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INDIAN INSTITUTE OF HANDLOOM TECHNOLOGY

Bargarh/Fulia/Guwahati/Jodhpur/Salem/Varanasi/Champa/Kannur/KHTI-Gadag/SPKM-Venkatagiri/KLB-IIHT-Hyderabad

Diploma in Handloom & Textile Technology

April/ May - 2026 Semester Examination

(Regulation-2021)

Semester : **V** Time:3 Hours

Course Code &Title : **HTOE301 Product Design** Maximum Marks:100

PART-A (10×2=20 Marks)

Answer all the questions within two to three sentences

1. What do you mean by Creative Attitude in product design?
2. Define the term Brain Storming.
3. What is product life cycle?
4. Write some difficulties that occur during product development.
5. What do you understand by Morphology of design?
6. What is the meaning of term 'Iteration' in product design?
7. What do you understand by the term Design for Safety?
8. Define mathematical modeling.
9. What are the first and second steps of design of any product?
10. Define Re-engineering.

PART-B **(**(6+10)×5=80 Marks)

Answer all the questions in detail

11. A. Define and explain levels of product with appropriate examples. (6)

    B. Explain New product development in various steps. (10)

(OR)

    C. Briefly explain creative design process with examples. (6)

    D. What is idea generation method? Explain its various types. (10)

12. A. Explain various challenges in product development. (6)

    B. Explain various phases of generic product development. (10)

(OR)

    C. What is the product analysis technique, explain each technique with example. (6)

    D. Whether Product life cycle affects the business model? Discuss in detail. (10)

13. A. Explain the effect of "Decision making" in product design. (6)

B. What are the types of product design? Explain each of them with example. (10)

(OR)

C. How environmental effects can be considered in product design? (6)

D. What are the different phases of morphology of design? Discuss each of them. (10)

14. A. What is the meaning of optimization in design? Explain. (6)

B. Explain 'design for six sigma' taking a suitable example. (10)

(OR)

C. Explain what is the role of computers in design? (6)

D. Which parameters are considered while designing for safety and reliability of a product? Explain in detail. (10)

15. A. Why designing is considered as thinking and time taking process? Explain in brief. (6)

B. If you are a design engineer, explain the parameters which you will keep in your mind while designing a handloom product. (10)

(OR)

C. What are the steps involved in 'Design for robustness'. (6)

D. Explain in detail, Why we have need for 'Design procedure' to design a product before manufacture to it. (10)

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Diploma in Handloom & Textile Technology

April/ May - 2026 Semester Examination

(Regulation-2021)

Semester : **V** Time:3 Hours

Course Code & Title : **HTOE310 Renewable Energy Technologies** Max. Marks: 100

PART-A (10×2=20 Marks)

Answer all the questions within two to three sentences

1. Define renewable energy
2. List any four conventional energy resources.
3. Recall the concept of solar radiation.
4. Identify the types of solar collectors.
5. Mention the factors affecting wind energy generation.
6. State the purpose of site selection in wind energy systems.
7. Name the components of a biogas plant.
8. Explain the concept of cogeneration in biomass systems.
9. State the function of hydrogen storage systems.
10. Summarize the working principle of fuel cell systems.

PART-B ((6+10)×5=80 Marks)

Answer all the questions in detail

11. A. Explain the present renewable energy scenario in India. (6)

    B. Describe the pattern of world energy consumption and available energy reserves. (10)

(OR)

    C. Describe the environmental impacts of conventional energy utilization. (6)

    D. Illustrate the potentials and major applications of renewable energy systems. (10)

12. A. Clarify the working of a flat plate solar collector with neat diagram. (6)

    B. Present the fundamentals of solar thermal power generation. (10)

(OR)

    C. Interpret the principle of solar photovoltaic conversion. (6)

    D. Examine the working of solar PV power generation and its applications. (10)

13. A. Explain the method of wind data collection and energy estimation (6)

B. Detail the construction and working of a wind turbine generator with neat sketch. (10)

(OR)

C. Classify the different types of wind energy systems and state their features. (6)

D. Analyze the safety measures and environmental aspects associated with wind energy systems. (10)

14. A. Describe the process of biomass gasification. (6)

B. Elaborate the concept of cogeneration and its applications in biomass systems. (10)

(OR)

