Mock Test Papers (MTP)

Dear Student Friends,

Presently, two new MTP's are available on ICAI website. As usual, most of the questions are repetitive in nature. Hence, to avoid the duplication of work, I have excluded the repeat questions and included only new questions with answers here.

Summary of April, 2021 (Series I) Mock Test Paper

MTP Q. No.	Reference of similar Question from our classroom notes
1	It is a new question, hence it is covered below with answer
2	It is a new question, hence it is covered below with answer
3	Covered in RTP - May, 2019 & Regular notes Ch.8 [Earlier Name : PHL]
4(a)	Covered in MTP - October, 2020 & PM notes Ch.3 [Earlier Name : M]
4(b)	Covered in our Regular notes of Chapter 7
4(c)	It is a new question, hence it is covered below with answer
5(a)	It is a new question, hence it is covered below with answer
5(b)	Covered in Case Study Digest - Case Scenario 1/55 [Earlier Name : Corner Pizza]
6(a)	Covered in RTP - November, 2019 & PM notes Ch.6
6(b)	Covered in Case Study Digest - Q. 20/119 [Earlier Name : Sandy]

Question 1 :

Cancer Research Foundation (CRF) is not for profit organisation established two years ago in form of a charitable public trust with the objective to conduct charitable activities related to disease of cancer for its' patients in home country (here-in-after referred to as a said country). This service was started after considering the 2018 report by the World Health Organisation (WHO), which said that one in every 10 will develop cancer during lifetime and one in 15 will die of the disease in the said country. In 2018, cancer took more than seven lakh lives. According to the estimates by the Medical Research Council of said country, the death toll is expected to rise 8.8 lakh by 2020.

The mission statement CRF is read as '***We are here to reduce cancer deaths to zero'***. CRF enlists the following three critical success factors to attain the mission :

1. To reduce the number of people suffering from cancer.
2. To develop treatment facilities for cancer patients.
3. To fund research programs to study the causes of cancer and prevention there from.

CRF comprises a board of trustees, a group of advisors, and volunteers apart from few executive staff members. Management rest with the board of trustees, whereas technical decision and representations made by a group of advisors (which comprises experts who are either renowned medical professionals or CEOs of pharma companies). Executive staff executes the operational task and coordinates activities like camps, awareness drives, etc. through volunteers. Only executive staff gets a fixed salary, advisors get honorarium to meet out of pocket expenses only.

CRF under its mission ***Nirog*** has tie-ups with different hospitals that take-care of the cancer patients. CRF teams whenever come across any case of a cancer patient who can't afford the treatment; intervene into the case and funds the treatment cost of such patients in said hospitals. CRF sponsors the research projects undertaken by individual medical professionals (either self-employed or practice in association with the hospital) and experts (from academia or industry) in domains related to the disease of cancer.

CRF gets donations from individuals and corporate (as part of their CSR initiatives) apart from grants from national and international bodies (including WHO, Red Cross, etc.). In recent years; the government also supported CRF with certain subsidies and recognised its efforts. Volunteers devote time and physical efforts. CRF has a system of budgetary control and usually meets the budgeted target and hardly overrun the budget.

Group of advisors divided into different sub-groups and each sub-group has assigned a list of volunteers to support the different allocated programs (called missions) such as ***Sarv Nirmaya, Nirog,*** and ***Aushad,*** etc. Under mission ***Aushad,*** some of the pharma companies also engaged to develop the advance treatment and medicines to cure cancer. Under mission ***Sarv Nirmaya,*** group of advisors make representations to different stakeholders including the government on policy matters. Delegates of advisors attend different conferences and seminars wherein they listen to and present their views. It is shared with associated volunteers for wider reach and building knowledge repository.

Required :

(i) Board of trustees at CRF are in doubt and divided over the need for performance measurement and evaluation. Majority is in favour of justifying the need. STATE your opinion. **(3 Marks)**

(ii) STATE at-least 3 difficulties associated with performance management in the case of CRF and give a possible way-out for the same. **(6 Marks)**

(iii) IDENTIFY at-least 2 key performance indicators against each of the critical success factors of CRF. **(6 Marks)**

(iv) Board of trustees at CRF, finally decided to apply value for money framework to assess the performance; but are concerned about its utility and how to draw the integrated conclusion if the result of all the three 'Es' (dimensions of value for money) are not aligned to each other. ADVISE the management. **(5 Marks)**

Answer 1 :

(i) Let's acknowledge this fact that CRF is a not-for-profit organisation and every not-for-profit organisation possess the following features :

- It performs non-economic activities
- Required funds to perform such activities
- Wealth creation for shareholders is not among the objectives
- Not expected/allowed to distribute the surplus among the stakeholders.

