

**R18**

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  $9 \mu\text{A}$  and collector current by 1.3 mA. If the collector load  $R_C = 6 \text{ K}\Omega$ ,  $R_L = 12 \text{ K}\Omega$ . 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  $Z_i$ ,  $Z_o$  and  $A_v$  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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