Name: **Enrolment No:**	UPES UNIVERSITY OF TOMORROW

UPES

End Semester Examination, December 2023

Course: Lean Manufacturing — **Semester: V**

Program: BBA (OM)+INT. BBA - MBA — **Time: 03 hrs.**

Course Code: LSCM 3018 — **Max. Marks: 100**

Instructions:

SECTION A

10Qx2M=20Marks

S. No.	Attempt all questions in this section	Marks	CO
Q 1	**MCQ & fill in the blanks, all carries equal marks**		
(i)	Which of the following is not one of the 5s? (a) Synchronize (b) sustain (c) shine (d) standardize	**2**	**CO1**
(ii)	Just in Time (JIT) means: - (a)Suppliers do not supply in time. (b) Workers arrive at work punctually (c)A lot of stock is kept meeting unforeseen demand. (d) Supplies are coordinated to arrive as they are needed.	**2**	**CO1**
(iii)	To implement lean system in any organization what are the two basic changes needed to bring…… & ……	**2**	**CO1**
(iv)	Who does not signify the importance of people as a resource? (a) TPS (b) Lean (c) Both (a) & (b) (d) None of these	**2**	**CO1**
(v)	Genchi Genbutsu belongs to_____. (a) TPS (b) Lean (c) Mass Production (d) None of these	**2**	**CO1**
(vi)	In which language Takt means cycle? (a) Japanese (b) Indian (c) Chinese (d) German	**2**	**CO1**
(vii)	The Toyota Production System (TPS) is the unique approach of the company in _____. (a) Trading	**2**	**CO1**

	(b) Manufacturing (c) Service (d) All the above		
(viii)	Jidoka means_____. (a) Machines with human intelligence (b) Machines with artificial intelligence (c)Machines with both human & artificial intelligence (d) None of the above	**2**	**CO1**
(ix)	Lean manufacturing practices _____-centric approach. (c) Employee (d) Customer (e) Employer (f) None of the above	**2**	**CO1**
(x)	Pull strategy emphasizes replenishing what is_____. (a) Unused (b) Consumed (c) Wasted (d) None of the above	**2**	**CO1**
SECTION B **4Qx5M= 20 Marks**			
Q	**Attempt all questions in this section**	**Marks**	**CO**
2	Draw and define the house of TPS?	**5**	**CO2**
3	Discuss TPS principles?	**5**	**CO2**
4	Elaborate how 5s can help organization to improve their performance?	**5**	**CO2**
5	Discuss the following with an example? (a) ETO (b) ATO	**5**	**CO2**
SECTION-C **3Qx10M=30 Marks**			
Q	**Attempt all questions**	**Marks**	**CO**
6	A projector manufacturing company exports projector, calculate the cycle, buffer & safety stock for the company when their daily shipment is 1400 units per day, assume takt time as 1 minute. The time the Kanban cards are in planning is 24 hours, and the delivery time (due to material handler's frequency) is 3 hours. In any typical queue they have 14 hours of demand in front of the order. Assuming safety factor as 0.03, also the average production is 1400 units for a month & standard deviation is 59.0 & average demand for a month is 1400 units & standard deviation for demand is 208.0. For a 99% on time delivery the acceptable value for one sided test (Z score= 2.33). Also calculate the number of kanban required when the kanban container size is 50 units.	**10**	**CO3**
7	Discuss the seven deadly sins?	**10**	**CO3**

