

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VI EXAMINATION – SUMMER 2025****Subject Code: 3160311****Date: 26-05-2025****Subject Name: Embedded System for Medical Device****Time: 10:30 AM TO 01:00 PM****Total Marks:70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

MARKS

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|------------|---|-----------|
| Q.1 | (a) Differentiate between embedded and general computing systems. | 03 |
| | (b) What is an embedded system? Explain the different applications of embedded systems. | 04 |
| | (c) What is Application Specific Integrated Circuit (ASIC)? Explain the role of ASIC in Embedded System design? | 07 |
| Q.2 | (a) Define Operating System | 03 |
| | (b) What is Embedded Firmware? What are the different approaches available for Embedded Firmware development? | 04 |
| | (c) What are the major activities of an operating systems with regard to process management? | 07 |
| OR | | |
| | (c) Explain the different external communication interfaces in brief | 07 |
| Q.3 | (a) Mention the board specification of Raspberry pi. | 03 |
| | (b) Interface a led on GPIO 17 and write a program to blink LED for 250ms. | 04 |
| | (c) Explain the various disk scheduling techniques. | 07 |
| OR | | |
| Q.3 | (a) Explain the role of Watchdog Timer in Embedded System | 03 |
| | (b) Interface Switch, buzzer and LED on GPIO 4, 18, 17. Write a program for if switch is pressed, LED and buzzer should be in on condition. | 04 |
| | (c) Explain in detail the operating system services | 07 |
| Q.4 | (a) What is the difference between Masked ROM and OTP? | 03 |
| | (b) Explain the standard data types used in python programming. | 04 |
| | (c) Explain Operating System Structure | 07 |
| OR | | |
| Q.4 | (a) What is independent process? | 03 |
| | (b) Explain the working principle of Ultrasonic sensor. | 04 |
| | (c) Interface HC- SR04 ultrasonic sensor with raspberry pi and display the result on LCD. | 07 |
| Q.5 | (a) What is the need of L293D motor driver ICs? Draw a pin diagram of L293D. | 03 |
| | (b) Write a program to read an image and perform negative and bitwise operation on image using OpenCV. | 04 |
| | (c) Interface LCD with Raspberry pi and display “Biomedical” on 1st Line and “India” on 2nd line. | 07 |
| OR | | |
| Q.5 | (a) List out the steps/syntax for capturing image with webcam in python. | 03 |
| | (b) Write a program to read an image and perform addition and subtraction operation on image using OpenCV. | 04 |
| | (c) Interface DC Motor with raspberry Pi. Write a program to controlling of DC motor using PWM. | 07 |