Register Number:……..

KUMARAGURU college of technology
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B.E DEGREE EXAMINATIONS: MAY 2018

(Regulation 2015)

Sixth Semester

ELECTRICAL AND ELECTRONICS ENGINEERING

U15EET603: Embedded Systems

COURSE OUTCOMES

CO1: Differentiate Embedded Systems from general purpose systems
CO2: Gain the knowledge on fundamentals of communication protocols
CO3: Understand the architecture and features of microcontrollers
CO4: Interface the peripheral devices with microcontroller
CO5: Realize the basic concepts of RTOS in accessing shared resources for optimized CPU performance
CO6: Understand the critical real-time issues involved in end product design with solutions using case studies

Time: Three Hours **Maximum Marks: 100**

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. Matching type item with multiple choice code CO2 [K_2]

List I	List II
A. Serial Synchronous Input	i. Print Controller
B. Serial Asynchronous Input	ii. reading from SDIO (Secure Data Association IO Card)
C. Parallel Port Input	iii. MODEM input
D. Parallel Port Output	iv. ADC input from sensor

	A	B	C	D
a)	ii	i	iii	iv
b)	iii	iv	ii	i
c)	ii	iii	iv	i
d)	iii	i	ii	iv

2. Which one of the following device is referred as embedded system? CO1 [K_1]

a) Digital Camera b) Computer
c) Motor d) Mobile Phones

3. Which of the following is referred as serial communication protocol? CO2 [K_2]

1. USB
2. HDLC
3. IBM Standard Architecture
4. CAN

a) 1,2,4 b) 1,4,2

c) 1,2,3 d) 1,4,3

4. _____ Instructions are present in PIC microcontroller. CO3 [K_2]

a) 35 b) 40

c) 30 d) 45

5. **Assertion (A):** PIC Microcontroller follows Harvard Architecture. CO3 [K_2]

Reason (R): It has separate memory and data bus

a) Both A and R are Individually true and R is the correct explanation of A b) Both A and R are Individually true but R is not the correct explanation of A

c) A is true but R is false d) A is false but R is true

6. _____ registers are used to walking up the ADC module in PIC microcontroller from sleep mode. CO4 [K_3]

a) ADRESH b) ADRESL

c) ADCON0 d) ADCON1

7. Arrange the following interrupts based on their priority from highest to lowest. CO4 [K_3]

1. Power-on-reset
2. High-priority interrupt
3. Low-priority interrupt

a) 1,3,2 b) 3,2,1

c) 2,3,1 d) 1,2,3

8. In real time operating system_____. CO5 [K_2]

a) all processes have the same priority b) a task must be serviced by its deadline period

c) process scheduling can be done only once d) kernel is not required

9. **Assertion (A):** Semaphore is variable used in multi processing system. CO5 [K_2]

Reason (R): It is used for to solve priority based problem.

a) Both A and R are Individually true and R is the correct explanation of A b) Both A and R are Individually true but R is not the correct explanation of A

c) A is true but R is false d) A is false but R is true

10. Which of the following devices is not used for implementing closed loop control of DC motor using PIC microcontroller? CO6 [K_2]

a) Actuator b) Motor Driver

c) Speed Sensor d) Temperature Sensor

PART B (10 x 2 = 20 Marks)
(Answer not more than 40 words)

11. Define Embedded System and mention some example of it. CO1 [K_1]
12. Tabulate the various advantage and disadvantages of various communication techniques. CO2 [K_2]
13. List the various types of ports in PIC Microcontroller and mention its function. CO3 [K2]
14. Write a short note on reset circuitry used in PIC Microcontroller. CO3 [K_2]
15. Draw the frame format for INTCON register. CO4 [K_3]
16. Calculate the value of count for creating 0.5 sec using TIMER0 of PIC microcontroller. Assume Prescalar: 1:256 and TMR0=0 CO4 [K_3]
17. Illustrate with an example about the concept of Priority Inversion Problem. CO5 [K_2]
18. Distinguish between General purpose Operating System and Real Time Operating System. CO5 [K_2]
19. Construct the list of modules for designing various sensor interfacing used in Washing machine. CO6 [K_2]
20. Draw the functional block diagram for designing of Electronic Voting Machine. CO6 [K_2]

Answer any FIVE Questions: -
PART C (5 x 14 = 70 Marks)
(Answer not more than 300 words)

Q.No. 21 is Compulsory

21. Illustrate in detail about the ADC programming using PIC microcontroller with example. CO4 [K_3]

22. a) Explain briefly about the various components of Embedded System with neat sketch. (9) CO1 [K_1]
    b) Write a short note on various types of memories used in embedded system. (5)

23. Discuss in detail about the following communication protocol. CO2 [K_2]
    a) CAN (7)
    b) I2C (7)

24. Explain briefly about the architecture of PIC Microcontroller with neat sketch. CO3 [K_2]

25.	Explain in detail about the configuration of any two types of Timer available in PIC microcontroller and write a Embedded C program to for each one of it.	CO4	[K_3]
26.	Explain semaphore and its types with an example.	CO5	[K_2]
27.	Explain with suitable block diagrams the design of automatic washing machine for domestic application.	CO6	[K_2]

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