Despite the fact that the not-for-profit organisation need not earn a profit, but it doesn't free them from their fiduciary responsibility towards the contributor of funds. They are responsible to provide reasonable assurance to the contributors of the funds that the funds are applied for the advancement of the stated purposes only and scale up to which such purposes are attained. So, performance measurement and evaluation is essential for Not-for-profit organisations as well. Hence, CRF should install the performance management system.

(ii) Due to its not-for-profit nature, CRF will face the following inherent challenges in the performance measurement :

- **It is difficult to quantify the cost and benefits** because the nature of the benefit can be behavioural and futuristic, whereas cost also includes externalities. There is also a time gap between the cost incurred and the benefit accrued, which makes trade-offs further difficult and complex. The best **way-out** is to use NFPI (non financial performance indicators) in addition to FPI (financial performance indicators), to consider the non-monetary qualitative factors.

- **Performance and commitment of state** (government) have an impact. Since the health of nationals are crucial for the government of the state or union, hence it is possible that the said country may also have any government health program and the same is working effectively. In such case, the obvious scope of activities by CRF will be reduced or changed substantially. So the scope of performance depends upon the performance of the government in the health sector, hence not an independent factor. The best **way-out** is to have a flexible performance matrix which is adjustable depending upon the performance of the state.

- **Multiple objectives to be attained that too within a limited set of resources.** Due to diverse stakeholders, a not-for-profit organisation like CRF has multiple objectives, which causes conflict inter-se. The best available **way-out** is prioritization among these objectives. Mind it, prioritization shall be based upon importance (utility) and urgency (time).

- **Measuring the utility of funds is essential but difficult.** Not-for-profit organisations don't earn to spend, they just budget to spend. The utility of funds for the not-for-profit organisation is not the same always if they have less funds to spend then utility may be more and vice versa due to the law of diminishing marginal returns. The **way-out** is the use of the value for money framework to measure the utility of funds spent.

(iii) Key Performance Indicators against each of the Critical Success Factors :

Critical Success Factors (CSF)	Key Performance Indicators (KPI)
To reduce the number of people suffering from cancer.	▪ Number of people suffering from cancer in the country during the period ▪ Improvement in recovery rate
To develop treatment facilities for cancer patients.	▪ Number of new treatment methods and medicines developed to cure cancer during a period ▪ Reduction in mortality rate
The fund research programs to study the causes of cancer and prevention there from.	▪ Percentage of money spent on research to the total amount of contributions in a period ▪ Number of research projects completed within time and budget during a period
Note – Alternate KPIs, but those which are relevant to the facts of the case may also be provided.	

(iv) Economy, efficiency, and effectiveness (3Es) are three dimensions of the value for money model which ensures the best possible value from available money (usually limited).

- **Effectiveness** (spent wisely) is an output measure, the goal approach to check whether the organisation has achieved its desired mission and objectives?
- **Efficiency** (spend well) is a link between input and output factor, a process approach to check whether the resources and funds available to the organisation have been utilised efficiency i.e. maximum output has been obtained with minimum input?
- **Economy** (spend less) is an input measure, the resource approach to check whether the appropriate quantity and quality of inputs are available at the lowest cost?

To form an **integrated conclusion** based on the non-aligned outcomes of 3Es, the board of trustee may consider the following stepwise guidelines :

Step 1 - Whether the objectives have been achieved i.e., is the operations been effective?

Step 2A - If the answer to the question asked in step 1 is **Yes**, then ask, are the expenses within budget? Are the operations economical and efficient?

Principle for the conclusion – If the answer to both the steps 1 and 2A is Yes, then the board of trustee may conclude that value for money is served.

Note – A cost overrun can also be justified, only if the operations have been effective; provided further that all the expenses incurred are indeed justified and that the resources have been put to the best possible use.

In a given case, it is mentioned that CRF has a system of budgetary control and usually meets the budgeted target and hardly overrun the budget, hence above-mentioned note has less worth.

