U.S.N | | | | | | | | | | |

P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belagavi)

Second Semester, B.E. - Semester End Examination; May / June - 2018

Basic Electronics

(Common to All Branches)

Time: 3 hrs *Max. Marks: 100*

***Note**: Answer **FIVE** full questions, selecting **ONE** full question from each unit.*

UNIT - I

1 a. With the help of circuit diagram, explain different types of diode configurations. 6

b. Explain the working of bridge rectifier. 8

c. Describe solar cells with diagrams. 6

2 a. Consider a full-wave rectifier with capacitor filter. Derive an expression for ripple factor. 8

b. For the circuit shown in Fig. 2(b), find maximum and minimum value of Zener diode current.

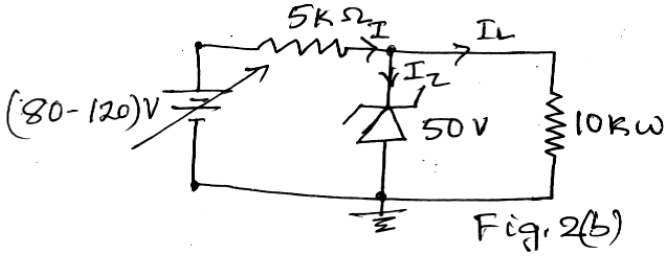

Fig. 2(b) 6

c. Briefly explain transmissive and reflective field effect LCD with no applied bias conditions. 6

UNIT - II

3 a. With the help of neat diagram, explain the construction and working principal of enhancement type MOSFET. 10

b. Distinguish between VMOS and CMOS. 4

c. For the *N*-channel depletion type MOSFET of Fig. 3(c). Determine;

(i) V_{GSQ} and I_{DQ} (ii) V_{DS}

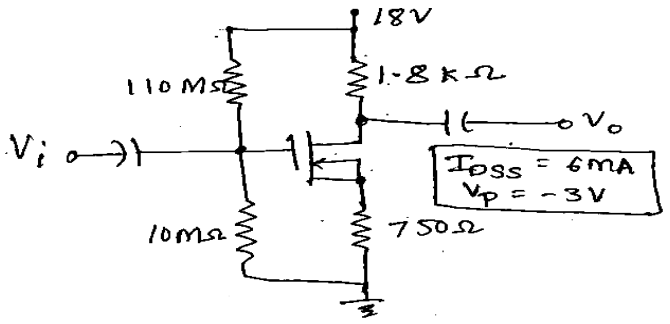

Fig. 3(c) 6

4 a. Derive an expression for input impedance, output impedance and voltage gain of E-MOSFET voltage-divider configuration. 8

b. With neat diagram and necessary equation, explain FET phase-shift oscillator. 6

c. Define oscillator. What are the conditions required to get sustained oscillation? 6

Contd…2

UNIT - III

5 a. Derive an expression for output voltage equation of the following :
(i) Summer
(ii) Integrator — 10

b. Discuss the offset-currents and voltages of an Op-amp. — 10

6 a. With a neat circuit, explain voltage controlled voltage source and current controlled current source. — 8

b. What is meant by filter? Explain first order low-pass and high pass filter with frequency response. — 8

c. Determine the output voltage of an Op-amp for input voltages of V_{i1} = 150 μV and V_{i2} = 140 μV and the amplifier has a differential gain of A_d = 4000. The value of CMRR is 100. — 4

UNIT - IV

7 a. Prove De Morgan's theorem. — 6

b. Compute;
(I) $(1010.1100)_2$ = ---------- $_{(10)}$ = ---------- $_{(16)}$
(II) $(D7.51A)_{16}$ = ---------- $_{(10)}$ = ---------- $_{(2)}$
(III) Perform binary subtraction
(i) 50 − 20 (ii) 30 − 70 — 10

c. Simplify: $A+\overline{A}B+AB\overline{C}=(A+B)$. — 4

8 a. With the help of a circuit diagram and truth table, explain the working of full adder. — 6

b. Implement and explain 3-to-8 decoder using basic gates. — 8

c. Realise the following :
(i) EXOR using NAND
(ii) OR using NOR — 6

UNIT - V

9 a. With the help of relevant sketch, explain amplitude modulation. — 8

b. Briefly explain the operation of super heterodyne receiver. — 7

c. Illustrate the basic topology of a typical switched telephone network. — 5

10 a. Explain the following :
(i) Piezo-electric transducer
(ii) Photo-electric transducer — 8

b. Explain the working of Linear Variable Differential Transducer (LVDT). — 7

c. Distinguish between passive and active transducers. — 5

* * * *