15/5/17 BE VII / ELX / CBSGS / Embedded System Design.

Q.P.Code: 013691

(3 Hours) **[Total Marks: 80]**

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

Q1 Answer the following questions. (20)

a) Justify the need for brown-out detection circuit in embedded systems environment and the mechanism of implementing the same.
b) What is a watch-dog timer, its use and typical application for an embedded system.
c) Explain the structure of typical C source program for ARM based target processor. Typically list the various data types along-with memory size supported by a C compiler.
d) Compare the serial communication protocols RS – 232C and RS – 485 protocols.

Q2 a) Write a note on the interrupt structure of Cortex – M architecture. (10)

b) Explain the utilisation bound in task scheduling in light of Rate Monotonic Scheduling algorithm. (10)

Q3) a) What is a task and various states that a task can lie in for an embedded environment. (10)

b) Explain briefly the register structure of Cortex-M3 architecture along-with the function of various special registers. (10)

Q4 a) Compare the features of Cortex – A8 and Cortex - R4 architectures. (10)

b)Explain the operation and significance of following MicroC/OS – II functions

a) OSSemPend(); & OSSemPost(); b) OSMboxPost(); & OSMboxPend(); (10)

Q5) a)Write a brief note on boundary scan architecture. (10)

b) Explain the various inter- process/task communication and synchronisation tools like semaphores, mutex, mailbox and pipe used by an RTOS environment. (10)

Q6) Write short notes on (Any two) (10 x 2) (20)

a) Problem of priority inversion and mechanism to prevent the same.
b) MSP-430 architecture and its low power capability.
c) Design metrics for a typical embedded system.

BE ELX Sem-VII (CBSGS) Sub- ICT DT- 19-5-2017

Q. P. Code: 11130

Time: 3 Hours. 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. (5 marks each) (20)

(a) What is the significance of High K and Low K dielectric in CMOS process?
(b) Explain the difference between contact, proximity and projection printing?
(c) Describe the SIMOX method for fabrication of SOI.
(d) Enlist the steps for obtaining Silicon from Sand.
(e) Explain the difference between Positive Photo resist and Negative Photo Resist.

2. (a) Explain Float zone method for Silicon crystal growth. What are its advantages? (10)
(b) Classify the types of Thin Film Deposition methods. (04)
(c) Explain the LPCVD process with neat diagram. Also enlist its advantages (06)

3. (a) Enlist the steps for fabrication of CMOS inverter using twin tub process. Draw vertical cross-sectional views starting from the substrate till the gate and source and drain formation in the fabrication of CMOS inverter using twin tub process. (10)
(b) Draw layout of CMOS NOR gate along with its circuit diagram. (05)
(c) Explain buried and butting contact. (05)

4. (a) Explain Steps of Lithography with suitable diagrams. Also classify Lithography techniques. (10)
(b) What is LOCOS? Why it is required in the CMOS process. Explain technology solutions for avoiding problems in LOCOS. (10)

5. (a) Describe with the help of a neat diagram Hayness-Schokley experiment for measurement of Drift Mobility of n-type semiconductor. (10)
(b) Explain Deal Groove model for Oxidation process. Explain where dry and wet oxidation processes are used during MOSFET fabrication process. (10)

6. Write short notes on any four of the following. (5 marks each) (20)

(a) FINFETs
(b) Automatic Test equipment
(c) Hall effect and resistivity measurement.
(d) BiCMOS
(e) Fabrication of carbon nanotube transistor.

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BE ELX | SEM-VII | CBSGS | DT- 25/05/2017.

Q.P.Code:13292

(3 Hours) [Total Marks: 80]

N. B.: (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.

1. Attempt **any four** questions **20**

a) What are the advantages of SVM over the conventional Sine wave PWM? Explain.
b) Compare various schemes of DC motor speed control.
c) With the help of neat sketch, explain the working of single-phase half-wave semi converter.
d) Explain the concept of battery charging systems.
e) What is V/F control? Explain in detail.

2. a) Draw and Explain the state space model for dc-dc buck converter in detail. **10**

b) Explain in detail the principle and working of simple boost converter with the help of neat circuit diagram and waveforms. **10**

3. a) Describe the effect of source inductance in 1-phase and 3-phase rectifiers. Draw relevant circuit diagrams and waveforms. **10**

b) Explain in detail the Multiple PWM as used for inverters. **10**

4. a) A 220V, 1500 rpm, 10A separately excited dc motor has armature resistance of 1 ohm. It is fed from a single phase fully controlled bridge rectifier with an ac source voltage of 230, 50Hz. Assuming continuous load, compute:

i) Motor speed at firing angle of 45 degrees and torque of 5 NM.

ii) Torque at firing angle of 55 degrees and at a speed of 1000 rpm. **10**

b) Explain dynamic and regenerative braking of DC motors. **10**

[TURN OVER]

5. a) With the help of neat waveforms explain the torque speed characteristic of induction motor & give detail description of forward regeneration, forward motoring and reverse plugging. **10**

b) Explain the working principle of stepper motor. What are different types of stepper motors? Discuss in detail permanent magnet stepper motor. **10**

6. Write short notes on **(any three)** **20**

i) SMPS & UPS.
ii) Kramer's drive.
iii) Induction heating.
iv) Harmonics reduction in inverters.

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