8	A company is setting up an assembly line to produce 192 units per 8-hour shift. The following table identifies the work elements, times, and immediate predecessors: **Work Element** / **Time(sec)** / **Immediate Predecessor** A / 40 / None B / 80 / A C / 30 / D, E, F D / 25 / B E / 20 / B F / 15 / B G / 120 / A H / 145 / G I / 130 / H J / 115 / C,I 1. Draw a precedence diagram 2. What is the desired cycle time (in seconds)? 3. What is the theoretical minimum number of stations? Assign tasks to each workstation 4. Compute the efficiency	**10**	**CO3**
	SECTION-D **2Qx15M= 30 Marks**		
Q	**Read the case and attempt both questions**	**Marks**	**CO**
	St James's Hospital, affectionately known as 'Jimmy's', is Europe's largest teaching hospital. It employs around 4500 people to support the 90 000 in-patient treatments per year and over 450 000 total admissions. Under increasing pressure to reduce costs, to contain inventory and to improve service, the Supplies Department has recently undertaken a major analysis of its activities, helped by the consultancy division of Lucas Industries, the UK-based manufacturing company. The initial review highlighted that Jimmy's had approximately 1500 suppliers of 15 000 different products at a total cost of £15 million. Traditionally, the Supplies Department ordered what the doctors asked for, with many cases of similar items supplied by six or more firms. Under a cross-functional task force, comprising both medical and supply staff, a major programme of supplier and product rationalization was undertaken, which also revealed many sources of waste. For example, the team found that wards used as many as 20 different types of gloves, some of which were expensive surgeons' gloves costing around £1 per pair, yet in almost all cases these could be replaced by fewer and cheaper (20 pence)		

alternatives. Similarly, anaesthetic items which were previously bought from six suppliers, were single-sourced. The savings in purchasing costs, inventory costs and general administration were enormous in themselves, but the higher-order volumes also helped the hospital negotiate for lower prices. Suppliers are also much more willing to deliver frequently in smaller quantities when they know that they are the sole supplier. Peter Beeston, the Supplies Manager, said:

'We've been driven by suppliers for years ... they would insist that we could only purchase in thousands, that we would have to wait weeks, or that they would only deliver on Wednesdays! Now, our selected suppliers know that if they perform well, we will assure them of a long-term commitment. I prefer to buy 80 per cent of our requirements from 20 or 30 suppliers, whereas previously, it involved over a hundred.'

The streamlining of the admissions process also proved fertile ground for improvement along JIT principles. For example, in the Urology Department, one-third of patients for non-urgent surgery found their appointments were being cancelled. One reason for this was that in the time between the consultant saying that an operation was required and the patient arriving at the operating theatre, there were 59 changes in responsibility for the process. The hospital reorganized the process to form a 'cell' of four people who were given complete responsibility for admissions to Urology. The cell was located next to the ward and made responsible for all record keeping, planning all operations, ensuring that beds were available as needed, and telling the patient when to arrive. As a result, the 59 handovers are now down to 13 and the process is faster, cheaper and more reliable.

Jimmy's also introduced a simple kanban system for some of its local inventory. In Ward 9's storeroom, for example, there are just two boxes of 10 mm syringes on the shelf. When the first is empty, the other is moved forward and the Ward Sister then orders another. The next stage will be to simplify the reordering: empty boxes will be posted outside the store, where codes will be periodically read by the Supplies Department, using a mobile data recorder.

The hospital's management is convinced of the benefits of their changes.

'Value for money, not cost cutting, is what this is all about. We are standardizing on buying quality products and now also have more influence on the buying decision ... from being previously functionally oriented with several buyers, we now concentrate on materials management for complete product ranges. The project has been an unmitigated success and although we are only just starting to see the benefits, I would expect savings in cost and in excess inventory to spiral!

	The report on Sterile Wound Care Packs shows the potential that our team has identified. The 'old' pack consisted of four pairs of plastic forceps, cotton wool balls and a plastic pot, which were used with or without additional gloves. This pack cost approximately 60 pence excluding the gloves. The "new" pack consists of a plastic pot, swabs, etc., and one pair of latex gloves only. This pack costs approximately 33 pence including gloves. Total target saving is approximately £20 000.'		
9	List the elements in St James's new approach which could be seen as deriving from JIT principles of manufacturing.	**15**	**CO4**
10	What further ideas from JIT manufacturing do you think could be applied in a hospital setting such as St James's?	**15**	**CO4**