Time Allowed: 3 Hours **Full Marks: 100**

The figures in the margin on the right side indicate full marks.
Where considered necessary, suitable assumptions may be made and clearly indicated in the answer.

SECTION – A : [OPERATIONS MANAGEMENT]

Answer Question No. 1 which is compulsory and any three from Questions Nos. 2, 3, 4 & 5

1. (a)

(i)	(d)
(ii)	(b)
(iii)	(a)
(iv)	(d)
(v)	(a)
(vi)	(b)
(vii)	(a)
(viii)	(c)

(b)

(i)	Five
(ii)	Process layout /Functional layout
(iii)	Process Design
(iv)	Total float

(c)

(i)	True
(ii)	True
(iii)	True

2. (a) (i) **Lean Production**

Production systems have become lean production systems which use minimum amounts of resources to produce a high volume of high quality goods with some variety. These systems use flexible manufacturing systems and multi-skilled workforce to have advantages of both mass production and jobs production (or craft production).

Lean Production aims to cut costs by making the business more efficient and responsive to market needs.

(ii) Capacity planning is mainly of two types:

(i) **Long-term capacity plans** which are concerned with investments in new facilities and equipments. These plans cover a time horizon of more than two years.

(ii) **Short-term capacity plans** which takes into account work-force size, overtime budgets, inventories etc.

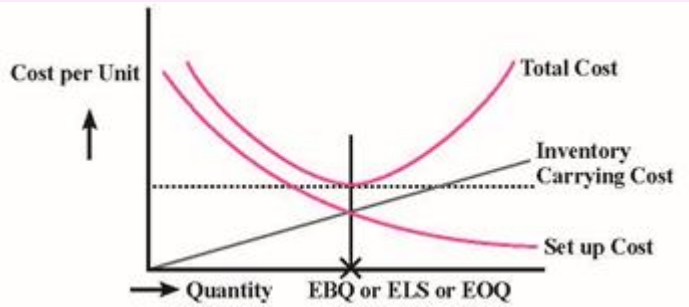
Capacity refers to the maximum load an operating unit can handle. The operating unit might be a plant, a department, a machine, a store or a worker. Capacity of a plant is the maximum rate of output (goods or services) the plant can produce.

(b) (i) **EBQ:** In inventory management, Economic Batch Quantity (EBQ) is a measure to determine the quantity of units that can be produced at the minimum average costs in a given batch.

If S is the set up cost per set up also known as Ordering Cost, 'C' is the production cost per unit produced and I is the inventory carrying or holding changes (%) and A is the annual demand for the item in units, then,

Economic Batch Quantity (EBQ)

$$= \sqrt{\frac{2AS}{C}} = \sqrt{\frac{2\times(Annual\ demand\ in\ unit)\times(Set\ up\ Cost\ per\ set\ up)}{(Production\ Cost\ per\ unit)\times(Inventory\ carrying\ charges\ (Percentage)}}$$



Economic Batch Quantity

(ii) ABC analysis is an inventory management technique that determines the value of inventory items based on their importance to the business. It groups item into three categories (A, B & C) based on their level of value within a business.

Classification	Item no.	Annual Rupee Usage	% of total
A	22,68	1,70,000	72.9%
B	27,03,82	53,000	22.7%
C	54,36,19,23,41	10,450	4.5%

3. (a) The mathematical formulation of the linear programming problem is

Maximise $Z = 7x_1 + 5x_2$

Subject to $3x_1 + x_2 \leq 48$

$2x_1 + x_2 \leq 40$

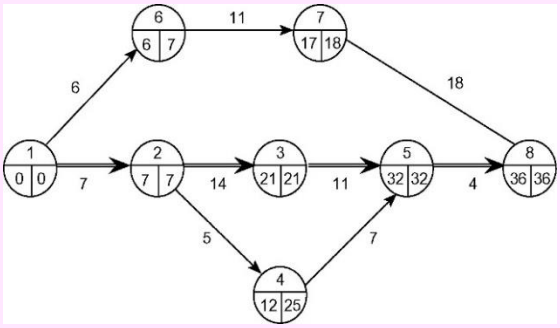
$x_1, x_2 \geq 0$

Where x_1 and x_2 denote the number of units of product A and B respectively.

