**Total No. of Questions : 8]** **SEAT No. :**

**P2272** **[Total No. of Pages : 3**

# [5254]-609
# B.E. (E & TC)
# ELECTRONIC PRODUCT DESIGN
## (2012 Pattern) (Elective - II)

***Time : 2½ Hours]*** ***[Max. Marks : 70***

***Instructions to the candidates:***

1) ***Attempt Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8.***
2) ***Figures to the right side indicate full marks.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Assume suitable data, if necessary.***
5) ***Use of non-programmable calculator is permitted.***

***Q1)*** a) What is techno-commercial feasibility? Establish techno-commercial feasibility of any one electronic product. **[7]**

b) Explain the concept of egoless design. **[6]**

c) State the salient features of - (i) Algorithm, (ii) Flowchart (iii) Pseudo code. **[7]**

OR

***Q2)*** a) Define ergonomics & state the objectives of ergonomics. Explain the various design considerations wrt to ergonomics. **[7]**

b) What is prototyping? Explain different types of prototyping. **[6]**

c) Explain the concept of risk abatement & failure prevention. **[7]**

***Q3)*** a) Discuss the PCB layout design rules for analog circuits; digital circuits & high speed circuits. **[7]**

b) Explain the various termination schemes for avoiding reflections & cross-talk in high speed PCB designs. **[7]**

c) Calculate the characteristics impedance for a stripline geometry when the PCB laminate thickness is 1.6mm, width of embedded track is 1mm with thickness of 35 microns. The relative permitivity is 3.2. **[4]**

***P.T.O.***

OR

***Q4)*** a) Explain the PCB design considerations with respect to - **[7]**

i) Ground & supply planes.

ii) Analog & digital grounds.

iii) Ground bounce.

b) Estimate the parasitic values for the following geometries of PCB tracks. **[7]**

i) Resistance of 12cm long copper track with 0.6mm width on standard 35 micron copper-clad laminate. (The resistivity of copper at 20°C is $1.72\times10^{-6}$ Ω.cm).

ii) Capacitance of two 1.5mm wide tracks on opposite side of double sided PCB, each with a track length of 10cm. The PCB laminate thickness is 1.5mm & $\in_r = 4.2$.

c) Explain the selection criterion for bypass & decoupling capacitor with suitable example. **[4]**

***Q5)*** a) Explain the different methods of product debugging. **[8]**

b) Compare - **[8]**

i) Simulation with prototyping

ii) Conducted EMI with radiated EMI.

OR

***Q6)*** a) Enlist the important parameters to be considered while selecting passive, active & switching components. **[8]**

b) Explain the process of EMI test to be carried out on product with suitable example. **[8]**

***Q7)*** a) Define documentation. What are the different types of documents to be prepared by the product manufacturer. **[8]**

b) With the help of suitable example explain how the bill-of-material is prepared. **[8]**

OR

***Q8)*** a) Explain the following terms with respect to documentation. **[8]**

i) Records

ii) Accountibility

iii) Liability.

b) Discuss the visual techniques of documentation with suitable example.**[8]**

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