12526

3 Hours / 70 Marks   Seat No.

Instructions – (1) All Questions are *Compulsory.*

(2) Answer each next main Question on a new page.

(3) Illustrate your answers with neat sketches wherever necessary.

(4) Figures to the right indicate full marks.

(5) Assume suitable data, if necessary.

(6) Use of Non-programmable Electronic Pocket Calculator is permissible.

(7) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1.   Attempt any FIVE of the following :   **10**

a) Define the internet of things (IOT).

b) List any two features of the ESP8266.

c) State any two advantages of MQTT.

d) State two advantages of smart waste management.

e) Define IOMT.

f) List any two applications of IOT.

g) State any two features of Ardiuno IDE.

Marks

2. **Attempt any THREE of the following :** **12**

a) Draw and explain the architecture of IOT.

b) Write any four enabling technologies of IOT.

c) State the process of installing ESP 8266 board in Ardiuno IDE.

d) Write the code to connect the Node MCU to wifi and obtain IP address.

3. **Attempt any THREE of the following :** **12**

a) Explain the evolution of IOT.

b) Write a program to blink an LED using Node MCU and explain it.

c) Explain working of motion detector.

d) Describe in brief thingspeak IOT platform.

4. **Attempt any THREE of the following :** **12**

a) State any four advantages and disadvantages of IOT.

b) Write a program to read DHT-11 sensor data using Node MCU.

c) Draw and explain IOT based crop monitoring and irrigation system

d) Interface ECG sensor with node MCU and state its working.

e) Describe any four smart devices used in IOMT.

Marks

5. **Attempt any TWO of the following :** 12

   a) Write and explain the procedure to configure a wifi web server using Node MCU.

   b) Define predictive maintenance and draw block diagram of predictive maintenance system.

   c) Explain impact of IOT on health care on the basis of benefits, challenges and future trends.

6. **Attempt any TWO of the following :** 12

   a) State any six features of LORa communication in detailed.

   b) Implement smart waste dustbin system using IOT with neat block diagram.

   c) Draw and explain IOT based medical monitoring system.

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Marks

1.   **Attempt any FIVE of the following :**   **10**

   a) List benefits of mobility aids.

   b) Define gait cycle.

   c) List factors in choosing a mobility aid.

   d) State applications of motion analysis.

   e) Give goals of rehabilitation robotics.

   f) Define rehabilitation engineering.

   g) State classification of orthosis on the basis of function.

2.   **Attempt any THREE of the following :**   **12**

    a)   Distinguish between manual wheel charir and powered wheel chair.

    b)   Explain contradications for using an orthosis.

    c)   Explain tele-rehabilitation in detail.

    d)   Compare walking stick and walking frame aids w.r.t. following points.

        i)   stability

        ii)   mobility

        iii) weight support

        iv) Use case

3.   **Attempt any THREE of the following :**   **12**

    a)   State classification of prosthesis.

    b)   Describe the concept of functional electrical stimulation.

    c)   Describe rehabilitation team with the help of core members of the rehabilitation team and their roles.

    d)   List the types of lower limb Orthosis. Also explain any one type in detail.

4.   **Attempt any THREE of the following :**   **12**

    a)   List types of disabilities as per WHO.

    b)   Describe spinal orthosis. Also give classification of spinal orthoses.

    c)   Compare medical model approach and social model approach related to rehabilitation care.

    d)   Describe different materials used in lower limb orthosis.

    e)   Give purpose of sensory rehabilitation and motor rehabilitation. Also list common conditions for both rehabilitation types.

Marks

5. **Attempt any <u>TWO</u> of the following :** **12**

    a) List basic components of prosthesis. Also state the role of knee joint and foot components.

    b) Describe tripods and quadripods. List advantages, disadvantages and uses of tripods and quadripods.

    c) A person is having disability related to lower limbs. Suggest a suitable prosthesis and explain in detail.

6. **Attempt any <u>TWO</u> of the following :** **12**

    a) Describe in detail, domains of ergonomics.

    b) Define powered wheelchair. Give the types of powered wheelchair. Also list advantages of powered wheelchair.

    c) Describe and intelligent prosthetic knee and hierarchically controlled prosthetic hand in detail.

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