(b) (i) Mean time t_e and variance δ_t^2 for each activity can be computed by using the formulae

$$t_e = \frac{1}{6}(t_o + 4tm + t_p) \text{ and } \delta_t^2 = [\frac{1}{6}(t_p - t_o)]^2$$

Activity	1-2	2-3	3-5	7-8	5-8	6-7	4-5	1-6	2-4
t_e	7	14	11	18	4	11	7	6	5
δ_t^2	4	16	14	16	1	16	4	4	1



(ii) Earliest event times and latest event times for each node are computed and are shown in the network above. The critical path is 1→ 2 → 3 → 5 → 8.
Expected time for completion of the project, E (T) = 7 + 14 + 11 + 4 = 36 days.
Project variance is obtained by summing variances of all the critical activities i.e., $\sigma_t^2 = 4 + 16 + 4 + 1 = 25$ days.

4. (a) According to the given distribution of demand, the random number coding for various demand levels is shown in table below:

Table: Determination of Random Numbers Interval

Demand	Probability	Cumulative Probability	Random number interval
0	0.01	0.01	00
10	0.20	0.01 + 0.20 = 0.21	01 – 20
20	0.15	0.21 + 0.15 = 0.36	21 – 35
30	0.50	0.36 + 0.50 = 0.86	36 – 85
40	0.12	0.86 + 0.12 = 0.98	86 – 97
50	0.02	0.98 + 0.02 = 1.00	98 - 99

The simulation experiment is now conducted for demand by taking a sample of 10 random numbers from a table of random numbers.
The simulated demand for the cakes for a period of 10 days is given in following Table

Table : Simulation Experiment Worksheet

Days	Random number	Demand
1	48	30
2	78	30
3	19	10
4	51	30
5	56	30
6	77	30
7	15	10
8	14	10
9	68	30
10	09	10
Total		220

Expected demand, on the basis of simulated data: = 220/ 10 = 22 cakes / day

(b) Percentage of working time = ((3000-500)/3000) x 100 = 83.33%
Actual working time in a study of 150 hrs = 150 x 0.8333 x 60 = 7500 min.
Production = 7000 units.
Time Required for one unit to produce = 7500 / 7000 = 1.0714 min,
So, manual time on this is 1.0714 x (3/5) = 0.643 mins and machine time is 1.0714 x (2/5) = 0.43 mins.
Normal time of labour = time of labour as per study x Rating Factor /100 = 0.643 x 120/100 = 0.772 min.
And normal time of machine = 0.43 min.
Now, if allowance is considered which is 11% of normal time which bring the standard time for the labour to produce = 0.772 x 1.11 = 0.857 min.
Hence Standard time required to produce a product = 0.857 + 0.43 = 1.286 min.
And, Standard time required to produce 49000 units = 49000 x 1.286 = 63,038 min = 1050 hrs.
Now, total available working hrs for 24 working day of 8 hrs shift of 7 labours = 1344 hrs in a month
Taking absenteeism in consideration actual working hour left = 1344 x 0.94 = 1263.4 hrs.
And
Productive efficiency of Labour = 1050/1263.4 = 0.8312 (83.12%)

5. (a) Arrive Rate = λ = 8 cars per hour

Service Rate = μ = 1 per 5 minutes, or 12 per hour

Av. no. of cars waiting in line = $L_q = \frac{\lambda^2}{2\mu(\mu-\lambda)} = \frac{8^2}{2(12)(12-8)} = 0.667$ car

Av. time cars spend in line and service = $W_s = \frac{L_q}{\lambda} + \frac{1}{\mu} = \frac{0.667}{8} + \frac{1}{12} = 0.167$ hours, or 10 minutes.

(b) Converting the frequencies to a probability distribution and determining the expected cost/month of breakdowns we get:

No. of breakdowns (x)	**Frequency in months (f)**	**Probability** $p = f/\Sigma f$	**Expected no. of breakdowns (px)**
0	2	0.083	0.000
1	8	0.333	0.333
2	10	0.417	0.834
3	3	0.125	0.375
4	1	0.042	0.168
			Total 1.710

Expected Breakdown cost per month; Expected cost = 1.710 × ₹ 2,800 = ₹ 4,788.