Step 2B – If the answer to the question asked in step 1 is **No,** then ask, is the difference from the target is marginal or huge? If the target is missed marginally then apply the decision principle stated in Step 2A, but if the target missed with a huge difference; then review the strategy.

Question 2 :

Testy Food Court (TFC) is renowned local name for all age of foodies for authentic taste and aroma. TFC has two divisions **Bake Studio** and **Hot Serve**. Both the divisions are working independently in two different kitchens of small hall building. Mr. Palash and her daughter Avnee manages the business, whereas son Subodh who is a Chartered Accountant by profession also supports the business with management consultancy.

Bake Studio division produces **cup-cake**. Cup-cake is baked in specially designed ovens and owing to lack of ovens and space in same; oven machines are considered as the bottleneck resource. Each cake requires 0.30 oven hours if oven is at 350^0C. 500 oven hours are available each month. Each cup-cake is sold for ₹ 30. The direct material cost per cake is ₹ 15. All other cost of operating ovens per month is ₹ 22,500.

Hot Serve runs like cafe with reading facility and produces only two products on alternate day basis, ***hot chocolate*** and ***latte*** which pass through two processes, beating and preparing. There are one chef and one helper apart from 3 waiters. Ms. Avnee herself manages the counter. Cafe starts at 10 AM in morning and remain open till 8 in evening. Idea is to focus customer; each cup of coffee is prepared separately at order and in accordance with specification. The requirement of time for each unit is expressed in matrix below -

Process\Product	Hot Chocolate	Latte
Beating	9.5 Minutes	7.5 Minutes
Preparing	9 Minutes	6.8 Minutes

Beating and Preparation process witness average downtime of 1.5 hours and 2.5 hours respectively on account of lunch hour of helper and chef and requisite cleaning of kitchen to maintain hygiene etc. The costs and revenue for each unit of Hot Chocolate and Latte are given below -

Particulars	Hot Chocolate	Latte
Direct Materials	40	30
Direct Labour	20	22
Variable Overhead	10	8
Absorbed Fixed Cost	10	5
Total Cost	80	65
Selling Price	100	80

Required :

TFC has adopted the backflush costing system with a raw material inventory control account and throughput accounting on Subodh's advice.

(i) Describe the feature (in brief) which distinguishes backflush accounting from other systems.

(2 Marks)

(ii) Compute the cup cake's throughput accounting ratio and interpret the results.

(2 + 4 Marks)

(iii) If maximum possible sale in a day for hot chocolate and latte is 50 and 62 cups respectively, then prepare the daily production plan that would maximise the contribution, using both throughput and traditional approaches. Also discuss appropriateness of both approaches.

(4 + 4 + 4 Marks)

Answer 2 :

(i) Backflush accounting

Back-flush accounting **helps in implementing JIT** system. It reduces the number of accounting entries by **delaying** the recording of cost until event takes place, in case of JIT even when goods are moved as finished inventory sold; **hence save costs and time.**

(ii) Throughput return per oven hour

(Sales – direct material cost) / Usage of bottleneck resource

(₹ 30 - ₹ 15) / 0.30 hours i.e. ₹ 50 per oven hour

Operating cost per oven hour

(total operating cost / bottleneck resource i.e. hrs. available)

₹ 22,500 / 500 hrs. i.e. ₹ 45 per oven hour

Throughput accounting ratio

(Throughput return per hour / cost per hour)

₹ 50 per oven hour / ₹ 45 per oven hour = **1.11 times**

<u>Interpretation</u>

Throughput accounting ratio is simply a relation between earning revenue and incurring cost in terms of battleneck, usually per unit of bottleneck activity. Throughput accounting ratio of any product if greater than one, then signify profitable business and in case ratio is less than one it means organisation loses money every time such product is produced.

In case of cup-cake unit of bake studio, throughput accounting ratio is 1.11 times which signifies business of baking cup-cakes is profitable because return is ₹ 1.11 to every rupee of cost.

Note : At this point it is worth to note, that throughput accounting and limiting factor analysis are different approaches, despite both moves around bottleneck. Throughput accounting is considered as approach to management reporting. Whereas limiting factor analysis is a financial analysis tool that supports management, to enhance revenue / contribution.