C. Explain the working of a biogas plant with neat sketch. (6)

D. Discuss the production of ethanol and biodiesel from biomass resources. (10)

15. A. Outline the working principle of tidal energy generation. (6)

B. Explain the open and closed OTEC cycles with neat diagram. (10)

(OR)

C. Summarize the construction and operation of a fuel cell system. (6)

D. Illustrate the concept of hybrid renewable energy systems and their applications. (10)

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Diploma in Handloom & Textile Technology

April/ May - 2026 Semester Examination

(Regulation-2021)

Semester : **V** Time:3 Hours

Course Code &Title : **HTPC301 Weaving Technology - II** Maximum Marks:100

PART-A (10×2=20 Marks)

Answer all the questions within two to three sentences

1. Name any two special jacquard machine used in jacquard weaving?
2. What is casting out in jacquard weaving?
3. Name the types of shuttle less loom.
4. Name the types of selvedges formed in shuttle less weaving.
5. Name any four reasons of loom stoppage in shuttle less loom.
6. Write down the formula to calculate the efficiency of a loom.
7. Calculate the diameter in inches of 40^S Ne cotton yarn using pierce's formula.
8. Define the term "cover factor".
9. Write the formula to calculate the GSM of the fabric, if the weight per linear meter of the fabric & width in inch is given.
10. Write the formula to calculate the reed width from cloth width & crimp.

PART-B **(**(6+10)×5=80 Marks)

Answer all the questions in detail

11. A. Write the short notes on different systems of harness building? (6)

    B. Write the working principle of double lift single cylinder jacquard with the neat sketch. (10)

    (OR)

    C. Name the different tie-ups used in jacquard & explain any one tie-up with neat diagram? (6)

    D. Write the working principle of open shed jacquard with the neat sketch. (10)

12. A. Write down the main advantages of shuttle less loom? (6)

    B. Explain the sequence of operations involved in weft insertion in a projectile loom with neat sketch. (10)

    (OR)

    C. Explain the main features of an electronic jacquard. (6)

    D. Classify the rapier weaving machine & explain the weft insertion technique for double rapier in rapier loom with suitable sketch. (10)

13. A. Write the merit & demerit of water jet loom. (6)

B. Explain the weft insertion method of Airjet loom with diagram. (10)

(OR)

C. Explain any four fabric defects and their reason. (6)

D. With neat sketch explain the sequence of operations involved in weft insertion in water jet loom. (10)

14. A. Write short notes on fractional cover & percentage cover. (6)

B. Derive the formula, cloth cover = K1 + K2 – (K1xK2)/28 (10)
Where, K1 : warp cover & K2: weft cover

(OR)

C. If the diameter of 80^s cotton yarn is 1/240 inch. What will be the relative diameter of 40s cotton yarn? (6)

D. Calculate the fractional cover of warp & weft and percentage cover of cloth from the followings: (10)

Count of warp & weft = 40^S ,
EPI & PPI = 52 & 48

15. A. A fabric is woven with 64 ends per inch of 40^s cotton yarn. Calculate the ends per inch with 32^s cotton yarn to maintain the same level of compactness. (6)

B. Calculate weight of warp and weft present in a 1000 yard of the fabric from the following particulars: (10)

Count of warp & weft – 26^s X 20^s cotton	Warp crimp – 6 %
Ends per inch - 52	Weft crimp - 8 %
Picks per inch - 48	Cloth width – 54 inch

(OR)

C. A plain cloth has 48 EPI. It is required to change the weave into 4 thread twill having same compactness. Calculate the EPI in the new fabric. (6)

D. Calculate weight of warp and weft present in 1000 meters of fabric with following particulars: (10)

Count of warp & weft – 20 Tex & 24 Tex	Warp crimp – 4%
Ends per cm - 24	Weft crimp - 5%
Picks per cm - 20	Cloth width – 120 cm

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Diploma in Handloom & Textile Technology

April/ May - 2026 Semester Examination

(Regulation-2021)

Semester- : V Time:3 Hours

Course Code & Title : **HTPC302 Textile Testing-II** Maximum Marks: 100

PART-A (10×2=20 Marks)

Answer all the questions within two to three sentences

1. Write the formula to calculate the shrinkage percentage of fabric.
2. What is meant by areal density of a fabric?
3. Mention any two tests used to measure the tensile strength of the fabric.
4. What is the sample size required for Elmendorf Tearing Tester?
5. Write the importance of fabric stiffness testing.
6. What is drape coefficient?
7. What is washing fastness of fabrics?
8. State the objectives of various fastness testing of testing materials.
9. Mention any two of fabric inspection systems.
10. List any two major defects that would occur during garment manufacturing.