Preventive maintenance cost per month: -

Average cost of one breakdown/month	= ₹ 2,800
Maintenance contract cost/month	= ₹ 1,500
Total	= ₹ 4,300

Thus, preventive maintenance policy is suitable for the firm.

SECTION – B : [STRATEGIC MANAGEMENT]

Answer Question No. 6 which is compulsory and any two from Questions Nos. 7, 8 & 9

6. (a)

(i)	(ii)	(iii)	(iv)
d	a	a	b

(b)

(i)	(ii)	(iii)
False	False	True

(c)

(i)	(ii)	(iii)
Fragmented	Porter's Five Forces	Efficiency

7. (a) (i) The term strategy is derived from the Greek word strategia, meaning "generalship'. Although the word is Greek, yet the concept has its origins from the classic, The Art of War, written by Sun Tzu written about 500 BC. This is regarded as the first methodical documentation on strategy. A strategy of an organisation provides the basic framework thorough which the organisation will achieve its mission and objectives. The sole objective of a strategy is to provide competitive advantage. Strategy may be defined as the direction and scope of an organisation over the long term, which achieves advantage for the organisation through the configuration of resources within a changing environment and to fulfill stakeholder expectations. From the analysis of the characteristics of strategy one can easily understand the consequences that are likely to arise from the strategic decisions. The following are the consequence of the characteristics of strategy or strategic decisions:

- Strategic Decisions are likely to be complex in nature.
- Likely to be made in situations of uncertainty.
- Likely to demand an integrated approach.
- Manage change relationships and networks outside the organisation.
- Strategic Decisions will very often involve change in organizations.

(ii) The objectives of strategic management may be listed as under:

- To identify opportunities and adapt resources to exploit the opportunities created.

- To create opportunities by stretching the resources and competences of the organisation and capitalise them.
- To help managers to understand the key relationships among actions, context, and performance by providing the conceptual frameworks.
- To help an organisation enjoy competitive advantage.
- To sustain and improve the competitive position by the deployment and acquisition of appropriate resources and by monitoring and responding to environmental changes.
- To monitor and remain responsive to the demands of key stakeholders.
- To identify the critical success factors and meet the needs and wants of the customers.
- To avoid failure by focusing on the building blocks of competitive advantage (superior efficiency, superior quality, superior innovation and superior responsiveness to customers), instituting continuous improvement and learning, tracking the best industrial practices and using benchmarking.
- To overcome inertia and accept the changes in the ever-changing environment to remain competitive and at times to survive.
- To develop a creative and innovative attitude and to think strategically.

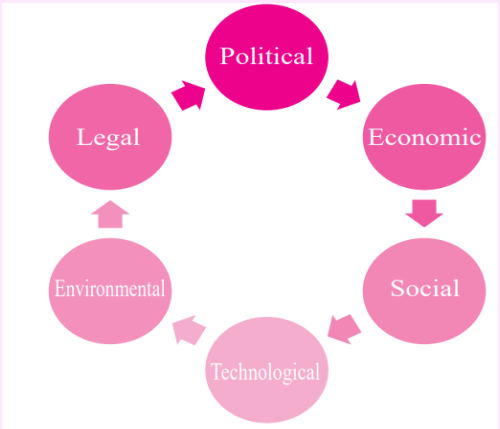
(iii) Red oceans represent all the industries that are currently in existence and are the known market space. In the red oceans, industry boundaries are defined and accepted, and the competitive rules of the game are known. Here companies try to outperform their rivals to grab a greater share of product or service demand. As the market space gets crowded, prospects for profits and growth are reduced. Products become commodities or niche, and cutthroat competition turns the ocean bloody; hence, the term "red oceans". In a red ocean market or a red ocean strategy, there is a concentrated market and will be highly competitive. These are normally found by the small but unpopular market. In a red ocean market, the competition would normally be high and the existing companies compete with each other using competitive methods. One of the examples of a red ocean company can be different automobile companies. All the various companies are competing with each other to solve the same problem or the demand faced by the consumers. A red ocean market is highly competitive and would be riskier for a new company especially a startup.

