humanperitus

Management Optional Test 1- Paper II

Detailed Solutions

Instruction Sheet for Using Model Answers:

1. *Read the model answer carefully*: Before using the model answer, make sure to read it thoroughly to understand the key points being made.

2. *Use the answer as a guide:* The model answer is not meant to be learned word for word, but rather used as a guide to help develop a comprehensive understanding of the question.

3. *Think of your own examples*: Although we have given examples, use the model answer to trigger your own thoughts and ideas, and try to think of examples and business cases from Indian companies to make the answer more relevant and specific to your context.

4. *Build your own answer:* Use the key points and ideas from the model answer as a starting point, and try to build your own answer using bullet points, diagrams, and frameworks.

5. *Practice*: Use the model answers to practice writing answers in preparation for the exam. The more you practice, the more confident and prepared you will be on exam day.

6. *Seek clarification:* If there is something in the **model answer that is not clear, don't hesitate to seek clarification from your instructor. Contact us at contact@humanperitus.com**

HUMAN PERITUS

Ph +91 97177 81110
contact@humanperitus.com
www.humanperitus.com

Are you targeting the **UPSC Civils Exam with a Management optional** in 2023 or 2024?

The preparation plan at Human Peritus has 5 components:

1. *Coaching classes* for approximately 350-400 hours to cover 100% of the syllabus. (View a few videos on our website to assess the style and quality of teaching.)

2. Special *numerical classes* for around 25 identified topics frequently asked in exams, such as CPM-PERT, Aggregate Planning, Capital Budgeting, Accounting, Hypothesis Testing, ANOVA Decision tree, etc.

3. *Printed booklets* to cover the entire syllabus. (Examine the sample booklets on our website to assess the quality of content.)

4. Detailed solutions for every *PYQ question from 2000 to 2023*. (Check out sample PYQs in the middle of this page.)

5. *Mock test papers* and answer writing practice. (Evaluate the quality of our mock tests on the website.)

By following this **5 points approach** for approx. one year, you can rely on us completely for 100% coverage and the confidence to face any possible question in the actual UPSC exam. Our promise is that the Management optional is our responsibility. You can focus on the GS paper.

If you're interested, please contact our team through the website of HUMAN PERITUS (https://humanperitus.in/).

HUMAN PERITUS

Ph +91 97177 81110
contact@humanperitus.com
www.humanperitus.com

Section A

1. (a) Describe the characteristics of a Bernoulli process. How is a Bernoulli process associated with the binomial distribution? (10)

A Bernoulli process is a discrete time stochastic process that models a sequence of independent and identically distributed binary outcomes (i.e., either success or failure) over time. The following are the characteristics of a Bernoulli process:

- *Independent Trials:* Each trial in a Bernoulli process is independent of all previous trials.
- *Binary Outcome:* Each trial in a Bernoulli process results in either a success or a failure, represented by 1 or 0, respectively.
- *Same Probability of Success:* The probability of success in each trial remains constant throughout the process.
- *Discrete Time:* A Bernoulli process models a sequence of events over discrete time periods.

The binomial distribution is closely associated with the Bernoulli process. If a Bernoulli process has a fixed probability of success (p) in each trial, then the number of successes in n trials follows a binomial distribution with parameters n and p. The binomial distribution models the probability of obtaining exactly k successes in n independent trials of a Bernoulli process.

Therefore, the Bernoulli process and the binomial distribution are interrelated, as the Bernoulli process models the underlying process generating binary outcomes, and the binomial distribution models the distribution of the number of successes in a fixed number of trials.

1. (b) What is Rapid Application Development (RAD)? Describe the tools that are commonly included in RAD packages. What capabilities can they provide? (10)

Rapid Application Development (RAD) is a software development methodology that emphasizes speed and agility in delivering functional software applications. The goal of RAD is to rapidly create functional prototypes and iteratively refine them into a final product.

RAD packages typically include the following tools:

- *Visual modelling tools:* These tools allow developers to quickly create and model applications using visual diagrams, such as flowcharts and UML diagrams. This allows developers to quickly visualize the functionality and design of the application before writing code.
- *Component libraries:* RAD packages often include pre-built components and libraries that can be easily integrated into the application. This allows developers to quickly add functionality to the application without having to write code from scratch.
- *Code generators:* RAD tools often include code generators that can automatically generate code based on the visual models and components used in the application. This helps to speed up the development process and reduce the amount of manual coding required.
- *Debugging and testing tools:* RAD packages often include debugging and testing tools that can help developers quickly identify and resolve issues in the application.

These tools can provide the following capabilities to RAD developers:

- *Rapid prototyping:* RAD tools allow developers to quickly create functional prototypes that can be tested and refined.