PART-B **(**(6+10)×5=80 Marks)

Answer all the questions in detail

11. A. Brief on the basic fabric particulars and need of analysis of these in textile testing lab. (6)

    B. Explain the procedure to measure the crimp percentage of the yarn from fabric with suitable diagram. (10)

(OR)

    C. Write in brief on fabric sampling techniques and factors to be considered during fabric sampling. (6)

    D. What is the importance of sampling in textile industry? Explain the random and bias sampling method. (10)

12. A. Explain the different methods of preparation of fabric samples for tensile strength testing. (6)

B. Explain the working principle of a tearing strength tester with a suitable diagram. (10)

(OR)

C. Brief on the method of measurement of bursting strength of a fabric. (6)

D. Explain the working principle and method of universal tensile tester for the measurement of tensile strength of a fabric. (10)

13. A. Write in brief about the effects of pilling. (6)

B. Explain the procedure to determine the flexural rigidity of a fabric with suitable diagram. (10)

(OR)

C. Write short notes on crease recovery measurement techniques of fabric. (6)

D. Elaborate the principle and method of drape testing of fabric. (10)

14. A. Write about the objectives of various fastness testing of textile materials. (6)

B. Explain in detail about the rubbing fastness method. (10)

(OR)

C. Write in brief about the colour fastness testing against perspiration. (6)

D. Explain in detail about the washing fastness testing method. (10)

15. A. Write about the working principle of automatic inspection machine. (6)

B. Explain about the 4 point system of fabric grading. (10)

(OR)

C. Discuss about AQL. (6)

D. Explain the procedure to assess the quality of manufacturing process from fabric to packing. (10)

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(Regulation-2021)

Semester : **V** Time:3 Hours

Course Code &Title : **HTPE301 Knitting Technology** Maximum Marks:100

PART-A (10×2=20 Marks)

Answer all the questions within two to three sentences

1. Define knitting.
2. What is stitch length?
3. Name any two types of knitting needles.
4. State the function of sinkers.
5. Define tuck stitch
6. What is rib structure?
7. What is a flat knitting machine?
8. Mention advantages of computer-controlled flat knitting machines.
9. What is an open loop in warp knitting?
10. State the function of the let-off system in warp knitting.

PART-B ((6+10)×5=80 Marks)

Answer all the questions in detail

11. A. Compare the properties of woven, knitted, and nonwoven fabrics (6)

    B. Explain yarn quality requirements for knitting and preparation of staple yarns. (10)

(OR)

    C. Classify knitting processes into weft and warp knitting with neat sketches. (6)

    D. Explain the basic knitting terminologies used in knitting technology. (10)

12. A. List the types of knitting needles with their merits and demerits. (6)

    B. Explain the loop forming sequence of latch needle with diagrams. (10)

(OR)

    C. Describe the passage of material through a weft knitting machine. (6)

	D.	Explain the functions of the following knitting machine elements: sinkers, cylinder, dial, cams, and feeder.	(10)
13.	A.	Write short notes on plain and rib knitted structures	(6)
	B.	Explain the production and properties of interlock and purl knitted fabrics.	(10)
		(OR)	
	C.	Explain the factors affecting loop formation.	(6)
	D.	Describe the formation of knit, tuck, and float stitches with diagrams.	(10)
14.	A.	State the basic principles of flat knitting machines	(6)
	B.	Explain the different types of flat knitting machines.	(10)
		(OR)	
	C.	List the elements of flat knitting machines	(6)
	D.	Explain the production of various weft knitted structures using flat knitting machines.	(10)
15.	A.	Differentiate between open loop and closed loop.	(6)
	B.	Explain the working of Tricot warp knitting machine	(10)
		(OR)	
	C.	Describe the guide bar movement mechanism and chain links for simple patterns.	(6)
	D.	Explain the uses of warp knitted fabrics in technical applications.	(10)

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April/ May - 2026 Semester Examination

(Regulation-2021)

Semester : **V** Time:3 Hours

Course Code & Title : **HTPE302 Advanced Fabric Structure** Maximum Marks: 100

PART-A (10×2=20 Marks)

Answer all the questions within two to three sentences

1. Show the division of the card used for 'Straight tie-Sectional Draft'.
2. Define 'Damask'.
3. State the use of 'Working Comber Board'.
4. Write the different series of warp and weft used in 'Figured Pique'.
5. Name the two different 'Backed Cloth Structures'.
6. Differentiate 'Reversible' and 'Non-Reversible Tapestry'.
7. List the Jacquard Systems used for weaving 'Figured Double cloth'.
8. Indicate the two weaves used for producing '4-Picks Figure Terry'.
9. Draw the sketches of the different types of 'Doups' used in Leno weaving.
10. Define 'Chenille'.