In blue oceans, competition is irrelevant as the landscape is new and unexplored. Blue ocean has been used here as an analogy to describe the

wider, deeper potential of market space that is not yet explored. A blue ocean strategy is focused more on the new trends and demands of the consumers in creating a new market based on it. Blue oceans are a more unoccupied market and not much known. The blue ocean market is mostly concentrated on providing value and is created based on that. In the blue ocean strategy, a new product or service is created which is not available in the market which would solve a problem that is already there in the market. The blue ocean market pays a lot of attention to value and innovation aspects. This is what the authors call the reconstructionist view.

Red Ocean Strategy Focus on current customers	Blue Ocean Strategy Focus on noncustomers
Compete in existing markets	Create uncontested markers to serve
Boat the competition	Make the competition irrelevant
Exploit existing demand	Create and capture new demand
Make the value-cost trade-off	Break the value-cost trade-off
Align the whole system of a firm's activities with its strategic choice of differentation or low cost	Align the whole system of a firm's activities in pursuit of differentiation and low cost.

(b) The macro-environment is the outermost and the highest-level layer. This consists of broad environmental factors that impact to a greater or lesser extent on almost all organizations. Here, the PESTEL framework can be used to identify how future trends in the political, economic, social, technological, environmental ('green') and legal environments might impinge on organisations. This PESTEL analysis provides the broad 'data' from which to identify key drivers of change. These key drivers can be used to construct scenarios of possible futures. Scenarios consider how strategies might need to change depending on the different ways in which the business environment might change.



The PESTEL framework categorises environmental influences into six main types: political, economic, social, technological, environmental and legal. Politics highlights the role of governments.

- Political processes shape a society's laws, which constrain the operations of organisations and managers and thus create both opportunities and threats. Political instability creates adverse conditions for the businesses to function. Investors rarely want to invest in countries where there is political turmoil and this in turn can be detrimental to the businesses in those regions. On the other hand, political stability and favourable government attitude towards businesses can create a lot of opportunities and is considered to be a favourable business environment.
- Macroeconomic forces affect the general health and well-being of a nation or the regional economy of an organisation which in turn affect companies' and industries' ability to earn an adequate rate of return. The four most important macroeconomic forces are the growth rate of the economy, interest rates, currency exchange rates, and inflation (or deflation) rates.
    - Economic growth tends to ease competitive pressures within an industry as it leads to an expansion in customer expenditures. This gives companies the opportunity to expand their operations and earn higher profits. On the other hand economic decline (a recession) increases competitive pressures as leads to a reduction in customer expenditures.
    - Interest rates can determine the demand for a company's products. Interest rates are important whenever customers routinely borrow money to finance their purchase of these products. Interest rates are also important because they influence a company's cost of capital, and therefore its ability to raise funds and invest in new assets. The lower the interest rates the lower the cost of capital for companies and more opportunities for investment.
    - Currency exchange rates define the comparative value of different national currencies. Movement in currency exchange rates has a direct impact on the competitiveness of a company's product.
    - Price inflation can destabilise the economy, producing slower economic growth, higher interest rates, and volatile currency movements. If inflation continues to increase, investment planning will become hazardous. The key characteristic of inflation is that it makes the future less predictable. Price deflation also has a destabilizing effect

on economic activity. If prices fall, the real price of fixed payments goes up. This is damaging for companies and individuals with a high level of debt who must make regular fixed payments on that debt.

- Social influences include changing cultures and demographics. Demographic forces are outcomes of changes in the characteristics of a population, such as age, gender, ethnic origin, race, sexual orientation, and social class. Like the other forces in the general environment, demographic forces present managers with opportunities and threats and can have major implications for organisations.
- Technological influences refer to innovations such as artificial intelligence, internet, nano-technology, or the rise of new composite materials.
- Environmental stands specifically for 'green' issues, such as pollution and waste. The environmental factors have now become extremely important for organisations as countries across the globe are increasingly concerned with the environmental changes and are striving towards clean, green and renewable sources of energy. The disposal of e –waste and global warming are also very important causes of concern. Organisations need to be more environment friendly.
- Finally legal embraces legislative constraints or changes, such as health and safety legislation or restrictions on company mergers and acquisitions.

