



**B.TECH DEGREE EXAMINATIONS: MAY 2017**

(Regulation 2014)

Sixth Semester

**TEXTILE TECHNOLOGY**

U14MCT605 : Control and Instrumentation for Textile Technology

**COURSE OUTCOMES**

- CO1:** Classify the measuring instruments by explaining their static characteristics and use basic statistical methods for measurements
- CO2:** Describe the working principle, characteristics of non electrical transducers such as displacement, velocity, temperature, pressure, humidity. Force and light
- CO3:** Explain the working principle of fiber testing methods and machines
- CO4:** Choose appropriate transducer for a given textile application
- CO5:** Distinguish manual systems and automation
- CO6:** Summarize various components of automatic control system and write process equation for simple operations related to material handling and feeding systems
- CO7:** Distinguish and describe the architecture, I/O and memory of PLCs with conventional controllers
- CO8:** Write simple PLC program by using logic and special functions.

**Time: Three Hours**

**Maximum Marks: 100**

**Answer all the Questions:-  
PART A (10 x 1 = 10 Marks)**

1. Matching the following:

CO4 [K<sub>1</sub>]

List I		List II	
A. Hygrometer		i. Neutral zone	
B. On-off controller		ii. Humidity	
C. Tachogenerator		iii. Closed loop	
D. Sewage treatment		iv. Speed	

- |    | A   | B  | C   | D   |
|----|-----|----|-----|-----|
| a) | ii  | i  | iv  | iii |
| b) | iii | iv | ii  | i   |
| c) | ii  | iv | iii | i   |
| d) | iii | i  | ii  | iv  |

2. The unloading characteristics will never follow the loading characteristics which is related to ----- characteristics of measurement system CO1 [K<sub>1</sub>]
- a) Hysteresis b) Backlash  
 c) Parallax d) Repeatability
3. ---- are examples of open loop control system CO5 [K<sub>2</sub>]
1. Riding bicycle  
 2. Filling of over head tank  
 3. Stepper motor  
 4. Servomotor
- a) 1,3 b) 1,4  
 c) 1,2 d) 2,3
4. ---- sensor is not using change in resistance principle. CO2 [K<sub>1</sub>]
- a) Thermocouple b) Strain gauge  
 c) RTD d) LDR
5. Assertion (A): PLC can be communicated directly with analog voltage CO7 [K<sub>1</sub>]  
 Reason (R): It has special provision for both digital and analog communication ports.
- a) Both A and R are Individually true and R is the correct explanation of A b) Both A and R are Individually true but R is not the correct explanation of A  
 c) A is true but R is false d) A is false but R is true
6. ---- gate provides maximum output (1) for both 0-0 and 1-1 inputs CO7 [K<sub>1</sub>]
- a) XOR b) OR  
 c) XNOR d) NAND
7. Sequence the elements of control systems by its location CO6 [K<sub>1</sub>]
1. Error detector  
 2. Controller  
 3. Actuator  
 4. Sensor
- a) 2-3-4-1 b) 1-3-2-4  
 c) 1-2-3-4 d) 4-1-3-2
8. ---- is a continuous controller which behaves as ON- OFF controller when the gain is increased CO6 [K<sub>1</sub>]
- a) Proportional b) Floating type  
 c) Derivative d) Integral

9. Assertion (A): Integral controller cannot be used as a standalone controller CO6 [K<sub>1</sub>]  
Reason (R): when the error is constant it will not generate output
- a) Both A and R are Individually true and R is the correct explanation of A      b) Both A and R are Individually true but R is not the correct explanation of A  
c) A is true but R is false      d) A is false but R is true
10. ---type of sensor is used in identifying yarn breakage in spinning process. CO3 [K<sub>1</sub>]
- a) Light sensors      b) Hygrometer  
c) Load cell      d) LVDT

**PART B (10 x 2 = 20 Marks)**  
**(Answer not more than 40 words)**

11. Differentiate precision and repeatability CO1 [K<sub>1</sub>]
12. What is calibration? CO1 [K<sub>1</sub>]
13. State the working principle of potentiometer with circuit. CO2 [K<sub>1</sub>]
14. Distinguish proximity sensors and metal detector CO2 [K<sub>2</sub>]
15. Difference between manual systems and automated systems. CO3 [K<sub>2</sub>]
16. What is UTM and list its 4 applications in textile industry. CO5 [K<sub>2</sub>]
17. How evenness of fiber is tested? CO4 [K<sub>2</sub>]
18. List the truth table of XNOR, NOR, NAND and XNOR with their corresponding symbols. CO7 [K<sub>1</sub>]
19. List four different types of PLC programming techniques. CO8 [K<sub>1</sub>]
20. Write a process equation for sewage treatment post dying process. CO6 [K<sub>2</sub>]

**Answer any FIVE Questions:-**  
**PART C (5 x 14 = 70 Marks)**  
**(Answer not more than 300 words)**

**Q.No. 21 is Compulsory**

21. Describe the static characteristics of measurement system with necessary drawings. CO1 [K<sub>2</sub>]
22. i) Describe the working of LVDT with its characteristics and also explain where it can be effectively used in textile industry. (10) CO2 [K<sub>2</sub>]  
ii) Explain the working principle of smoke sensors (4) CO2 [K<sub>2</sub>]
23. What is strain and how it is measured? Also explain the various types of strain gauges and its applications. CO3 [K<sub>2</sub>]

24. Explain the various discontinuous and continuous controllers used in textile industry and justify your selection of controllers. CO6 [K<sub>2</sub>]
25. Draw the architecture of PLC and explain the working of each units of PLC. CO7 [K<sub>2</sub>]
26. Briefly discuss about CO8 [K<sub>2</sub>]
1. Timer
  2. Counter
  3. Draw PLC ladder logic program for the digital logic equation  
 $D = \overline{(A+C)} + B + (A.B).C + A.C + A.B$
27. i) With neat sketches, explain the working of absolute pressure measurement using bellows and bourdon gauges. (10) CO4 [K<sub>3</sub>]
- ii) What is the purpose of pressure gauges and how elastic type pressure gauges are used in textile industries? (4) CO4

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