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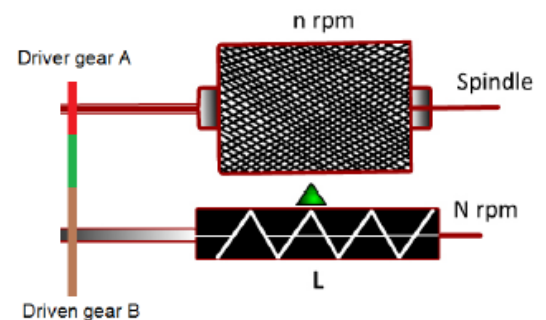
Use your own calculator*Unfair means will result in cancellation of examination***Answering any question without justification/necessary calculation will fetch no points***Every unit mistake will result in 0.5 mark deduction every time*

Q1. As a rule of thumb, we expect that diameter of a cotton yarn, with packing factor of 0.6, $d = 1/28(Ne)^{0.5}$ [where, $Ne = 840$ yards or 30240 inches in 1 pound or 453.6 gm]. If the cotton yarn has a packing factor 0.55, amend the above-mentioned relation (density of yarn 1.5 g/cm^3) (2)

Q2. Considering the new relation, find the fabric cover factor including warp (K_1) and weft (K_2) cover factors. (2)

Q3. What are the basic principles of yarn clearing instruments during winding processes? Differentiate them based on two areas where one should use a particular mechanism. (2+1)

Q4. Show that for spindle driven winder, the traverse ratio remains constant. (3)



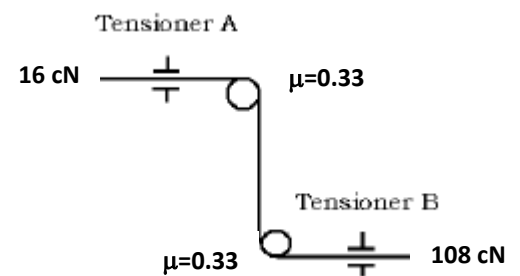
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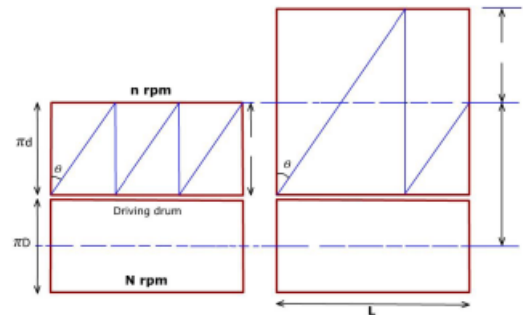
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Q1. As a rule of thumb, we expect that diameter of a cotton yarn, with packing factor of 0.6, $d = 1/28(Ne)^{0.5}$ [where, $Ne = 840$ yards or 30240 inches in 1 pound or 453.6 gm]. If the cotton yarn has a packing factor 0.65, what will be the deviation, in terms of fraction, from the above-mentioned relation. (density of yarn is given as 1.48 g/cm^3) (2)

Q2. The tensioning system shown in the bottom Figure is being used in a winding system. The input and output tensions are 16 cN and 108 cN respectively. If disc (additive) type tensioners A and B are identical then calculate the weights used in tensioners A and B. (3)



Q3. Show that for drum driven winder, the traverse ratio reduces with the increase in package diameter. (3)



Q4. Differentiate between direct and sectional warping (use 4 points) (2)

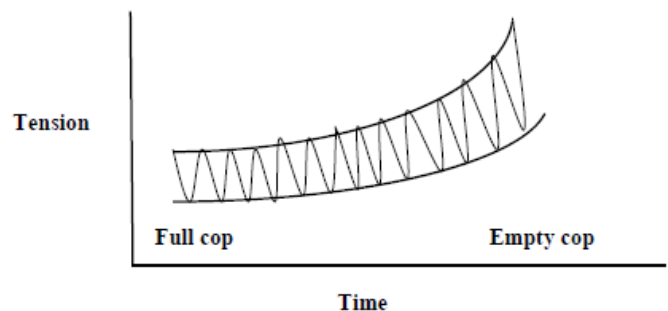
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Q1. As a rule of thumb, we expect that diameter of a cotton yarn, with packing factor of 0.6, $d = 1/28(N_e)^{0.5}$ [where, $N_e = 840$ yards or 30240 inches in 1 pound or 453.6 gm]. If the cotton yarn has a packing factor 0.55, amend the above-mentioned relation (density of yarn 1.5 g/cm^3). What will be the new fabric cover factor if warp and weft factors are K_1 and K_2 , respectively. (2+2)

Q2. During Pirn unwinding we get to see a short- and long-term tension variation as per the image given. Provide the rationale for both kinds of tension variation in the pirn. [Use the tension variation relation to justify your answer] (1+1+1)



Q3. The empty diameter of a spindle-driven cylindrical package is 5 cm. The spindle speed is 1500 r.p.m. and traverse velocity is 100 m/min. Determine-

a) Winding speed and angle of wind at the start

b) Winding speed and angle of wind when package diameter becomes double

(1.5+1.5)