Roll No. | | | | | | | |

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TEC–201

B. Tech. (Second Semester)
End Semester EXAMINATION, 2017
(All Branches)
BASIC ELECTRONICS ENGINEERING

Time : Three Hours] [*Maximum Marks : 100*

Note : (i) This question paper contains *five* questions.

(ii) All questions are compulsory.

(iii) Instructions on how to attempt a question are mention against it.

(iv) Total marks assigned to each question are twenty.

1. Attempt any *two* questions of choice from (a), (b) and (c). (2×10=20 Marks)

(a) What is Duality principle of Boolean algebra ? State and prove the DeMorgan's laws.

(b) Perform the following number system conversion :

(i) $(65.2)_8 = (?)_{10}$

(ii) $(A\,9.8)_{16} = (?)_{10}$

(iii) $(85.25)_{10} = (?)_2$

(iv) $(111011.100)_2 = (?)_8$

(v) $(10100111)_2 = (?)_{16}$

(c) Perform the following :

(i) $(35)_{10} + (25)_{10}$ in Binary

(ii) $(389)_{10} + (245)_{10}$ in BCD

(iii) $(13)_{10} - (10)_{10}$ in Binary using 1's complement

2. Attempt any *two* questions of choice from (a), (b) and (c). (2×10=20 Marks)

(a) Write short notes on the following :

(i) Extrinsic semiconductors

(ii) Mass action law

(b) Derive the continuity equation for semiconductors

(c) A semiconductor has $10^{16}/cm^3$ donor atom concentration and $1.1\times10^{17}/cm^3$ acceptor atom concentration. If intrinsic carrier concentration is $10^{12}/cm^3$, then find the free electron and hole concentration and conductivity it mobility of electron is 800 $cm^2/V\text{-}s$ and that of hole is 200 $cm^2/V\text{-}s$.

3. Attempt any *two* questions of choice from (a), (b) and (c). (2×10=20 Marks)

(a) What do you mean by the breakdown of a PN junction diode ? Discuss the effect of temperature on the characteristics of PN junction diode.

(b) Derive the expression for ripple factor, rectification efficiency and PIV for a centre tapped full wave rectifier.

(c) Write short notes on the following :

(i) Varactor diode

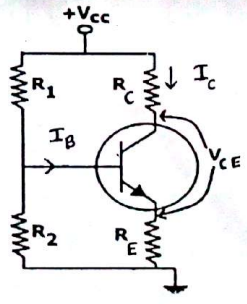
(ii) LED

4. Attempt any *two* questions of choice from (a), (b) and (c). (2×10=20 Marks)

(a) Draw CB, CE and CC configuration of a BJT. Discuss the currents I_{CBO} and I_{CEO}.

(b) Explain construction, operation and characteristics of an E/MOSFET.

(c) In the following circuit find I_C and V_{CE}. Given $V_{CC} = 12$ V, $R_1 = 12\,k\Omega$, $R_2 = 2.4\,k\Omega$, $R_C = 3.8\ k\Omega$, $R_E = 1\ k\Omega$, $V_{BE} = 0.7$ V and $\beta = 50$.



5. Attempt any *two* questions of choice from (a), (b) and (c). (2×10=20 Marks)

(a) Write short notes on the following :

(i) Concept of virtual ground

(ii) Properties of an ideal Op-amp

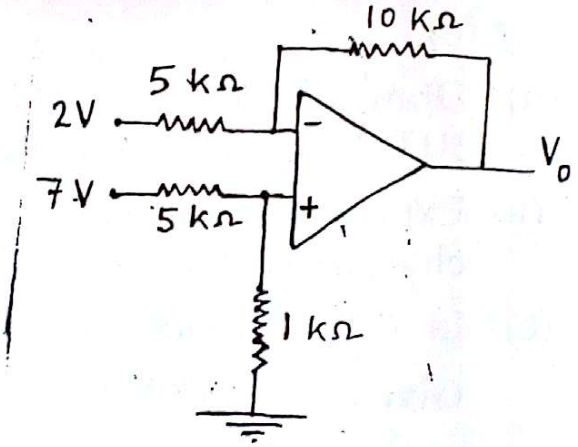
(b) Derive expression for voltage gain of :

(i) Inverting

(ii) Non-inverting operational amplifier configurations

(c) Determine output voltage V_o in the following circuits :

(i)



(ii)