

VPM's
DR VN BRIMS, Thane
Programme: MMS (2017-19)
Fourth Semester Examination April 2019

Subject	Operations Applications & Cases (Operations)		
Roll No.		Marks	60 Marks
Total No. of Questions		Duration	3 Hours
Total No. of printed pages	4	Date	22.04.2019

Q1) 20 Marks (Compulsory)

Case-The HyperCar

From his solar-powered digs down the road from the ski slopes of Aspen, Amory Lovins is gearing up to take on the giants of the global auto industry, Mr. Lovins has a degree from Oxford University, a MacArthur Foundation "genius" grant, and a reputation as an environmental consultant that fetches him as much as \$20,000 a day. At the age of 53, he has written or co-written 27 books and cofounded an environmental think tank that has spun off three for-profit businesses. But his pet project these days involves a new level of risk and ambition: Hypercar Inc. a fledgling car company with a plan to build a superefficient sport-utility vehicle that he is convinced will revolutionize the industry. All he needs is about a quarter of a billion dollars to get the thing out of the lab and onto the street.

His dream is an earth-friendly SUV that would get the equivalent of 99 MPG of gas and emit nothing but drinkable water. It would be powered not by an internal-combustion engine, but by a fuel cell that cleanly converts hydrogen into electricity.

But that would be only the start for the Hypercar. Mr. Lovins's machine would be made not out of steel, but of lightweight carbon fiber-the kind used to make fighter planes, tennis rackets and skis. And it would be driven by two joysticks instead of a steering wheel-one result of its sophisticated electronic brain, which would do everything from linking the car to online entertainment programs to suggesting when it's time to take the car into the shop.

At least that's the theory. No one has yet figured out how to build a carbon-fiber car economically. No one has put a fleet of fuel-cell-powered cars on the road. No one has built a production car steered by joysticks. And none of the established industry players is willing to fork over the piles of money the Hypercar needs for a real rollout. None of which seems to bother Mr. Lovins in the least.

BP Amoco PLC has invested about \$500,000 in Hyper-car. Its hope is that Mr. Lovins's project will spur the world's established auto makers to move boldly to produce cleaner vehicles. BP sees the radical Hypercar as a way to apply "a bit of competitive pressure" to prod the big automakers to produce even more efficient de-

signs, says Chris Mottershead, BP's London-based technology vice president for lower carbon growth.

Mr. Lovins hatched the idea for a superefficient auto-mobile about a decade ago, and spent the next several years trying to convince auto makers that they could make money by building it. General Motors Corp., for one, didn't bite. "I have a lot of strange friends, and Amory is on the outer limit," says Donald Runkle, former head of GM's advanced-technology labs. He invited Mr. Lovins to talk to his engineers, but GM concluded that building the kind of car Mr. Lovins envisioned didn't make much business sense. "Those puppies cost a lot of dough," explains Mr. Runkle, now an executive vice president of Delphi Automotive Systems Corp., the big auto supplier.

On a recent morning, Mr. Lovins stood in a conference room at the Mirage hotel and casino in Las Vegas. He had flown in to give a slideshow about the Hypercar at a conference dealing with how the Internet will affect the auto industry. More empty seats than people greeted his presentation. But afterward, he thought he had hit the jackpot when he got a few minutes to make his pitch to a software executive sporting a green golf sweater and very deep corporate pockets.

The executive was Barry McNealy, brother of Sun Microsystems Inc. Chairman Scott McNealy. Sun is working with some of the world's biggest auto makers in a race to design software that will link cars to the Internet, and Barry McNealy, who is in charge of Sun's dealings with its automotive customers, had convened an annual meeting of his staff at the conference where Mr. Lovins had just spoken. He tried to convince Mr. McNealy that the Hypercar would be the perfect test vehicle for Sun's software. That way, he told Mr. McNealy, "you get there first."

Mr. McNealy was polite. "I love what you guys are doing," he told Mr. Lovins. He added that his brother might be interested in hearing more about the Hypercar if Mr. Lovins pitched it as a possible office on wheels, an idea Sun believes could catch on with consumers. But Mr. McNealy stopped far short of writing a check. "Your ability to get to market remains to be seen," he noted, and in the auto industry, "the barriers to entry for a niche player are very high."

That week, Mr. Crumm, the CEO for the Hypercar and retired GM executive, received three representatives of Terra Trust, an environmentally focused Swiss investment fund. Terra had pledged to invest \$1.5 million of the \$5 million Hypercar has raised so far. But Terra has come up \$100,000 short because of managerial problems that the representatives blame on their predecessors.

Over coffee and cookies, Mr. Crumm and his staff gave the Terra people an overview of their Hypercar plans. The group cut to the chase. "You can have all these fancy plans, but you could be nowhere near assembly," said Urs Lustenberger, a young lawyer who serves on Terra's new management team.

