BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)

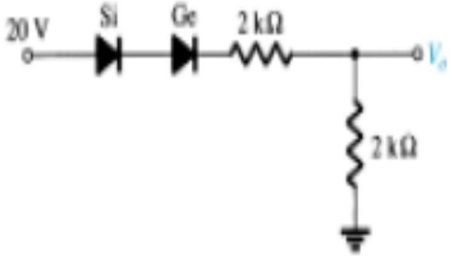
CLASS: B.TECH/IMSC **SEMESTER : II**
BRANCH: BT/CIVIL/CEP&P/CHEM. ENGG./MECH/PROD/FT/PHYSICS **SESSION : SP/19**

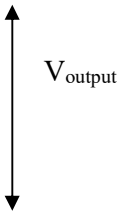
SUBJECT: EC101 BASICS OFELECTRONICS AND COMMUNICATION ENGINEERING
TIME: 3.00 Hrs. **FULL MARKS: 50**

INSTRUCTIONS:
1. The question paper contains 5 questions each of 10 marks and total 50 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
***4*. Before attempting the question paper, be sure that you have got the correct question paper.**
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

Q.1(a) Define donor and acceptor impurities. Also, derive the expression for diode dynamic resistance. [5]

Q.1(b) Explain the transition and diffusion capacitance of the p-n junction diode. Determine the output voltage and current through the following circuit. [5]





Q.2(a) Elaborate the emitter-bias configuration with suitable example. How collector feedback configuration will improve the stability? Explain with a suitable example. [5]

Q.2(b) Outline the advantages of the FET over conventional BJT. Draw the JFET & MOSFET symbols for n-channel and p-channel. [5]

Q.3(a) What is Barkhausen criterion? How does Hartley oscillator differ from Colpitt's oscillator in construction? [5]

Q.3(b) What do you mean by CMRR and slew rate? Determine the output voltage of an OP-AMP for input voltages of V_1 = 150μV and V_2= 140μV. The amplifier has a differential gain of A_d = 4000 and the value of CMRR is 100. [5]

Q.4(a) Simplify the Boolean expression N= **(A + A'B + C'D + C) and prove that N= (A + B + C + D)**. Also realize its output using NOR gates. [5]

Q.4(b) Construct a half-subtractor circuit and express the following function in a sum of minterms **F(*w*,*x*,*y*,*z*)= *wxy'* + y'z + wxz' + w'x'z** [5]

Q.5(a) Draw the block diagram of a communication system and briefly explain. Also define modulation index of an amplitude modulated signal. [5]

Q.5(b) The tuned circuit of an oscillator in a simple AM transmitter employs a 50 μH coil and 2 nF capacitor. If the oscillator output is modulated by audio frequencies up to 10 kHz, estimate the frequency range occupied by the sideband. [5]

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