INDIAN INSTITUTE OF INFORMATION TECHNOLOGY
UNA [HP]
An Institute of National Importance under MoE
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School of Electronics
CURRICULUM: IIITUGECE20
End Semester Examination
December 08, 2022
Time: 9:00 AM to 12:00 PM

Degree	B. Tech.	**Branch**	ECE
Semester	V		
Subject Code & Name	ECPE32: Embedded Systems		
Time: 180 Minutes	**Answer All Questions**		**Maximum: 100 Marks**

Sl. No.	Question	Marks
1.a	What is a relay circuit? Explain about various relays and their operation.	5
1.b	Differentiate Harvard and Von-Neumann architectures and explain the differences.	5
1.c	Compare and contrast big endian and little endian process with an example.	5
1.d	Analyze various levels of abstraction in the design of embedded system with an example.	5
2.a	Explain the components of a typical embedded system in detail.	5
2.b	Draw the circuit of a single SRAM cell and DRAM cell.	5
2.c	i) Write an assembly program that adds 2 to the contents of locations 0x20-0x2F using indirect addressing. ii) Write an assembly code for PIC controller to generate a square wave on pin-0 of PORT A?	5 (2.5*2)
2.d	Analyze how RAM location is accessed in direct and indirect addressing mode for PIC microcontroller.	5
3.a	Describe the operation of stepper motor in various modes with possible winding currents.	5
3.b	How is the data transfer controlled in inter integrated circuit bus protocol? Explain with timing waveforms.	5
3.c	Illustrate the DMA transfer in a computer system and explain the necessity of DMA transfer.	5
3.d	Differentiate a Timer and a counter with a block diagram.	5
4.a	Illustrate how threads share the process structure and interpret how threads and processes contrast in terms of memory utilization.	5
4.b	What is RTOS? Explain the types of real time Kernels and basic functions.	5

4.c	Three processes with process IDs P1, P2, P3 with estimated completion time 24, 3, 3 milliseconds respectively enter the ready queue together in order P1, P2, P3. Calculate the waiting time and Turn Around Time (TAT) for each process and the average waiting time and turnaround Time.	5
4.d	Explain the various factors to be considered for the selection of a scheduling criteria and describe the real time scheduling algorithms.	5
5.a	Describe the hardware design and task synchronization model of smart card design.	5
5.b	Describe the general block diagram of a IoT device and interpret the various IoT protocols.	5
5.c	Identify the basic components of a Wireless Sensor Network (WSN). Explain about different WSN architectures.	5
5.d	Explain the hardware and synchronization model of various tasks in the design of Adaptive Cruise Control (ACC) system for cars.	5

*****GOOD LUCK*****