(iii) Finding the Bottleneck Operation :

Particulars	**Beating Process**	**Preparing Process**
(a) Total available time (10 AM to 8 PM)	600 minutes	600 minutes
(b) Down time [1.5 hours & 2.5 hours]	90 minutes	150 minutes
(c) Effective time available [a - b]	510 minutes	450 minutes
(d) Time per unit of Hot Chocolate	9.5 Minutes	9 Minutes
(e) Time per unit of Latte	7.5 Minutes	6.8 Minutes
(f) Total time required for maximum sale of 50 & 62 cups of HC & Latte	940 minutes [(50 x 9.5) + (62 x 7.5)]	871.6 minutes [(50 x 9) + (62 x 6.8)]
(g) Throughput Accounting Ratio [f / c]	184.31%	**193.69%**

Conclusion : As the TA Ratio of **Preparing Process** is higher, it **is the bottleneck** operation. Hence, decision of maximising contribution shall be based upon time available for preparing process.

Throughput Approach : for daily production plan to maximise total contribution

Particulars	Hot Chocolate	Latte
(a) Selling Price per unit (₹)	100	80
(b) Material Cost per unit (₹)	40	30
(c) Throughput Contribution per unit [a - b]	60	50
(d) Preparing process time per unit	9 Minutes	6.8 Minutes
(e) Contribution per minute [c / d]	6.66	7.35
(f) Ranking based on (e) above	II	I
(g) Preparing Process Time allocated as per ranking above	28.4 Minutes [Bal. Fig.]	421.6 Minutes [62 x 6.8]
(h) Possible Production units [g / d] R/off	3 units	62 units
(i) Possible throughput contribution [c x h]	₹ 180	₹ 3,100
(j) Maximum total throughput contribution	₹ 3,280	

Traditional approach : for daily production plan to maximise total contribution

Particulars	Hot Chocolate	Latte
(a) Selling Price per unit	100	80
(b) Total Variable Cost per unit	70	60
(c) Contribution per unit	30	20
(d) Preparing process time per unit	9 Minutes	6.8 Minutes
(e) Contribution per minute [c / d]	3.33	2.94
(f) Ranking based on (e) above	I	II
(g) Preparing Process Time allocated as per ranking above	450 Minutes [50 x 9]	0 Minutes [Bal. Fig.]
(h) Possible Production units [g / d] R/off	50 units	0 units
(i) Possible throughput contribution [c x h]	₹ 1,500	NIL
(j) Maximum total contribution	₹ 1,500	

Discussion :
Marginal Costing gained importance in first half of 20th century, especially in 1930's and 40's, when labour cost used to be variable largely of completely, because there were casual workers. But circumstances and labour laws has been changed significantly since then. Now the labour/workforce is largely permanent, hence ***labour cost no longer remain variable cost.*** Especially in shorter period let's say decision making for 3-6 months. Labour contracts used to have termination clause, which usually have provision of notice etc. Throughput approach gives importance to this substance and consider only material cost as real variable cost. Hence, rather than considering the contribution after deduction of all variable costs, it computes throughput contribution by reducing material cost from revenue. Hence, use of throughput costing can make decision more relevant because it considers the true nature of cost.

Overall, decision of maximisation of contribution can be taken using either the traditional or throughput contribution approach. However, appropriateness of selection among these two techniques depends on the variability of labour and variable overheads, which in turn depends on the time horizon of the decision.

Question 4(c) :

Murat District Cooperative Bank (M-DCB) was established in the year 1909, the 111-year old district cooperative bank has become the oldest among around 375 district banks in the country. Since M-DCB was established more than a century ago, hence has a traditional style of working; but bank now realised the need for change especially in its products; to survive and sustain the existing customer base, even to grow further. In the recent meeting of top-level management at M-DCB, a major discussion took place regarding the functionalities of the bank account it offers to business customers. However, no resolution has been adopted, and similar agenda will be discussed again in the next board meeting. The summary from the discussion that took place at the meeting are as under -

The executive head of the overall banking operation gave a briefing to board members about the existing features of bank account for business customers (BC). He mentioned that currently bank charges rupees 2.36 (₹2 + taxes) for each transaction at the branch (such as a deposit into the account, withdrawal from the account, electronic payments, and transfers), whereas its competitors or newly designed commercial bank offers such transactions to the business customers free of cost. Further, recent market research suggests if M-DCB does not revamp features of the bank account to business customers then it will lose 15% of existing business customers.

