Code No: 153AB

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech II Year I Semester Examinations, March - 2021
ANALOG AND DIGITAL ELECTRONICS
(Common to CSE, IT, ITE)

Time: 3 hours   Max. Marks: 75

Answer any five questions
All questions carry equal marks
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1.a)   Derive the expression for ripple for the circuit FWR with inductor filter.
  b)   Explain the working of semiconductor photo diode.   [8+7]

2.a)   Explain V-I characteristics of a tunnel diode and write its applications.
  b)   Define clipping and clamping circuits. Differentiate clipping and clamping circuits. [7+8]

3.a)   Draw the circuit diagram of an NPN junction transistor in CE configuration and describe its characteristics.
  b)   For the transistor amplifier circuit, when signal changes by 0.012 V, the base current changes by 9 μA and collector current by 1.3 mA. If the collector load $R_C = 6$ KΩ, $R_L = 12$ KΩ. Determine input resistance, current gain and voltage gain. [9+6]

4.a)   What is the necessity of biasing circuits? Derive the expression for stability factor of self-bias circuit.
  b)   Derive the expressions for Zi, Zo and Av for common drain J-FET amplifier.   [8+7]

5.a)   Draw a totem-pole output buffer with a TTL gate. Explain its operation.
  b)   Draw the circuit of an improved version of D.T.L. 3-input NAND gate, and explain its operations with the help of Truth Table. If h_{FE} of each transistor is 40, find FAN-OUT of the circuit.   [8+7]

6.a)   Simplify the following function using K-map.
       $F(A,B,C,D) = \Sigma(1,3,4,5,6,11,13,14,15)$
  b)   Draw the logic circuit of a 3 to 8 decoder and explain its working.   [7+8]

7.a)   Design a 4-bit comparator circuit using logic gates.
  b)   Design a modulo 10 counter using JK flipflops and explain its timing diagram.   [7+8]

8.a)   Using D-Flip flops and waveforms, explain the working of a 4-bit SISO shift register.
  b)   Difference between static and dynamic RAM. Draw the circuits of one cell of each and explain its working.   [7+8]

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