He was particularly impressed by the Hypercar model's high-tech tires, which are designed both to increase fuel economy by reducing rolling resistance and to run safely for short distances when flat. Like almost all components on the Hypercar except its carbon-fiber body, the tires would be made by an outside supplier. The idea is that by depending heavily on suppliers, Hypercar won't have to do as much manufacturing itself.

The Hypercar staff was itching to raise about \$60 million that they figure they need to build 20 or so test Hypercars that actually run. They need those test cars before they can move to full-scale production, which itself could cost another \$140 million, the company estimates. But the Terra representatives apologized that their fund doesn't have the kind of money Hypercar needs.

The week before Christmas, the Hypercar team convened a three-day summit in Basalt. Because of the problems with raising money, some of

the young staffers suggested scaling back the company's do-or-die production goal. Messrs. Lovins and Crumm agreed that the company will start trying to license its technology to other auto makers in two years, regardless of whether it's ever able to build a fleet of Hypercars. Mr. Crumm had been "pushing or the brass ring," he acknowledged a few days later. But the company found that to raise the funds needed, it must offer a short-term way for investors to reap a profit. "There are some investors who want to harvest the technology and unload," Mr. Crumm says.

It is now three years later and you have been approached by Amory Lovins for advice (address your report to him). As you prepare your recommendations, assume that the Hypercar is technically feasible (that is, it can and will work within the next two years). You should also assume that the purchase price for this car would be within \$2000 of a comparable, conventional car.

Questions

1. What is the overall business feasibility of the Hypercar (use any models and frameworks that are appropriate)?
2. To what extent are the conditions "right" for the successful introduction and launch of this car?
3. What are the major obstacles to the successful introduction and launch of this new approach to designing and building cars?
4. What should Lovins do next with the Hypercar concept?

*Source: Adapted from "One Quest to Build a Truly 'Clean' Car Has Gathered Steam," by Jeffrey Ball, Staff Reporter of *The Wall Street Journal*.

Attempt Any FOUR from the Remaining SIX Questions

Q2) Any two from (a) or (b) or (c) ————— (5x2) = 10 Marks

- a) Under what conditions inspections, storages & transports could be considered value-adding?
- b) How would a restaurant use the 5-S program? How would an operating room use this program?
- c) M/s ABC Ltd. has projected sales of 300, 500, 400, 100, 200 and 300 for the six months Jan to June and the numbers of working days in the corresponding month are 22, 19, 21, 21, 22 & 20 respectively. The company at present employs 20 workers and each unit requires 10 labour hours for its production. The hiring costs are Rs 300 and layoff costs are Rs 400 per person. Company policy is to retain a safety stock equal to 20% of the monthly forecast. There are currently 50 units in stock carried at Rs 2/- per unit - month. Stock outs have been assigned a cost of Rs.20/- per unit – month. Labour cost /hr is Rs 6/- and Rs 9/- on regular & O.T. basis respectively. Working hours in a day 8 hours.

Suggest an aggregate plan based upon the Chase strategy

Month	Days	Demand	Safety Stocks	Op. Stocks	Production Required	Man power Required
Jan						
Feb						
Mar						
Apr						
May						
Jun						

Q3) Any two from (a) or (b) or (c) ————— (5x2) = 10 Marks

- a) Select two products that you have recently purchased; one should be a service and the other a manufactured good. Think about the process that you used to make the decision to purchase each item. What product characteristics were most important to you? What operational activities determine these characteristics?
- b) The design capacity for engine repair in our company is 80 trucks /day. The effective capacity is 40 engines /day and the actual output is 36 engines /day. Calculate the utilization and efficiency of the operation. If the efficiency for next month is expected to be 82%, what is the expected output?
- c) An automobile garage owner wants to perform process analysis in order to improve customer service process. You have been engaged as a consultant. Prepare a one-page plan of action for the automobile garage owner.

Q4) Any two from (a) or (b) or (c) ————— (5x2) = 10 Marks

wine bottling plant is situated in Nashik. Plant operates all the days in a year. Plant is using bestin class bottle filling techniques to fill the wine. However they are continuing with manual approach for packing the bottles after they are filled with wine. Company is keeping the stock of packaging material in its warehouse which is in same premises. This company is having 2 vendors which provide packaging material. Till date vendors have prove themselves very loyal with their commitments and because these two vendors company has never faced any stocked out issue for packing material. Company has 3 planned maintenance schedules in which they carry out all the maintenance work of all the machines and equipment's. The details are mentioned below.

Below are the facts about a wine & spirits bottling plant for the year 2014.

Shift Details:

1st shift: 8:00 am to 4:00 pm

2nd shift: 4:00 pm to 12:00 midnight

3rd shift: 12:00 midnight to 8:00 am

Planned Maintenance Schedule:

1) 1st March 2014 to 7th March 2014

2) 1st July 2014 to 7th July 2014

3) 1st November 2014 to 7th November 2014

[Note: Year 2014 is not a leap year]

Below are the breakdowns observed in respective months in bottling plant line.