For managers, it is important to analyse how these factors are changing now and how they are likely to change in the future, drawing out implications for the organisation. Many of these factors are linked together. Key drivers for change are the high-impact factors likely to affect significantly the success or failure of strategy. Typical key drivers will vary by industry or sector. For example, the key driver for a computer manufacturer may be technological change. Public sector managers are likely to be concerned with social change (for example, an ageing population), political change (changing government funding and policies) and legislative change (introducing new requirements). Identifying key drivers for change helps managers to focus on the PESTEL factors that are most important and which must be addressed as the highest priority.

8. (a) 1. **The Market-Advantage Test**. This test of fit with market strategy is fundamental, following Alfred Chandler's classic principle that 'structure follows strategy'. For example, if coordination between two steps in a production process is important to market advantage, then they should probably be placed in the same structural unit.

2. **The Parenting Advantage Test**. The structural design should fit the 'parenting' role of the corporate centre. For example, if the corporate centre aims to add value as a synergy manager, then it should design a structure that places important integrative specialisms, such as marketing or research, at the centre.
3. **The People Test**. The structural design must fit the people available. It is dangerous to switch completely from a functional structure to a multidivisional structure if, as is likely, the organisation lacks managers with competence in running decentralised business units.
4. **The Feasibility Test**. This is a catch-all category, indicating that the structure must fit legal, stakeholder, trade union or similar constraints. For example, after scandals involving biased research, investment banks are now required by financial regulators to separate their research and analysis departments from their deal-making departments. Goold and Campbell then propose five tests based on good general design principles, as follows:
5. **The Specialised Cultures Test**. This test reflects the value of bringing together specialists so that they can develop their expertise in close collaboration with each other. A structure fails if it breaks up important specialist cultures.
6. **The Difficult Links Test**. This test asks whether a proposed structure will set up links between parts of the organisations that are important but bound to be strained. For example, extreme decentralisation to profit accountable business units is likely to strain relationships with a central research and development department. Unless compensating mechanisms are put in place, this kind of structure is likely to fail.
7. **The Redundant Hierarchy Test**. Any structural design should be checked in case it has too many layers of management, causing undue blockages and expense. Delayering in response to redundant hierarchies has been an important structural trend in recent years.
8. **The Accountability Test**. This test stresses the importance of clear lines of accountability, ensuring the control and commitment of managers throughout the structure. Because of their dual lines of reporting, matrix structures are often accused of lacking clear accountability.
9. **The Flexibility Test.** In a fast-moving world, an important test is the extent to which a design will allow for change in the future. For instance, divisional domains should be specified broadly enough to allow divisional managers to follow new opportunities as they emerge.

Goold and Campbell's nine tests provide a rigorous screen for effective structures. But even if the structural design passes these tests, the structure still needs to be matched to the other strands of the organisation's configuration, its processes and relationships. Each strand will have to reinforce the others.

The **first four tests** stress fit with the key objectives and constraints of the organisation. That is

- The Market-Advantage Test.
- Parenting Advantage Test.
- The People Test.
- The Feasibility Test.

(b) (i)

- When an organisation embarks on a transformation journey, embracing digital technologies, two of their main objectives are to out manoeuvre competitors and attain sustainable competitive advantages or growth and prosperity. Basu (2021)
- When 'trans-created' solutions are offered by an entity to solve customers' problems, meet their latent demands, and/or simplify operating processes, that business entity starts operating in a strategically created 'blue ocean' market space in that traditional sector. The phrase 'trans-created' means creation of a new versatile product and/or related business model transforming a traditional one run by legacy systems.
- Innovative applications of digital technologies help them to implement the strategic plan and enjoy first mover's advantages. Such interplays of strategies and technologies can be termed as 'innovention', which is a combination of three tasks. viz., innovation, invention, and creation driven by distinctively formulated strategies.
- The objective is to generate and share values. Here value also includes value for time, quality, greener technology, and minimised risks, in addition to additions to organisations' profit measurable in monetary terms.
- Basu (2021) mentions that according to Bharadwaj et.al., the emerging idea on digital business strategies may be categorized under four major groups viz, scope, scale, agility, and sources of value creation.

- These would be the influencing factors for scoping digital strategies for those business entities which want to leverage digital technologies for value creation by integration of operating business processes.

Research scholars Chanias and Hess in their seminal work concluded that "Digital transformation strategies are predominantly shaped by a diversity of emergent strategizing activities of separate organisational sub communities through a bottom-up process and prior to the initiation of a holistic digital transformation strategy by top management. As a result, top management's deliberate strategies seek to accomplish the subsequent alignment of pre-existing emergent strategy contents with their intentions and to simultaneously increase the share of deliberate contents."

