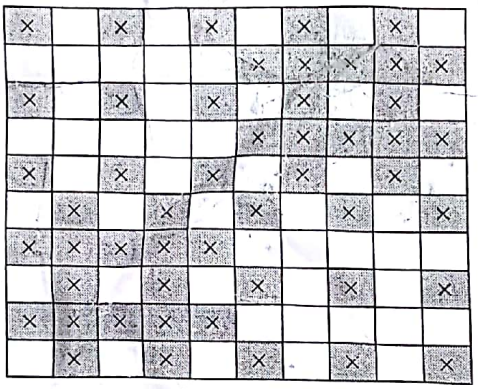
04.05.2018 @LHC325 (10.30 AM-12.30 PM)

MAJOR TEST
TXL 231 (FABRIC MANUFACTURE I)
Maximum Marks: 40

Answers must be supported with relevant figures and mathematics expressions.

1. (a) What kind of combination of viscosity and squeeze pressure is chosen in modern sizing machine? Justify your answer in detail.
   (b) Explain the following statement:
   "The performance of sized yarn in weaving may be different even if the size material and add on% is same". (2.5+2.5)

2. Show the drafting and lifting plan of following weave using minimum number of healds. (5)



3. A design is repeating on 18 ends and 18 picks. What kind of shedding system should be chosen? Explain your answer highlighting the limitations of other shedding systems for this design assuming hypothetical values. (1+4)

4. a) What are the two major limitations of overpick system? (2.5+2.5)
   b) What is bumping? How bumping can be prevented? Explain your answer with necessary mathematical expressions.

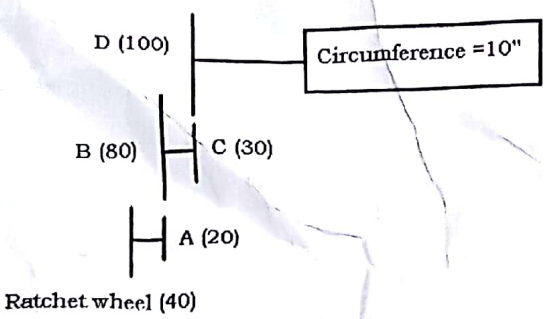
5) A delicate silk fabric is being produced on a shuttle loom equipped with cam shedding and running at 150 picks per minute. The cams are having two equal dwells and each of them corresponds to 60 degree rotation of the cam. If the shuttle mass is 500 g, shuttle length is 0.30 m and reed width is 2.20 m, then calculate the following: (5)

   a) Angular position of crank shaft when the shed is fully open.
   b) Average velocity of shuttle in m/s
   c) Power requirement for picking in kW.

6) Draw the acceleration curve of sley and SHM against the angular position of the crank shaft for a sley having eccentricity of 0.5. Show necessary calculations. X axis should be marked at 30° interval. (5)

7) For the following take up system determine the cause of periodicity (show complete calculation) in pick spacing if

i. Wavelength is 0.75 inch
ii. Wavelength is 0.0375 inch
iii. If only one tooth of gear B is worn-out then what type of fault (width and wavelength) will be produced in the fabric (5)



8) A loom is running with negative let-off motions. The full and empty diameter of weavers beam is 60 cm and 20 cm, respectively. The weaver does not want the warp tension variation to exceed by 20% during the weaving.

a) How many times the weight has to be shifted during the weaving?
b) Calculate the weaver's beam diameter for the first three weight shifting.
c) Plot the warp tension against weaver's beam diameter with and without weight shifting (Y axis: warp tension, X axis: diameter) (5)