



**M.E / M.TECH/MCA DEGREE EXAMINATIONS: NOV/ DEC 2024**

(Regulation 2024)

First Semester

**TECHNICAL TEXTILES**

24TXT505: Protective Textiles

**COURSE OUTCOMES**

- CO1:** Evaluate the components and performance of ballistic fabrics to assess their suitability for protective applications.
- CO2:** Analyze the properties and uses of conductive textiles and aerosol protection materials to differentiate their protective capabilities.
- CO3:** Examine the applications and functionalities of intelligent textiles and surface treatments to recommend appropriate protective uses.
- CO4:** Interpret the interactions between protection and thermal comfort to prioritize factors influencing the effectiveness of protective textiles.
- CO5:** Develop strategies for general protection requirements and applications to enhance the safety of various professional environments.

**Time: Three Hours**

**Maximum Marks: 100**

**PART A (4\*20 = 80 Marks)**

1.
  - a) How is the ballistic property of a fabric evaluated using ballistic impact test, 8 CO1 [K<sub>3</sub>]  
backface deformation and trauma assessment? Explain.
  - b) Compare finned and spiral geometry in ballistic fabrics. 6 CO1 [K<sub>5</sub>]
  - c) What is yarn gripping in ballistics fabrics? How does it aid in the improved 6 CO1 [K<sub>2</sub>]  
performance of ballistic fabrics?
2.
  - a) Explain the properties of fabrics coated with Inherently Conducting 8 CO2 [K<sub>3</sub>]  
Polymers (ICPs).
  - b) Why are textile materials incorporated in Radar barring fences? Analyse 6 CO2 [K<sub>4</sub>]  
their key features.
  - c) Evaluate the usage of FIL-Tex measurement system in aerosols. 6 CO2 [K<sub>5</sub>]
3.
  - a) Discuss the various applications of smart textiles for protective purposes. 10 CO3 [K<sub>1</sub>]
  - b) Elaborately detail the various types of surface treatments given to textiles to 10 CO3 [K<sub>1</sub>]  
respond to external stimuli or improve their performance.
4.
  - a) Explain in detail how moisture storage of textile materials enhances the 10 CO4 [K<sub>2</sub>]

protective features of fabrics.

- b) Elucidate how thermal manikins work and state the properties that are measured using it along with its applications. 10 CO4 [K<sub>2</sub>]

**Answer any ONE Question**

**PART B (1\*20 = 20 Marks)**

5. a) State the three most common properties required in military clothing. 3 CO5 [K<sub>2</sub>]  
b) Analyse the usage of protective textiles for motorcyclists. 5 CO5 [K<sub>4</sub>]  
c) Elucidate the various textiles used in defence systems and weapons with their requirements. 12 CO5 [K<sub>3</sub>]

OR

6. a) Mention any three advancements in UV protective textiles. 3 CO5 [K<sub>2</sub>]  
b) Analyse the various requirements of high altitude clothing. 5 CO5 [K<sub>4</sub>]  
c) Describe in detail the essential properties of firefighter protective clothing and state the functions of the various materials and layers used in it. 12 CO5 [K<sub>3</sub>]

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