- *Reduced development time:* By using pre-built components, code generators, and visual modelling tools, RAD can significantly reduce the amount of time it takes to develop software applications.
- *Improved collaboration:* RAD tools can facilitate collaboration between development teams, business stakeholders, and end-users, enabling them to work together to design, test, and refine the application.
- *Faster time-to-market:* By reducing development time and improving collaboration, RAD can help organizations get their products to market faster.

In summary, RAD is a software development methodology that emphasizes speed and agility in delivering functional software applications. RAD packages include visual modelling tools, component libraries, code generators, and debugging and testing tools, which provide capabilities for rapid prototyping, reduced development time, improved collaboration, and faster time-to-market.

1. (c) (i) What is the central limit theorem? Does the central limit theorem specify that individual cases follow a normal distribution?
(ii) Why is it correct to say, "We are 95% sure that the population mean is between Rs 15.85 and Rs 19.36" but not proper to say, "The probability is 0.95 that the population mean is between Rs 15.85 and Rs 19.36"? (5+5)

(i) The central limit theorem (CLT) states that, given a large enough sample size, the sum of independent and identically distributed random variables will approach a normal distribution, even if the original individual random variables have a different distribution.
An example to illustrate the central limit theorem could be a scenario where you have a factory producing light bulbs, and you want to know the average lifespan of these light bulbs. You can't test every single light bulb produced, so you randomly select a sample of 50 light bulbs and measure their lifespans.
Suppose the lifespans of these light bulbs are not normally distributed, and instead follow a skewed distribution. But if you repeat the process of selecting a sample of 50 light bulbs and measuring their lifespans, and keep track of the average lifespan for each sample, you'll find that the distribution of these sample averages approaches a normal distribution as the sample size increases.
This is because, according to the central limit theorem, the sum of many independent and identically distributed random variables will approach a normal distribution, regardless of the shape of the original distribution. So, even though the lifespans of individual light bulbs may not follow a normal distribution, the average lifespan of a large enough sample of light bulbs will approach a normal distribution, and this allows you to make inferences about the population of light bulbs based on a sample.

No, the central limit theorem does not specify that individual cases follow a normal distribution. The central limit theorem states that the distribution of the sum or average of a large number of independent, identically distributed random variables approaches a normal distribution, regardless of the shape of the original distribution.
In other words, even if the individual cases have a different distribution, the average of a large number of cases will tend to have a normal distribution. The central limit theorem is a fundamental concept in statistics and has important implications in areas such as hypothesis testing, estimation, and quality control.

(ii) It is not proper to say "The probability is 0.95 that the population mean is between Rs 15.85 and Rs 19.36" because probabilities only apply to events, not to parameter values. The statement implies that there is a single, fixed probability of 0.95 that the population mean is exactly equal to some value within the interval of Rs 15.85 and Rs 19.36, which is not a well-defined concept in statistics.

In contrast, saying "We are 95% sure that the population mean is between Rs 15.85 and Rs 19.36" is correct because it refers to a confidence interval. A confidence interval is a range of values that we are confident contains

the true population mean with a certain level of confidence, such as 95%. The interpretation of a 95% confidence interval is that if we were to repeat the sample many times and construct a confidence interval for each sample, we would expect the true population mean to be contained within the interval in approximately 95% of the cases.

In conclusion, the first statement correctly conveys the concept of a confidence interval, while the second statement misinterprets the concept of probability in the context of estimating population parameters.

1. (d) (i) List the assumptions of the basic single-server queuing model (Model A, or M/M/1).
(ii) Harish bakery prepares all its cakes between 4 a.m. and 6 a.m. so they will be fresh when customers arrive. Day-old cakes are virtually always sold, but at a 50% discount off the regular Rs 10 price. The cost of baking a cake is Rs 6, and demand is estimated to be normally distributed, with a mean of 25 and a standard deviation of 4. Find out the optimal stocking level. (5+5)

(i) The basic single-server queuing model, also known as Model A or M/M/1, makes the following assumptions:
- *Poisson Arrivals:* Customers arrive at the system according to a Poisson process, meaning that the inter-arrival times between customers are exponentially distributed.
- *Exponential Service Times:* Service times for customers are also exponentially distributed.
- *Single Server:* There is only one server available to serve customers, and customers are served on a first-come, first-served basis.
- *No Balking or Reneging:* Customers do not leave the system before being served and do not leave after entering the queue and waiting for service.
- *No Customer Storage:* There is no limit to the number of customers that can be waiting in the queue, but customers are not stored in the system and are served immediately upon arrival.
- *No Priorities:* All customers have the same priority, and there is no differentiation in terms of priority among customers.
- *Stationary Process:* The arrival and service processes are stationary, meaning that their statistical properties do not change over time.