Currently, the bank pays interest @ 2% p.a. to the customer on any balance in the account and charge interest @ 14% p.a. on overdrawn accounts. Currently, the bank has a base of 18 lakhs business customers, who makes nearly 140 such transactions in a month period. Half of the business customers maintain the average credit balance of ₹ 1,20,000 each and the remaining half have overdrawn with an average debit balance of ₹ 45,000 each.

GM responsible for CASA operations suggested the rate of interest on credit balances shall increase by 1% p.a. and business customers shall be charged with the fixed annual account maintenance cost of ₹ 3,000 (taxes extra), to be paid in monthly instalments; in lieu of charges for transactions, to increase the base of business customers by 10%.

GM responsible for Customer Relations suggested that business customers should not be charged for transactions and at the same time, no interest shall be paid on credit balance if any maintained by the business customers if M-DCB is willing to increase business customers by 20%.

Required :

ADVISE the Board of Directors (purely based on financial perspective), whether to change the features of the account for a business customer or not. Presume the tendency of both old and new customers regarding nature of balance and number of transactions are expected to remain the same.

Student Note :

CASA operations is not defined in the question by ICAI. I feel it stands for Current Account & Savings Account operations. It is my guess work.

Answer 4(c) :

M-DCB has three possible courses of action, including status quo (keeping the features as it is) and making changes as per the suggestions of GM-CASA Operations or GM-Customer Relation.

Considering the calculation of annual income shown in annexures (I, II and III) based upon below mentioned assumptions, it is advisable to the Board of Directors to change the features of account for the business customer and adopt the suggestion of GM – CASA operations, because it results in maximum annual income to M-DCB.

Assumptions – While making the calculations it is assumed that :

1. Interest @ 14% p.a. will continue to be charged on an overdrawn account with debit balances.
2. Change in business customer base corresponding to change in features of the account, will not result in any change in staffing, administration cost or resource planning.
3. Transactions takes place throughout the year without the time value of money.
4. Customer those who close or open the account, do same on day 1 of the year (i.e. at the opening of the year).

Annexure I : Statement of annual income with status quo (keeping the features as it is)

Head	**Details**	**(₹ in Lakhs)**
Transaction Charges	(18 lakh business customers – 2.70 lakh lost business customers) x (140 transactions per month x 12 months) x ₹ 2 per transaction	51,408
Interest Income	50% of (18 lakh business customers – 2.70 lakh lost business customers) x ₹ 45,000 per customer x 14%	48,195
Interest Expenses	50% of (18 lakh business customers – 2.70 lakh lost business customers) x ₹ 1,20,000 per customer x 2%	(18,360)
Net Annual Income		**81,243**

Annexure II : Statement of annual Income as per suggestion of GM-CASA Operations

Head	**Details**	**(₹ in Lakhs)**
Transaction Charges	(18 lakh business customers + 1.8 lakh new business customers) x ₹ 3,000 per customer p.a.	59,400
Interest Income	50% of (18 lakh business customers + 1.8 lakh new business customers) x ₹ 45,000 per customer x 14%	62,370
Interest Expenses	50% of (18 lakh business customers + 1.8 lakh new business customers) x ₹ 1,20,000 per customers x 3%	(35,640)
Net Annual Income		**86,130**

Annexure III : Statement of annual income as per suggestion of GM-Customer Relation

Head	Details	(₹ in Lakhs)
Transaction Charges	(18 lakh business customers + 3.6 lakh new business customers) x ₹ 0 per customer	NIL
Interest Income	50% of (18 lakh business customers + 3.6 lakh new business customers) x ₹ 45,000 per customer x 14%	68,040
Interest Expenses	50% of (18 lakh business customers + 3.6 lakh new business customers) x ₹ 1,20,000 per customers x 0%	(NIL)
Net Annual Income		**68,040**

Question 5(a) :

Line-On Power Solutions (LPS) is producing laptop power adaptors (charger) using specially customised machine PA-C12. The management at LPS is highly concerned with the productivity of such a machine, because this machine is engaged in an activity which is a constraint function (bottleneck activity). Management of LPS constitutes a lean team with the objective of identifying the various techniques which can be used in order to enhance the overall productivity at LPS including PA-C12 especially. PA-C12 is a human-operated machine and took a standard time of 20 minutes to produce one power adaptor.