PART-B **(**(6+10)×5=80 Marks)

Answer all the questions in detail

11. A. Show the Drafting followed in 'Sectional Tie-Sectional Draft', indicating harness and end numbering. (6)

    B. Taking a figured guide graph on 16 x 16, indicate the weave structure of 'Damask' on 48 x 48, produced by using a 3-eye decked mail harness with 8 healds and weaving 3 picks per card. (10)

    (OR)

    C. Show the draft diagram for a 'Pressure Harness' loom set with 3 eyes and 2 eyes decked mail alternately and 5 healds. (6)

    D. Based on a figured guide graph on 20 x 20, show the complete weave structure of i) Extra Warp on 40 x 20 and ii) Extra Weft on 20 x 40 using 1: 1 order of Plain: Extra threads, with suitable bindings. (10)

12. A. Indicate the Drafting diagram of a jacquard loom weaving 'Figured Pique' fabric set with healds for plain ends. (6)

    B. A jacquard loom is set with the working comber boards and healds for weaving 'Figured Patent-Satin' cloth. Taking 48 x 48, indicate the figured weave structure of the cloth produced on this loom. (10)

    (OR)

C. Mark the two weaves used for weaving 'Figured Patent Satin'. (6)

D. A jacquard loom is set with healds for weaving 'Figured Pique cloth'. Taking 48 x 48, indicate the figured weave structure of the cloth produced in this loom, based on a 16 x 12 figured guide graph. (10)

13. A. Write on the salient features of the 'Traditional Tapestry' woven in India without using any figuring shedding device. (6)

B. Taking 48 x 48, mark the weave structure for weaving 'Figured Warp-Backed Cloth' using 6 thread twill binding. (10)

(OR)

C. Indicate the ground and figure weaves of 'Weft-Backed Cloth' on 8 x 16 based on 8 thread twill. (6)

D. Mark the weaves of '4 Picks -Reversible Tapestry' and draw its cross-section. (10)

14. A. Using the card diagram, show the Punching Procedure followed to punch the cards for weaving 'Figured Double Cloth' using the Sectional Tie-Sectional Draft. (6)

B. Taking a figured graph motif on 12 x 12, indicate the weave structure of '3-Picks Figured Terry' on 48 x 36, to weave in a jacquard loom set with healds. (10)

(OR)

C. Write about the four different Jacquard setups used for weaving the 'Figured Terry' fabric. (6)

D. Using a 20 x 20 figured guide graph, design the complete weave structure of 'Four colour effect- Double Equal plain cloth on 40 x 40. (10)

15. A. Draw the neat interlacing diagrams of 'Gauze' and 'Leno' weave structure, taking two ends and four picks. (6)

B. Show the draft, interlacing diagram, and lifting plan of 'Pointed Leno – combined with Plain weave' structure. (10)

(OR)

C. Draw the neat sketches of the fabric effects produced while weaving 'Chenille' using two looms. (6)

D. Show the draft, interlacing diagram, and lifting plan of 'Leno' structure produced using Straight Draft and Pointed Draft with Single Beam and Double Beams. (10)

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(Regulation-2021)

Semester : **V** Time:3 Hours

Course Code & Title : **HTPE303 Fashion Designing** Maximum Marks: 100

PART-A (10×2=20 Marks)

Answer all the questions within two to three sentences

1. Define Fashion.
2. What is meant by Style in fashion?
3. What is Hue in colour?
4. What is Colour Harmony?
5. Define Balance in design.
6. What is Rhythm in fashion design?
7. What is a placket in garment design?
8. Define Pleats in clothing.
9. What is Market Research in fashion?
10. Define Fashion Portfolio.

