B.TECH/AEIE/7TH SEM/AEIE 4101/2018
TELEMETRY & REMOTE CONTROL
(AEIE 4101)

Time Allotted : 3 hrs **Full Marks : 70**

Figures out of the right margin indicate full marks.

Candidates are required to answer Group A and any 5 (five) from Group B to E, taking at least one from each group.

Candidates are required to give answer in their own words as far as practicable.

Group – A
(Multiple Choice Type Questions)

1. Choose the correct alternative for the following: **10 × 1 = 10**

(i) Telemetry includes transmission of data over:
(a) Wireless link (b) Optical fibre link
(c) Pneumatic link (d) All of the mentioned.

(ii) Optical fibres use _____ as a transmission media?
(a) visible light (b) LASER (c) micro-wave (d) both (a) and (b).

(iii) Internet of things improves over WSN by adding ____ support.
(a) cloud (b) base station (c) internet (d) both (a) and (c).

(iv) If f_c is the frequency of a signal to be sampled by other signal f_s, then the elation between f_c and f_s is?
(a) $f_s <= 2\ f_c$ (b) $f_s => 2\ f_c$ (c) no relation (d) $f_s = 1/2\ f_c$.

(v) What role does a compressor play in pneumatic telemetry?
(a) Maintains constant air pressure (b) does nothing
(c) Acts as an damper (d) filters the air.

(vi) Which of the following is correct for long distance telemetry?
(a) Transmission of electrical voltage
(b) Transmission of electrical current
(c) Transmission of analogue signal
(d) All of the mentioned.

(vii) A satellite stays in orbit because the following two factors are balanced
(a) Satellite weight and speed (b) Gravitational pull and inertia
(c) Centripetal force and speed (d) Weight vs the pull of moon and sun.

(viii) The multiple access scheme used by GPS?
(a) FDMA (b) OFDMA (c) TDMA (d) CDMA.

(ix) MQTT is _____ protocol.
(a) Machine to Machine
(b) Internet of Things
(c) Machine to Machine and Internet of Things
(d) Machine Things.

(x) Process of utilizing one data link for multiple data transfer is called _____.
(a)multiplexing (b) over transfer
(c) multiprocessing (d) none of the mentioned

Group – B

2. (a) Explain with a neat diagram the working of a current based telemetry system. What advantage does current telemetry offer over voltage telemetry based systems?

(b) Draw the basic block diagram of the transmitter side of a telemetry system. Briefly describe the functional blocks of the transmitter side.

(3 + 3) +(3 + 3)= 12

3. (a) State how telemetry systems can be classified based on the carrier medium used for communication. What do you understand by hydraulic telemetry system? Give an example of hydraulic telemetry system from your daily life.

(b) Briefly describe what you understand by a Bluetooth pico-net with a neat diagram. List down the features of Bluetooth pico-net. What is the maximum number of slave device that a Bluetooth pico-net can support?

(4 + 2) +(3 + 2 +1)= 12

Group – C

4. (a) Explain the working of a TDM based telemetry system with a necessary block diagram. State few points of difference between TDM and FDM systems.

(b) What do you understand by sampling? State how sampling frequency is related to the frequency of the signal that is to be sampled?

(3+3)+(4 + 2)= 12

5. (a) State what do you understand by a wireless sensor network? Give a few applications of wireless sensor networks in smart city applications?

(b) Briefly describe the two different types of analogue multiplexing techniques.

(4 +2) + 6= 12

Group – D

6. (a) What is the basic principle used in optical communication? How is optical communication advantageous in terms of interference over conventional wired communication links?

(b) What are the main sources of attenuation in an optical fiber? What do you mean by numerical aperture of an optical fiber?

(2 + 4) +(4 + 2) = 12

7. (a) State the three categories of satellite based on their position in the orbit. What are the advantages of using a phase beam over a global beam antenna in a satellite?

(b) Explain the working of ALOHA protocol used in case of satellite communication system. Draw necessary flow chart in support of your answer.

(4 + 2) + (4 + 2)= 12

Group – E

8 .(a) Explain the basic differences between the MQTT protocol from HTTP. What do you understand by M2M in case of IoT systems?

(b) Explain in brief the layers involved in an IoT system.

(4 + 2) +6= 12

9. (a) Briefly describe what you understand by a Bluetooth scatter-net with a neat diagram. List down the features of Bluetooth scatter-net.

(b) Write short note on ant two of the following:

(i) Pneumatic verses hydraulic telemetry system

(ii) TCP/IP Protocol

(iii) FDM Architecture

(5 + 1) + (3 × 2) = 12