0.05.2019 @LHC121 (8.00 AM-10.00 AM)

MAJOR TEST
TXL 231 (FABRIC MANUFACTURE I)

Maximum Marks: 41

Answers must be supported with relevant figures and mathematical expressions.

1. a) State whether the following sentence is true of false and justify your answer.

"The optimum size add-on is higher for polyester filament yarns than that of cotton yarns."

b) "Optimum size add-on is the necessary but not the sufficient condition for achieving good weaving performance". Explain the statement with suitable diagram and logic. (3+3)

2. The width of size box is 210 cm, yarn diameter is 0.2 mm and equivalent yarn diameter is 0.5. The speed of sizing machine is 80 m/ min. The size add-on and concentration of size paste is 8% and 24%, respectively. The linear density of input yarn is 20 tex (without moisture) and 90% of water present in wet pick up is being evaporated, then calculate the following.

   i. Percent occupation in size box
   ii. Total number of yarns passing through the size box
   iii. Oven dry mass of yarn (in kg) passing through the machine per minute
   iv. Amount of water to be evaporated /min. (6)

3. A shuttle loom is running at 200 picks/min. The mass and velocity of shuttle when it leaves the picker is 0.5 kg and 15 m/s, respectively. The crank shaft rotation during which picker is in contact with shuttle is from 80° to 110°.

Calculate the following considering straight line nominal displacement of picker.

   i. Alacrity of picking system
   ii. Rigidity of picking system in kN/m
   iii. Time for maximum acceleration of shuttle in s
   iv. The maximum acceleration of shuttle in m/s^2 (6)

4. A shuttle loom, running at 180 picks per minute, is having 1.75 m width and length of the shuttle is 0.25 m. The shuttle enters and leaves the shed when the displacement of sley is 25% more than the radius of crank. If the radius of crank and length of connecting rod is 0.1 m and 0.5 m respectively, then determine the following.

   i. Displacement of sley in m when the crank is at bottom centre.
   ii. Acceleration of sley in m/s^2 when the crank is at back centre
   iii. Angular position of crank shaft (to the nearest integer) when the shuttle leaves the shed
   iv. Average velocity of the shuttle in m/s (6)

5. What is the objective of let-off motion? Name different classes of let-off system? How are the different from each other? Draw a neat diagram to show the variation in warp tension in the plain shuttle loom of our laboratory. (1+1+2+2)