Up-till now

LPS is working in three shifts in the day for 6 days a week. Each shift is of 8 hours with a lunch break of 30 minutes and two tea breaks of 15 minutes each. Shift change downtime is 30 minutes per shift. Preventive maintenance time per shift is 10 minutes. In a week downtime was 6 hours of which 5 hours are due to breakdown maintenance and remaining hour on account of power failure.

PA-C12 works through all three shifts. During the said week 306 adaptors were produced using PA-C12, out which only 290 met the quality specifications of the QC team.

Towards lean and way forward

In order to enhance the productivity of PA-C12, management at the advice of the lean team decided to apply TPM. A three-member TPM team (which is part of a lean team) is specifically designated for PA-C12. As a result of efforts, shift changes downtime is reduced to 20 minutes. Preventive maintenance time further increased by 5 minutes per shift, but this results in a reduction of 4 hours in breakdown maintenance on a weekly basis. The workers agreed to the arrangement of a reduction of 5 minutes in each of tea break and extending the lunch break to 35 minutes.

Management is positive with the improving culture, but anxious to know the benefit out of TPM implementation and its performance in terms of improvement in productivity. TPM team which is responsible for the productivity of PA-C12 identified that in the recent week post-implementation of TPM, 320 adaptors were produced out of which 304 adaptors passed quality check.

Required :

(i) OEE can be the cornerstone of implementing TPM in Life-On Power Solution? EXPLAIN. **(4 Marks)**

(ii) ANALYSE the TPM performance in terms of effective use of PA-C12 at LPS using a relevant approach. **(6 Marks)**

Answer 5(a) :

(i) TPM (Total Productive Maintenance) is the system which, adds value by maintaining and improving the production process and ensuring, quality, continuity through men and machines. Productivity is all about the efficient and effective use of all resources. In order **to evaluate the TPM performance** in terms of effective use of PA-C12 at LPS, OEE (Overall Equipment Effectiveness) can be applied. OEE is a "best practices" metric that is productive in the true sense (with quality). OEE is measured in terms of percentage. A score of 100% represents **"perfect production"** with zero waste, zero defect, and zero downtime.

OEE can be computed either as –

(Good Count x Ideal Cycle Time) / Planned Production Time

OR

(Availability Ratio) x (Performance Ratio) x (Quality Ratio)

Availability measures the run time as a percentage of planned production time. Run time may be less than planned production time due to unplanned downtime. Unplanned downtime arises on account of loss of production time due to abnormal downtime (like breakdown or power failure etc.)

Performance measures the speed of work. It measures the relation between ideal cycle time required for actual production and run time (time consumed for actual production).

Quality can be defined as conformance to the need of customers. The product which meets the quality criteria (such customer's need) can be said, good count. Quality can be measured as the percentage of good counts to the total counts (product produced or output generated).

Seiichi Nakajima in his book, Introduction TPM (originally published in 1984 and later in 1988 translated into English) suggested that ideal values (World-Class OEE) for the OEE component measures are :

- Availability rate in excess of 90 percent
- Performance (efficiency) rate in excess of 95 percent.
- Quality rate in excess of 99 percent.

Such levels of Availability, Performance and Quality would result in an **ideal OEE scores of approximately 85 percent.**

(ii) Analysis of Present and Revised OEE :

Calculation of OEE at Present :

Particulars	Minutes/week	Minutes/week
(a) Total available time per week [8 hours/shift x 3 shifts/day x 6 days/week x 60 min.]		8,640
(b) Planned Downtime : Lunch break [30 min. x 3 shifts x 6 days] Tea breaks [15 min. x 2 x 3 shifts x 6 days] Shift change [30 min. x 3 shifts x 6 days] Preventive maintenance [10 min. x 3 x 6 days]	 540 540 540 180	 1,800
(c) Planned production time per week [a - b]		6,840
(d) Unplanned Downtime due to breakdown maintenance & power failure (6 hours x 60 min.)		360

(e) Actual operating time per week [c - d]		6,480
(f) Availability Ratio [6,480 / 6,840 x 100]		**94.74%**
(g) Standard time for actual output [306 units x 20 min.]		6,120
(h) Performance Ratio [6,120 / 6,480 x 100]		**94.44%**
(i) Quality Ratio [290 units / 306 units x 100]		**94.77%**
(j) **OEE Ratio** [f x h x i]		**84.79%**

