

Time: 3 Hours.

May-2016.

Max. Marks: 80

N.B.

- 1) Question No. 1 is compulsory
- 2) Solve any three questions from the remaining questions
- 3) Assume suitable data if necessary

1. Solve any four of the following

- (a) Explain Interstitial and substitutional diffusion process. (20)
- (b) Explain Electronics package reliability.
- (c) Explain the concept of clean rooms.
- (d) Explain Nuclear and electronic stopping mechanisms in Ion implantation with neat diagrams
- (e) Give the steps in a standard RCA cycle during wafer cleaning

2.

- (a) What is Ion Implantation? Explain the process with a neat diagram. (10)
- (b) Describe optical lithography with the help of a neat diagram. (10)

3.

- (a) Explain the fabrication process step along with vertical cross-sectional views for CMOS Inverter using twin tub process. (10)
- (b) With neat diagram explain the Float Zone technique of crystal growth. (10)

4.

- (a) What is the significance of Design rules? Draw layout for the CMOS inverter using λ based design rules. (10)
- (b) Discuss Etching methods for photoresists removal. (10)

5.

- (a) Explain SOI fabrication using bonded SOI and smart cut method. (05)
- (b) State advantages of BiCMOS over CMOS (05)
- (c) Describe with the help of a neat diagram Haynes-Schokley experiment for measurement of Drift Mobility of n-type semiconductor. (10)

6. Write short notes on any four of the following

(20)

- (a) MODFET and optoelectronics devices
- (b) Nanowire transistor
- (c) Molecular Beam epitaxy
- (d) Second order effects in bipolar transistor
- (e) VLSI Technology Trends affecting Testing

Q.P.Code **31331**

(3 Hours)

[Total Marks : 80

- N.B. :** 1. Question No.1 is compulsory.
2. Solve any **three** questions out of remaining five questions .
3. Assume suitable data if necessary .

- Q1** Attempt any **four** from the following : 20
- Why separately excited DC motor is widely used as compared to DC shunt motor ? Explain
 - Give advantages of regenerative braking of DC motor compared to other methods of braking ?
 - Explain why V/F control is popular in AC induction motor control.
 - Give advantages of high frequency induction heating as compared to conventional methods of heating.
 - Compare SMPS with linear regulated power supply.
- Q2** a) Explain the effect of source inductance in single-phase full converter working in rectifier mode. Draw relevant output voltage waveforms Give equations which can be used to determine overlap angle μ and output DC voltage. 10
- b) In a 3-phase full converter working in rectifier mode, input supply is 440V (L-L), 50Hz. If firing angle $\alpha = \pi/4$ and load current is 20 A constant with load voltage = 370 V, determine source inductance L_s and overlap angle μ . 10
- Q3** a) Explain the steps involved in space vector modulation (SVM) technique used in three-phase voltage source inverter. 10
- b) Explain using block diagram and transfer function, working of PI controller for DC-DC converter . 10
- Q4** a) Give details of the state-space averaged model of DC-DC buck converter operating in continuous conduction mode. 10
- b) A separately excited DC motor armature winding is supplied power using single-phase full bridge converter working on 250V, 50Hz mains supply. If $R_a = 0.1 \Omega$ and armature current is 50 A, find the firing angle of the converter at 700RPM. Assume that field winding is supplied with rated DC voltage and motor ratings are 110V DC, 1000 RPM and 75A. 10
- Q5** a) Explain rotor resistance method of speed control of three-phase wound rotor induction motor. Draw speed-torque characteristics and give disadvantages of this technique. 10

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b) Explain the following regions as related to V/F control of AC induction motor.

i) Constant torque

ii) Constant power

Draw variations in applied voltage and motor current over entire operation from low speed to double the rated speed of the motor.

Q6 Write short notes on :

a) Battery charging circuit and its working

b) Selection of battery capacity in UPS.

c) Constant torque and constant power regions in control of separately excited DC motor.

N.B: (1) Answer any four questions out of six questions

(2) Question No:1 is compulsory

(3) Assume suitable data if necessary

1. Answer any four questions briefly:

(20)

- Compare OSI reference model and the TCP/IP reference model
- Explain the authentication protocols of PPP
- How does Token Bucket algorithm work?
- Explain 'bit stuffing' in bit oriented protocols.
- Sketch and explain construction of graded index optical fiber

2. a) With a suitable sketch explain the transition/connection phases in Point to Point Protocol (PPP). Also explain the supported sets of protocols in the PPP stack. (10)

b) Distinguish between Go Back N ARQ and Selective Reject ARQ. (10)

Sketch the frame flow diagram for Go Back N ARQ and with 3 bit sequence number field and window size of 5, showing the following events:

- Frame 0 is sent ; Frame 0 is acknowledged.
- Frames 1 and 2 are sent ; Frames 1 and 2 are acknowledged
- Frames 3,4,5 are sent ; Frame 4 is damaged.
- Timer for frame 5 expires

3. a) Explain the different classes of IP addresses. Identify the class of the following IP addresses and give their default subnet masks: (05)

1) 227.56.83.0 2) 114.22.43.21 3) 129.14.12

b) Explain TCP connection establishment and release. (05)

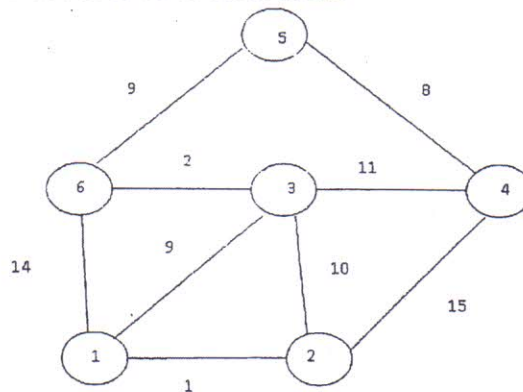
b) Draw TST switch and three stage space division switch for $N=20$, $n=5$ and $k=2$ and estimate the number of crosspoints required for both cases. (10)
If the above space division switch is to be made non-blocking, calculate the minimum number of crosspoints required.

4. a) Explain ADSL with respect to spectrum allocation and modulation technique (10)

b) What are the conditions to be satisfied by a good CRC generator polynomial? (10)

For P = predetermined divisor = 110101(LSB) and D = K bit data block = 1010001101(LSB), find the CRC.

5. a) Apply Dijkstra's and Bellman Ford algorithm to the given network and find the least cost path between source node 1 to all other nodes (10)



b) Explain how TCP handles error control and flow control

(10)

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6. Write short note on: (Any TWO)

(20)

- a) Compare OSPF and BGP
 - b) Berkeley socket
 - c) HDLC
 - d) CSMA/CD
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