the typical RC coupled common emitter amplifier?

5. **Attempt any *one* part of the following:** **10X1=10**
- a) Discuss how does the circuit of a clap oscillator different from that of a calpitt oscillator? Explain the properties of quartz crystal which are responsible for its use in an oscillator?
  - b) Sketch the circuit of a Wien bridge oscillator and deriver the expression for frequency of oscillation.
6. **Attempt any *one* part of the following:** **10X1=10**
- a) Explain the working of J-K flip-flop and discuss race around condition of J-K flip-flop. Show how this condition can be removed.
  - b) Differentiate between synchronous and asynchronous counter give the logic diagram of a BCD counter.
7. **Attempt any *one* part of the following:** **10X1=10**
- a) Give the functional block diagram of timer IC 555 and explain how it can be used to obtain a Monostable Multivibrator?
  - b) Distinguish between A/D and D/A converters. Explain the operation of any one of them?