Registration No : | | | | | | | | | | |

Total Number of Pages : 02 **B.Tech**
PEI8J002

8th Semester Regular Examination 2018-19
EMBEDDED SYSTEMS
BRANCH : AEIE, IEE
Max Marks : 100
Time : 3 Hours
Q.CODE : F014

Answer Question No.1 (Part-1) which is compulsory, any EIGHT from Part-II and any TWO from Part-III.
The figures in the right hand margin indicate marks.

Part- I

Q1 **Only Short Answer Type Questions (Answer All-10)** **(2 x 10)**

a) State some features and characteristics of Embedded System.
b) Classify Embedded Systems on the basis of complexity of performance.
c) How can a Brown out protection circuit be used to increase the reliability of an embedded system design?
d) The availability of a product is 93%. The Mean Time Between Failure is 32 days. Determine the Mean Time To Failure of the product in Days.
e) Write two operational and two non-operation qualities that an embedded system must possess.
f) What are the fundamental issues you may face in hardware software co-design of your embedded system?
g) How does pre-emptive scheduling work? Give an example
h) How do EDA Tools help in the designing of Embedded Systems? Give one example of an EDA tool.
i) Determine the output of the following piece of code:

```
char str1[] = "Hello", str2[] = "World!";
strcpy(str1, str2);
printf("%s\n", str1);
```

j) State one advantage and one limitation of Simulator based debugging.

Part- II

Q2 **Only Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve)** **(6 x 8)**

a) Explain the concept of Memory Shadowing and its advantages.
b) Explain different communication interfaces used in Automotive domain.
c) Design an automatic ice-cream vending machine based on FSM model for the following requirement. The machine is initiated by inserting a 5 rupees coin. After inserting the coin, the user can either select 'Vanilla', 'Strawberry' or 'Chocolate' ice-cream (to get their choice of flavour) or press 'Cancel' to cancel the order and take back the coin.
d) Explain the need of DFG. How is it different from CDFG? Draw the DFG for the following expression:

$$y = x^2 + ab$$

e) Explain the role of analog electronic components in embedded hardware design. Draw a circuit used in embedded application using analog components- resistor, capacitor and diode.
f) Three processes with process ID P1, P2, P3 with c values of 10, 14, 20 ms respectively enters the ready queue together in the order P3, P2, P1. Calculate the above parameters using Round Robin scheduling. (No I/O waiting time present for any process).Time Slice=2ms. Calculate the Waiting time and Turn Around Time (TAT) for each process and the average waiting time and Average Turn Around Time (TAT) for these processers.
g) Distinguish between MicroC/ OS and VxWorks.

h) Compare between In System Programming (ISP) and In Application Programming (IAP).

i) Justify the use of handmade enclosures for an embedded product.

j) Illustrate different components of an Embedded System by taking the Washing Machine as an example.

k) Elaborate on re-entrant function? Discuss are its pros and cons? Give an example.

l) Illustrate the Product Life Cycle curve with proper explanation

Part-III

Only Long Answer Type Questions (Answer Any Two out of Four)

Q3 With suitable illustrations and examples describe the different UML diagrams **(16)**

Q4 Contrast a RTOS from a GPOS with suitable examples. How can you choose a RTOS for your embedded system? **(16)**

Q5 Discuss the role of IDE in Embedded System Development environment. **(16)**

Q6 You have selected Rapid prototyping for your embedded system development. Give justification for the same. What are the different techniques available? Evaluate these techniques on the basis of their merits and limitations. **(16)**