Calculation of OEE after Lean System :

Particulars	**Minutes/week**	**Minutes/week**
(a) Total available time per week [8 hours/shift x 3 shifts/day x 6 days/week x 60 min.]		8,640
(b) Planned Downtime : Lunch break [35 min. x 3 shifts x 6 days] Tea breaks [10 min. x 2 x 3 shifts x 6 days] Shift change [20 min. x 3 shifts x 6 days] Preventive maintenance [15 min. x 3 x 6 days]	 630 360 360 270	 1,620
(c) Planned production time per week [a - b]		7,020
(d) Unplanned Downtime due to breakdown maintenance & power failure (2 hours x 60 min.)		120
(e) Actual operating time per week [c - d]		6,900
(f) Availability Ratio [6,900 / 7,020 x 100]		**98.29%**
(g) Standard time for actual output [320 units x 20 min.]		6,400
(h) Performance Ratio [6,400 / 6,900 x 100]		**92.75%**
(i) Quality Ratio [304 units / 320 units x 100]		**95.00%**
(j) **OEE Ratio** [f x h x i]		**86.61%**

Analysis :

TPM performance is positive in terms of effective use of PA-C12 at LPS because Overall Equipment Effectiveness (OEE) is improved from **84.79% to 86.61%.** There is an absolute increase of 1.82%, the relative increment is 2.15% (1.82% / 84.79%). Now OEE is beyond the ideal rate of 85% as suggested by Seiichi Nakajima. Hence, considering OEE only (rather than its individual components) it can be said that machine demonstrate the world class performance. It is important to note that both performance and quality rates are still lower than the ideal rate (world class performance), whereas availability rate still persists beyond the ideal rate and upholding the OEE beyond ideal rate of 85%.

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Summary of April, 2021 (Series II) Mock Test Paper

MTP Q. No.	Reference of similar Question from our classroom notes
1	It is a new question, hence it is covered below with answer
2	Covered in MTP - October, 2019
3	Covered in RTP - November, 2018 & Regular notes Ch.8
4(a)	Covered in November, 2020 Exam & Regular notes Ch.6
4(b)	Covered in November, 2019 Exam & PM notes Ch.13
4(c)	Covered in ICAI module & Regular notes Ch.10
5(a)	Covered in November, 2018 Exam & Regular notes Ch.7
5(b)	Covered in May, 2019 Exam & Regular notes Ch.12
6(a)	Covered in MTP - May, 2020 & PM notes Ch.2
6(b)	Taken from ICAI website & covered in PM notes Ch.11

Question 1 :

Nations' Mart is the supplier of packed grocery items to local kirana shops and departmental stores under a franchise model. Such local kirana shops and departmental stores are not an exclusive franchisee of Nations' Mart, because certain other items such as veggies, cosmetics, eggs and bread etc. which are not offered by Nations' Mart, these local kirana shops and departmental stores are free to buy from other suppliers.

Nations' Mart offers items under its own brand, they purchase these grocery items either directly from manufacturers or from their established suppliers at a significant discount, part of which it passes to such franchisee local kirana shops and departmental stores. It is estimated that such local kirana shops and departmental stores save around 8-12% (of purchase prices) on items supplied by Nations' Mart.

For inbound logistics since its establishment, Nations' Mart relies upon the manufacturer or their established suppliers and in some cases use the service of haulage contractors working on behalf of these manufacturers or suppliers. Nations' Mart purchases items into their large and multi-purpose regional warehouses. Warehouses have facilities for re-packing of items in smaller units. Each regional warehouse has designated geographical areas to serve.

Nations' Mart sales representatives conduct the meeting with each franchisee (local kirana shops and departmental stores) after every 8 weeks to decide the weekly standing order quantity for the upcoming 8 weeks. Such weekly standing orders delivered to these local kirana shops and departmental stores through specialist haulage contractors local to the regional warehouse. Such local kirana shops and departmental stores can increase the weekly order through phone or e-mail, but can't reduce their standing order requirements until the next meeting with a sales representative of Nations' Mart.

Required :

The board of directors recognised the need to review the supply chain to enhance the brand recognition of Nations' Mart and also address the issue raised by the franchisee regarding inflexible ordering and delivery system. ADVISE the board, how Nations' Mart can re-structure its supply chain presuming it keeps on supplying the re-packaged items.