PART-B ((6+10) ×5=80 Marks)

Answer all the questions in detail

11. A. List and briefly explain the reasons for changes in fashion. (6)

    B. Explain the Fashion Cycle with a neat flow chart or diagram. (10)

(OR)

    C. Explain the classification of fashion with examples. (6)

    D. Describe the role of a fashion designer in the styling and production of costumes. (10)

12. A. Explain the elements of design used in fashion design. (6)

    B. Explain the Prang Colour Chart and colour characteristics (Hue, Value, and Intensity) (10)

(OR)

C. Write short notes on the types of shapes used in fashion design. (6)

D. Discuss the psychology of colour and its application in the apparel market. (10)

13. A. Explain the types of balance in design with examples. (6)

B. Explain the principle of rhythm in design through repetition, alternation, progression, and gradation. (10)

(OR)

C. Write short notes on proportion and scale in fashion design. (6)

D. Discuss how harmony is achieved in fashion design using lines, shapes, colours and textures. (10)

14. A. Explain the basic concepts in designing skirts. (6)

B. Explain the different types of necklines and collars used in garment design with neat sketches. (10)

(OR)

C. Describe the basic concepts in designing trousers. (6)

D. Discuss the types of fullness in garments such as pleats, gathers, tucks and frills. (10)

15. A. Explain the methods of fashion trend forecasting. (6)

B. Explain the importance of wardrobe planning in daily life. (10)

(OR)

C. Write short notes on types of silhouettes in garments. (6)

D. Describe the steps involved in developing a fashion portfolio. (10)

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Semester : **V** Time:3 Hours

Course Code &Title : **HTPE304 TECHNICAL TEXTILES** Maximum Marks:100

PART-A (10×2=20 Marks)

Answer all the questions within two to three sentences

1. Mention any four segments of technical textiles.
2. Define high performance of fibre with two examples.
3. Write any three primary characteristics required for automobile textiles.
4. Give any two examples of a textile materials used in seat belts.
5. Classify the filtration based on the raw material state.
6. Define dust collection theory.
7. What are the basic fibre properties requirements for ballistic protective clothing?
8. Mention any two fibres used in flame resistant protective clothing.
9. State the important fibre characteristics required for medical protective clothing.
10. Write the any two applications of geotextiles.

PART-B **(**(6+10)×5=80 Marks)

Answer all the questions in detail

11. A. Describe about the Glass and carbon fibre used in technical textiles (6)

    B. Explain the twelve sectors of technical textiles based on the function. (10)

(OR)

    C. Suggest the current scenario of technical textiles based on the raw material. (6)

    D. Discuss the structure, properties and applications of any one aramid fibre used in technical textiles. (10)

12. A. Give a brief note on property requirements for the seat belts and air bags. (6)

    B. Explain the manufacturing process of nylon tyre cords with illustration. (10)

(OR)

	C.	Explain the physical and mechanical properties required for conveyor belts.	(6)
	D.	Elaborate the manufacturing process of conveyor belts with neat sketches.	(10)
13.	A.	Explain the principles of filtration mechanism.	(6)
	B.	Discuss the importance and applications of liquid filtration in textiles.	(10)
		(OR)	
	C.	Explain the working principles of dust collection filtration mechanism.	(6)
	D.	Explain the various cleaning mechanism of filter with suitable diagrams.	(10)
14.	A.	Classify the personal protective clothing based on applications.	(6)
	B.	Describe the raw materials, manufacturing process and application of flame resistant protective clothing.	(10)
		(OR)	
	C.	Suggest the raw materials and techniques required for protective clothing.	(6)
	D.	Discuss the construction of chemical protective clothing in detail.	(10)
15.	A.	What are the primary characteristics required in textiles for medical applications?	(6)
	B.	Elaborate the classification of medical textiles based on its applications.	(10)
		(OR)	
	C.	Explain the essential properties of raw materials required for geotextiles.	(6)
	D.	Elaborate the functions of geotextiles and its applications.	(10)

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(Regulation-2021)

Semester : **V** Time:3 Hours

Course Code & Title : **HTPE305 Apparel Marketing & Merchandising** Max Marks: 100

PART-A (10×2=20 Marks)

Answer all the questions within two to three sentences

1. Define the term marketing.
2. Write any four functions of marketing.
3. Define retail merchandising.
4. Mention four roles of merchandiser.
5. List out the accessories and trims used in garment manufacturing.
6. Write the objectives of MRP.
7. Define the term "order confirmation" and mention its importance.
8. List out at least four important terms of sale and shipment.
9. What do you mean by route card?
10. Mention two popular software programs used in garment manufacturing.