The triggering event for the entire process of interplay between strategy and digital technologies is identification of the emergent need(s), problem(s) and risks of customers, solution for which was a long persisting latent demand of governmental and/ or societal ecosystem.

- Such a process of identifying an opportunity for an entirely new business and revenue model can also be prompted by digital transformation while business strategies are infused into technology and vice versa.
- A business entity generates loads of data while conducting transactions at the physical marketplace. Particularly a bank generates billions of transactional data conducted with millions of customers. Such data can further be collated for transaction types, time duration, repeats for errors, geographical regions, age group, gender, range values, language, time of the day, etc. once captured.
- Cognitive tools from the stables of Artificial Intelligence, Machine Learning and Big Data Analytics, can now be used for further processing of such data.
- When done, the processed information can enable Chief Experience Officers (CXOs) to draw many inferences in the context of business that has been done and/or can be done.
- Further reflection on such information can trigger innovative thoughts to craft out new business designs that can be offered to customers through digital solutions, mode, and media. These can then be taken to the physical customers' marketplace for implementation and revenue generation. This is called the PDP Loop.

Therefore, the process of interplay starts even before formulation of strategy and/or while formulating the same.

i. Common elements of Digital Strategy

- Choose a Leader -This is arguably the most important part of creating a digital strategy, but choosing the right person will depend on company culture, structure and priorities. Whether companies place leadership with the CEO or an appointed Chief Digital Officer, the leader's influence will need to match the scope of digital strategy; otherwise, it will be difficult to create the full buy-in from each department necessary to make effective changes.
- Attack vs. Defend- McKinsey & Company emphasizes that companies would do well to categorize their potential threats and opportunities in digital business, then compare these against their own purpose. This clarifies whether a proactive or defensive stance needs to guide new initiatives.
- Take a Measured Approach - Digital strategy often incorporates a process for assessing whether new technology will really complement or grow the current business. If you fear that your company is already behind on digital, it can be tempting to rush into a project without looking at how it fits your current strategy. By taking a measured approach, you can avoid wasting resources on initiatives that don't align with your business's needs and priorities.
- Future Proof - The goal of digital transformation is to create an appropriate foundation for digital business. This means creating an organization that can continue to reinvent itself as necessary to keep up with changes in technology and customer expectations. Digital strategy should be visionary enough to carry companies through changes in the digital economy, in a way that continues to bring a digital edge to the business.

9. (a) (i) The following points regarding Big Data is essential in understanding the same

- Big data is a collection of data that is huge in volume and is growing exponentially with time.
- It is a data with so large size and complexity that none of traditional data management tools can store it or process it efficiently.

- Big data is also a data but with huge size. Examples of Big Data include stock exchange, social networking site, jet engine, etc.
- There are three types of Big Data namely, structured, unstructured and semi-structured.

⇒ A 'structured data' is any data that can be stored, accessed and processed in the form of fixed format. A lot of success has been achieved over a period of time in developing techniques for working with such kind of data (where the format is well known in advance) and also deriving value out of it.

⇒ An unstructured data is one with unknown form or structure. In addition to the size being huge, un-structured data poses multiple challenges in terms of its processing for deriving value out of it.

⇒ A semi-structured data can contain both the forms of data. Example of semi-structured data is a data represented in an XML file.

Big Data can be described by the following characteristics

- Volume – Size of data plays a very crucial role in determining value out of data. Also, whether a particular data can actually be considered as a Big Data or not, is dependent upon the volume of data. The name Big Data itself is related to a size which is enormous. Hence, 'Volume' is one characteristic which needs to be considered while dealing with Big Data solutions.
- Variety – Variety refers to heterogeneous sources and the nature of data, both structured, unstructured and semi structured. During earlier days, spreadsheets and databases were the only sources of data considered by most of the applications however, in recent period data can be in the form of emails, photos, videos, monitoring devices, PDFs, audio, etc.. These data also need to be analysed.
- Velocity – The term 'velocity' refers to the speed of generation of data and processing of data to be responsive to the needs of the customers. Big Data velocity deals with the speed at which data flows in from sources like business processes, application logs, networks, and social media sites, sensors, mobile devices, etc. The flow of data is massive and continuous.
- Variability – This refers to the inconsistency which can be shown by the data at times, thus hampering the process of being able to handle and manage the data effectively.