(20 Marks)

Answer 1 :

The **supply chain** is a network that consists of the flow of materials, goods, and related information among manufacturers, suppliers, retailers, and consumers. The supply chain can be divided into two parts based upon flow, directions, or source and destination. Towards the supplier side, it is termed as **Upstream Supply Chain** and towards the consumer side, it is termed as **Downstream Supply Chain.**

Nations' Mart can enhance its brand recognition through Upstream Supply Chain Management in the following ways -

Process of placing the order

Nations' Mart should review the process of placing the order, **e-procurement shall be introduced** to the possible extent and information shall be shared with the manufacturers and suppliers allowing the suppliers' access to forecast demand. Which in turn reduces costs and improves the efficiency of the supply chain at suppliers' end and the same will benefit Nations' Mart for sure.

Note – This will lead to an extended value chain that will be capable to generate enhanced value.

Inbound logistics

Nations' Mart can revamp its logistics in either of the following ways -

i. Develop in-house logistics capabilities – Nations' Mart can look forward to owning the trucks and tempos to develop in-house logistics capabilities, it can apply its logo on the entire fleet, which will enhance the brand visibility.

ii. Use third-party logistics rather than manufacturers and their established suppliers and that too in conjunction with a review of its outbound logistics.

The cost of inbound logistics can be offset by reduced prices (FOB rather than CIF) by such manufacturers and their established suppliers.

Note – a detailed cost-benefit analysis should be conducted to assess whether these options are financially viable.

Outsourcing of the warehousing and re-packaging

Nations' Mart may look for an **integrated logistic partner** who also offers storage and warehousing solutions, since it will be a large contract (especially, if consolidated for all the warehousing needs of Nations' Mart), for any integrated logistic partner hence able to **negotiate a good price.**

Note – It is a strategic decision because if the warehousing and re-packaging are outsourced then Nations' Mart can strategically reposition itself and focus on brand awareness, hence further **critical evaluation of core capabilities and competencies** is required.

Nations' Mart can enhance its brand recognition and address the issue raised by franchisee regarding inflexible ordering and delivery system through Downstream Supply Chain Management in the following ways -

Shift to pull model of the supply chain

The inflexibility of the ordering and delivery system can be eliminated, if Nations' Mart shifts to the pull model of the supply chain. This enables the franchisee (local kirana shops and departmental stores) to have **flexibility while ordering (quantity and time)** to match their need as per actual demand.

Note – This may result in low overall demand, which may cause Nations' Mart **not able to get the same substantial discount** which earlier it is getting from manufacturers or from their established suppliers.

But if the existing practices are continued then Nations' Mart **may lose some of the franchisee** (local kirana shops and departmental stores), hence cost-benefit analysis is essential.

Use of IT solution

In order to streamline the downstream supply chain, Nations' Mart need to use IT solution (especially if they shift to the demand-driven system) for following purposes -

i. To collect and consolidate the orders from the local kirana shops and departmental stores for each item individually and further place the order accordingly.

ii. Use of E-POS (electronic point of sale) at local kirana shops and departmental stores to have an **overview of sales information, stock level, and customers' buying habits and trends.** This will auto streamline the ordering and distribution. This will result in extended value chain, hence, may be able to generate greater value for customer.

Note 1 - If IT is used extensively then Nations' Mart can directly reach consumers through the **E-Commerce platform.** The terms of the **franchise agreement need to be analyzed** to judge the viability of direct sales by Nations' Mart.

Note 2 – If local kirana shops and departmental stores allowed to place orders online then the **sales representative** which were earlier responsible for meeting with these local kirana shops and departmental stores **can be deployed for marketing and branding activities.**

Outbound logistics and distribution arrangements

As mentioned earlier Nations' Mart can club the contract regarding inbound and outbound logistic requirements to negotiate with the logistic contractors. In regard to outbound logistics specifically, rather than relying upon local haulage contractors for regional warehouses, Nations' Mart **can go for one single integrated logistics company.** This single contract will afford **economies of scale.**

As mentioned earlier, **own logistic abilities** can be developed by owning a fleet of vehicles which can be used for greater brand visibility by putting the logos and advertisement material on such vehicles. **Scheduling of routes** shall be done scientifically using some operation research methods such as transportation and linear programming.

Note – The costs and benefits analysis should be performed before decision on such a change.

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