(Time:3 Hours)   Total Marks: 80

Note: 1) Question No.1 is compulsory.
2) Attempt any three questions from remaining five questions.
3) Assume suitable data if necessary.
4) Figures to the right indicate full marks.

Q.1)   Explain in brief

a)	EDLC	5M
b)	SPI	5M
c)	Semaphores	5M
d)	Task states	5M

Q.2) a)   What is the necessity of task scheduling? Explain Task Switching.   10M
            Three periodic processes scheduled using EDF, will processes meet the deadlines?

Process	Execution Time = e_i	Period = p_i
P1	1	8
P2	2	5
P3	4	10

      b)   Suggest the various strategies to help faster programming.   10M

Q.3) a)   What is priority inheritance problem? Explain it with neat sketch. Suggest   10M
            solutions.
      b)   What need is of debug and trace facility? How cortex M3 supports it?   10M

Q.4) a)   Design G+ n an elevator system. Give the proper details for this,   10M
            i.   FSM which describes the functioning of the system
            ii.   Hardware block diagram and list of components with justification
            iii. Design challenges and suggest solutions for ethical practice in
                  development
      b)   Explain various design metrics. Explain the various optimization challenges   10M
            for embedded system.

Q.5) a)   What are different communications means available for industrial field   10M
            devices?
      b)   Explain briefly register structure of Cortex M3 architecture along with the   10M
            function of various special registers.

Q.6) a)   Give the comparison details between black box and white box testing.   10M
      b)   Write short note on: i)Various data types ii)FPGA   10M

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(3 Hours) [Total Marks: 80]

N. B.: (1) Question No. 1 is compulsory.

(2) Attempt any **THREE** questions from the remaining five questions.

(3) Assume suitable data if necessary.

(4) Figures to the right indicate full marks.

Q1. Attempt **any four** questions. **20**

a) What problems will be faced if thyristors are used in an inverter circuit?

b) State true or false with justification: Buck-boost converters are difficult to model and control.

c) Explain the process of torque generation in a DC motor.

d) An induction motor basically works on the principle of Lenz's Law. Explain the meaning of this statement.

e) What are SMPS? Explain any SMPS circuit with the help of neat waveforms.

Q2. a) Compare with the help derivation, the output DC voltage of a single-phase fully controlled bridge rectifier with and without source inductance. Can it be concluded that source inductance is an undesired factor in the performance of a controlled rectifier?

10

b) In a 3-Φ full converter working in rectifier mode, input supply is 440V (L-L) 50 Hz AC. If firing angle $\alpha = \Pi/4$ and load current is 20A constant with load voltage = 370V, determine source inductance Ls and overlap angle μ. **10**

Q3. a) Derive and explain the average state space model of Buck Converter. Use this state space model to derive equation for output voltage of the converter at equilibrium condition (dv/dt=0). **10**

b) Explain various feedback control methods for DC-DC converters. Which method is best suitable for efficient control? Which method does not require mathematical model of the converter? **10**

Q4. a) Given a single phase AC supply, design a power electronic circuit to charge a battery. How will you decide the current requirement of the circuit?   **10**

b) List the desirable features of an UPS. Explain on line and off line UPS.   **10**

Q5. a) A 220V, 1500 rpm, 10 A separately excited DC motor has Ra=2 Ω and is fed from single phase fully controlled bridge rectifier with source voltage of 230V, 50Hz. Assuming continuous load current, compute: **10**

(i) Motor speed at firing angle of 45 degrees and torque of 4 N-m.

(ii) Developed torque at firing angle of 30 degrees and speed of 1200 rpm.

b) Explain the variable frequency control method for speed control of induction motor for two different working modes.   **10**

Q6. Write short notes on (**any two**)   **20**

    i)   Importance of output filter in an inverter.
    ii)   Advantages of SVM over conventional sine wave PWM.
    iii)   Modeling of DC-DC converter.
    iv)   Induction heating.

Time: 3 Hours   **Marks: 80**

Note before:
1) Question no. 1 is compulsory
2) Attempt any three from the remaining questions
3) Assume suitable data wherever necessary

Q.1.   Answer any FOUR: 20
- a) Explain various LAN topologies with neat diagram.
- b) What is meant by the terms bit stuffing and byte stuffing?
- c) Write a note on Bellman Ford Algorithm.
- d) Explain ALOHA and slotted ALOHA.
- e) An ISP is granted a block of addresses starting with 120.60.4.0/22. The ISP wants to distribute this block to 95 organizations with 8 addresses each. Design sub blocks and give the slash notations for each sub block. Find how many addresses are still available after these allocations.
- f) Compare connection oriented and connection less services with examples

Q.2.a. Write a note on sliding window protocol.   10
    b. Explain the function of MAC and LLC sub layers.   10

Q.3.a. Draw and explain IPv4 header. Compare IPv4 and IPv6.   10
    b. Write a short note on ICMP.   10

Q.4.a. Describe three way handshake in TCP. Why do we have it only in TCP and not in UDP.   10
    b. Explain how TCP handles error control and flow control?   10

Q.5.a. State and explain various types of frames in HDLC.   10
    b. Explain OSI and TCP/IP and explain the function of each layer.   10

Q.6.   Write short note on (any two):   20
a) Berkley API
b) CSMA/CD and CSMA/CA
c) Domain Name Server

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