PART-B **(**(6+10)×5=80 Marks)

Answer all the questions in detail

11. A. Give the comparison of retail and wholesale marketing. (6)

    B. Briefly explain the functions of various types of advertising media. (10)

(OR)

    C. Discuss the need and importance of marketing strategies. (6)

    D. Define the market research and briefly explain various methods of market research. (10)

12. A. Briefly explain what a merchandiser should know. (6)

    B. Define visual merchandising and discuss its role in marketing. (10)

(OR)

C. Write a detailed note on apparel merchandising. (6)

D. Explain the various functions of the merchandising division. (10)

13. A. Compare supply chain and demand chain analysis. (6)

B. Define sourcing, discuss sourcing of accessories. (10)

(OR)

C. Explain the role of buying houses in garment manufacturing. (6)

D. Discuss how material management is essential in the garment industry. (10)

14. A. Discuss the need and importance of garment exports. (6)

B. Briefly explain the various terms of export payment. (10)

(OR)

C. Discuss export rules and regulations. (6)

D. Briefly explain pre-shipment and post-shipment documentation. (10)

15. A. Explain the importance of time management in the process of merchandising. (6)

B. Elaborate the applications of software in marketing with suitable examples. (10)

(OR)

C. Explain the importance of accessories follow up in garment production. (6)

D. Explain about the production scheduling with suitable examples and practical check points. (10)

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(Regulation-2021)

Semester : **V** Time:3 Hours

Course Code & Title : **HTPE306 & Advances in Textile Processing** Max Marks: 100

PART-A (10×2=20 Marks)

Answer all the questions within two to three sentences

1. Enlist the key parameters affecting the efficiency of the enzymatic treatment/s.
2. State the name of the enzyme used in the bleaching of cotton fabric during wet processing.
3. Define the reserve and cross shade in bicomponent fabric/s.
4. Differentiate the term GLM and GSM.
5. Mention ink types.
6. What do you mean by DPI in context of Digital Printing?
7. Why Garment processing is preferred instead of higher MLR requirement.
8. Write the name of the two nano antibacterial agents.
9. Enlist the key parameters affecting the Dissolved Oxygen Level in water.
10. State the permissible level of Sulphate and Chloride for the drinking Water.

PART-B **(**(6+10) ×5=80 Marks)

Answer all the questions in detail

11. A. Why are enzymes preferred over the conventional chemicals? (6)

    B. Write a brief note (including the process parameters) on the application of the Enzyme in Scouring, Bleaching, Post bleaching, and silk degumming. (10)

(OR)

    C. Explain the lock-and-key mechanism of a protein-based biocatalyst used in sustainable textile wet processing. (6)

    D. Describe the enzymatic de-sizing and Bio-polishing process of cotton fabric with suitable recipe and process parameters (10)

12. A. Why singeing of P/C blended fabric is carried out after its dyeing. Also write the possible defects to be occur in same. (6)

B. Explain the Mechanism and Process of combined de-sizing, scouring & bleaching process of 100% cotton fabric in detail. (10)

(OR)

C. Explain the working of padding mangle and J-Box machine. (6)

D. Describe the processing of the 65/35 blended P/W fabric with suitable recipe/s and process parameter/s in detail. (10)

13. A. Write a Brief note on the Flock Printing and its application in Textile. (6)

B. Explain in detail Kadi and Brasso printing and mention it applications in Textiles. (10)

(OR)

C. Write a brief note on the High density print. (6)

D. Why has digital printing gained popularity in textiles? Describe the mechanism and process of a digital printing machine, with a suitable diagram. (10)

14. A. Brief about the Ultra-Violet Protection and its applications in textiles. (6)

B. Define the term plasma. State the basic characteristics of plasma, the various types of plasma, and their applications in textile end uses (10)

(OR)

C. Write a brief note on the Anti bacterial finish. (6)

D. Define the term nanotechnology. State the basic characteristics of nanomaterials and their applications in various textile end uses. (10)

15. A. Write the characteristics of the water used in textile processing, textile waste water and treated effluent to be drain in sea. (6)

B. Describe the design and working of an effluent treatment plant in detail. (10)

(OR)

C. What are the sources of water pollution in textile wet processing unit? (6)

D. Write a detailed note on alternative sources of highly pollution-creating, conventionally used chemicals in textile wet processing, along with their applications in specific processes. (10)

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