Month	No Breakdowns	of	Total Time loss (in minutes)
Jan-14	12		650
Feb-14	15		550
Mar-14	8		440
Apr-14	13		500
May-14	21		650
Jun-14	16		560
Jul-14	6		350
Aug-14	13		600
Sep-14	18		750
Oct-14	15		600
Nov-14	10		350
Dec-14	13		400

- a) Calculate Reliability Parameters MTBF and MTTR
- b) Calculate Availability
- c) Propose a maintenance strategy on basis of reliability parameters
(Make required assumptions and specify it)

Q5) Any two from (a) or (b) or (c) ————— (5x2) = 10 Marks

- a) For an organization that you are familiar with, provide an example of each of the four categories of purchases shown in figure. What sourcing strategy would you use for each? Why?

HIGH	Leverage		Strategic	
	Standardize Purchases		Build collaborative partnerships	
	Use competition to select suppliers		Single or dual source	
Value of Spend to Firm	Consolidate purchase			
	Noncritical		Bottleneck	
	Increase efficiencies		Use multiple sources	
	Electronic Catalogs		First substitute materials	
	Purchasing Cards		Develop new suppliers	
LOW	Vendor Managed Inventory			
LOW			High	

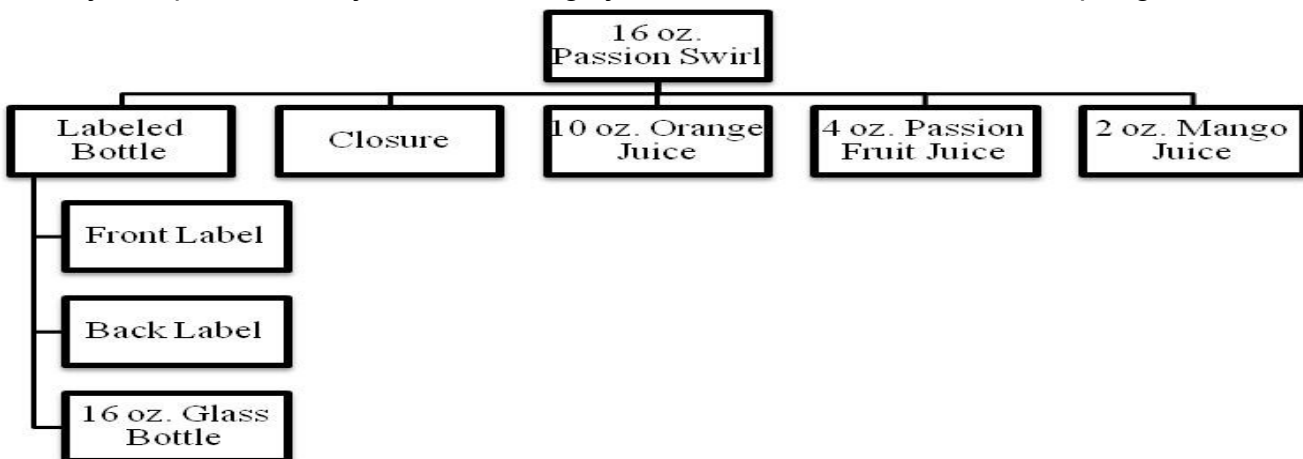
- b) What do you mean by safety stock and safety lead time in an MRP? When should organizations use these in MRP?
- c) How do you define capacity utilization? What factors influence the utilization of resources in an operating system?

Q6) Any two from (a) or (b) or (c) ————— (5x2) = 10 Marks.

- a) Why should you not include setup times when calculating TAKT times?
- b) What do you understand by “process analysis”? Why should organizations conduct process analysis?
- c) What do you understand by “Estimation” in tendering process? Explain its importance in the tender process.

Q7) Any two from (a) or (b) or (c) ————— (5x2) = 10 Marks

- a) Pick a product (good or service) that you are interested in consuming something in the near future (for example, a textbook, apartment rental, cell phone, etc.). Analyze the offerings of two competing firms. How do the products compare on various dimensions of quality? From these differences, what can you infer about each company’s strategy & the customers that they seem to be targeting?
- b) Do you think chase strategies might be more appropriate in some industries than in others? Give some examples and explain why?
- c) The Organic Juice Co. produces a line of fresh, natural organic juices. Given the MPS and BOM for one type of juice, Passion Swirl, complete the MRP schedules for the components: orange juice, passion fruit juice, and mango juice. There are 128 fluid ounces per gallon.



MPS

Item	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8
Passion Swirl Number of 16 oz. bottles	2000	2000	2500	2500	2500	3000	3000	3000

Item	Orange Juice	Passion Fruit Juice	Mango Juice
------	--------------	---------------------	-------------

Lot size rule	FOQ=120 Gallons	FOQ=50 Gallons	FOQ=50 Gallons
Safety stock	50 Gallons	10 Gallons	10 Gallons
Beginning inventory	80 Gallons	10 Gallons	40 Gallons
Lead Time	2 weeks	3 weeks	2 weeks