(ii) **The demerits of cloud computing**

In spite of the fact that cloud computing has huge benefits yet, it has its own causes of concern as follows:

Cloud security: There is a clear lack of transparency regarding how and where sensitive information entrusted to the cloud provider is handled. When relying on the cloud, organisations risk data breaches, hacking of APIs and interfaces, compromised credentials and authentication issues.

Cost unpredictability: The concept Pay-as-you-go subscription plans for cloud use, along with scaling resources to accommodate fluctuating workload demands, can make it tough to define and predict final costs.

Lack of capability and expertise: With cloud-supporting technologies rapidly advancing, organisations are struggling to keep up with the growing demand for tools and employees with the proper skill sets and knowledge needed to architect, deploy, and manage workloads and data in a cloud.

IT governance: The emphasis on do-it-yourself capability in cloud computing can make IT governance difficult, as there is no control over provisioning, de provisioning and management of infrastructure operations.

Compliance with industry laws: When transferring data from on-premises local storage into cloud storage, it can be difficult to manage compliance with industry regulations through a third party.

Management of multiple clouds: Every cloud is different, so multi-cloud deployments can disjoint efforts to address more general cloud computing challenges.

Cloud performance: Network and provider outages can interfere with productivity and disrupt business processes if organisations are not prepared with contingency plans.

Building a private cloud: Architecting, building and managing private clouds whether for its own purpose or for a hybrid cloud goal can be a daunting task for IT departments and staff.

Cloud migration: The process of moving applications and other data to a cloud infrastructure often causes complications. Migration projects frequently take longer than anticipated and go over budget.

Vendor lock-in: Switching between cloud providers can cause significant issues. This includes technical incompatibilities, legal and regulatory limitations and substantial costs incurred from sizable data migrations.

(b) Business Process Engineering may be considered to be a radical redesign of business processes often used by companies to cut costs and return to profitability. During the 1990s, recognition that the re- design of operational processes could achieve substantial efficiency gains stimulated a surge of interest in a new management tool called business process reengineering (BPR). It may be mentioned that BPR is not in itself a type of structure, but it is an effective program to implement a turnaround strategy. Hammer and Champy (1993) defined BPR as 'the fundamental rethinking and radical redesign of business processes to achieve dramatic improvements in critical contemporary measures of performance such as cost, quality, service, and speed'.

There are primarily three important reasons that lead an organisation to undertake re-engineering

- An organisation needs dramatic improvements to sustain itself and is already in deep trouble. High failure rates of products and repetitive customer complaints can be a one of the reasons that can cause huge disruption in the functioning of the organisation.
- The need for re-engineering can be felt by the management keeping in mind the imminent problems that the organisation is expected to face in the future due to some dramatic changes in the environment, both internal and external.
- There can be situations when reengineering can help organisations to be in better position than they are currently in.

BPR recognises that production and commercial processes involve complex interactions among many individuals and evolve over time with little conscious or consistent direction. According to Pates (2003) with information technology, the temptation is to automate existing processes. The key is to detach from the way in which a process is currently organized and to begin with the question: 'If we were starting afresh, how would we design this process?' Hammer and Champy (1993) point to the existence of a set of 'commonalities, recurring themes, or characteristics' that can guide BPR. These include:

- Combining several jobs into one.
- Allowing workers to make decisions.
- Performing the steps of a process in a natural order.
- Recognition that processes have multiple versions and designing processes to take account of different situations.

- Performing processes where it makes the most sense, e.g., if the accounting department needs pencils, it is probably cheaper for such a small order to be purchased directly from the office equipment store along the block than to be ordered via the firm's purchasing department.
- Reducing checks and controls to the point where they make economic sense.
- Minimizing reconciliation.
- Appointing a case manager to provide a single point of contact at the interface between processes.
- Reconciling centralization with decentralization in process design - e.g., via a shared database, decentralized decisions can be made while permitting overall coordination simply through information sharing.

BPR has resulted in major gains in efficiency, quality and speed. The following case study reveals the same.