These questions and answers should help you to think about, revise and consolidate the material covered in Lecture 9.

1. Explain how a Kanban system operates.

2. What are the key principles in JIT from a planning and control point of view?

3. JIT/Lean approaches advocate PULL control – explain why it may be difficult to implement pull systems in some contexts.

4. Explain the five focussing steps in TOC.

5. The BEST COLOUR Textile factory has three processing stages – 1. fabric washing, 2. fabric colouration, 3. fabric finishing. All fabric production goes through each of these stages in sequence. The factory has only one colouration machine which operates in batch mode, i.e., when it is loaded, the colouring process runs for a set period of time. The machine is then unloaded, and the coloured fabric proceeds to finishing. The next batch of fabric then commences on the fabric colouration machine.

    If the colouration machine's output is too low to meet the current high demand, why should BEST COLOUR consider a TOC approach to maximise output ?

6.   Outline how BEST COLOUR (in Q5) could apply a TOC approach using Drum-Buffer-Rope (DBR) principles to increase output from the formulation machine.

7. Why does high product variety cause operational problems in production and supply chain systems?

8. What is 'form postponement' and how can it be achieved in an operational system?

9. What does Mass Customization seek to achieve?

10. What best practices help to achieve Quick Response (QR)?

Sample answer

Q5/Q6

BEST COLOUR could benefit from using a Theory of Constraints (TOC) approach to examine the constraints on capacity in each of its processes and what is limiting overall throughput of fabric in the factory. The five focusing steps of TOC allow the identification of constraints, the exploitation of constraints to maximise output, and the subordination of constraints through techniques such as Drum-Buffer -Rope (DBR).

Given that the colouration machine has been identified as not having sufficient capacity to meet demand, then BEST COLOUR may benefit from a TOC initiative on the colouration machine, focusing on its capacity constraints and how its output could be maximised.   So how could it do it? – see Q6 answer.

6. As the colouration machine is the dominant constraint, then the focus should be on the second step in TOC – exploiting its capacity to the fullest extent. The focus then moves to the third step in TOC - subordinating to this constraint, i.e. making sure all the operations are concentrated on getting the maximum output from the colouration machine..

Drum-Buffer –Rope (DBR) principles can be used to ensure maximum use of the available colouration process capacity to achieve maximum output.

First, a desired rate of production (drumbeat - D) should be established for the this machine, e.g., the throughout rate per hour/shift/day for the colouration machine.

Second, Exploitation is the critical stage to maximise cuse of the colouration machine capacity. In doing so we will need a buffer (B) with the right mix of products waiting to go to the colouration stage to ensure it is never 'starved' of work – i.e. a queue of work should be waiting to go on to the colouration machine. In doing this we ask many questions e.g. Could the machine work for a longer period than the rest of the facility? Is there an opportunity to minimise lost time in machine set ups and changeovers from one colour to the next? Is there a best colouration sequence that reduces overall set up time losses? What preparation can be done so that changeovers from one colour to the next can be done quickly?

The sub-ordinate stage ensures the flow and sequencing of orders to the colouration machine buffer is managed in such a way that the queue of work waiting to go into colouration reflects the required relative proportions of demand. There is no point in preparing fabric for colouration if there is limited demand for that fabric and colour and if a fabric with high demand and colour is needed. This is achieved by the Rope (R), which controls the release of fabric for preparation to ensure the queue of fabric in the buffer reflects actual demand in the right proportions.

A diagram could be used to support your answer.