(ii) σ_d = standard deviation= 4 cakes, $\bar{d}$ = average daily demand = 25 cakes, Cost price = ₹ 6, Selling price = ₹ 10

Salvage value = 50% of sales price = ₹ 5

Cost of overage, C_e = Cost price – Salvage value = 6 – 5 = 1

Cost of shortage, C_s = Sales price – Cost price = 10 – 6 = 4

Service level $= \frac{C_s}{C_e + C_s} = \frac{4}{1 + 4} = 0.80 = 80\%$

z at 80% service level = 0.84

Optimal order quantity $= \bar{d} + z\sigma_d = 25 + (0.84 \times 4) = 28.36$ cakes.

1. (e) Identify five people, along with their contributions, who have contributed to the theory and techniques of Operations Management. (10)

1. *W. Edwards Deming* - W. Edwards Deming was an American engineer and statistician who made significant contributions to the field of operations management, particularly in the area of quality control and continuous improvement. He is best known for his work in the field of Total Quality Management (TQM), where he advocated for a focus on improving processes and empowering workers to drive quality improvements. He also introduced the concept of the "PDCA cycle," which stands for Plan, Do, Check, Act and is a widely used method for continuous improvement.
2. *Eliyahu M. Goldratt* - Eliyahu M. Goldratt was an Israeli physicist and business management consultant who is best known for his contributions to the field of operations management, specifically

in the area of production and inventory management. He is the creator of the Theory of Constraints (TOC), which is a management philosophy that focuses on identifying and managing bottlenecks in production processes to improve efficiency and productivity.

3. *Michael E. Porter* - Michael E. Porter is a Harvard Business School professor who has made significant contributions to the field of operations management, specifically in the area of strategy and competitiveness. He is best known for his work on the Five Forces model, which provides a framework for analyzing the competitiveness of an industry and developing strategies for success. He has also made important contributions to the field of supply chain management and has written extensively on the role of operations in creating and sustaining competitive advantage.

4. *Edward A. Chase* - Edward A. Chase is a professor of operations management and has made significant contributions to the field of operations management, specifically in the area of manufacturing and supply chain management. He is best known for his work on the concept of "lean production," which is a production system that emphasizes the elimination of waste in all aspects of production. He has written extensively on the principles and practices of lean production and has provided guidance to organizations on how to implement these principles.

5. *Joseph M. Juran* - Joseph M. Juran was an American engineer and business consultant who made significant contributions to the field of operations management, specifically in the area of quality control and management. He is best known for his work on the "Juran Trilogy," which consists of three elements of quality management: quality planning, quality control, and quality improvement. He also developed the concept of the "quality cost," which refers to the costs associated with poor quality and the benefits of improved quality. He has written extensively on the principles and practices of quality management and has provided guidance to organizations on how to implement these principles

2. (a) The Vice President for Human Resources for a large manufacturing company noticed an increase in absenteeism that he thinks is related to the general health of the employees. Four years ago, in an attempt to improve the situation, he began a fitness program in which employees exercise during their lunch hour. To evaluate the program, he selected a random sample of eight participants and found the number of days each was absent in the six months before the exercise program began and in the last six months. Below are the results. At the 0.05 significance level, can he conclude that the number of absences has declined? Estimate the p-value. (15)

Employee	Before	After
1	6	5
2	6	2
3	7	1
4	7	3
5	4	3
6	3	6
7	5	3
8	6	7

Null and Alternate hypothesis.

$H_0 = \mu_d \leq 0$

and $H_1 = \mu_d > 0$

From the data, $\bar{d} = 1.75$, s = 2.9155

Test Statistics, $t = \dfrac{1.75}{\frac{2.9155}{\sqrt{8}}} = 1.698$

Critical value of $t_{\propto} = 1.895$

Because our t is less than $t_{\propto}$.

Do not reject the null hypothesis (H_0).

There is no difference in the mean number of absences.
P value is: $0.05 < P < 0.10$

2. (b) Once a candidate is selected after clearing all stages of written, interview, group discussion, the Indian Air Force conducts a physical examination to assess the physical suitability of the candidate. It involved the number of activities, which are listed in the table. The average time of each activity is also given in minutes.

Activity	Average time
Medical history	10
Blood tests	8
Eye examination	5
Measurements (e.g., weight, height, blood pressure)	7
Medical examination	16
Psychological interview	12
Exit medical evaluation	10

These activities can be performed in any order, but there are two exceptions. The Medical history must be taken first, and Exit medical evaluation is last. At present, there are three paramedics and two physicians on duty during each shift. Only physicians can perform exit evaluations and conduct psychological interviews. Other activities can be carried out by either physicians or paramedics.
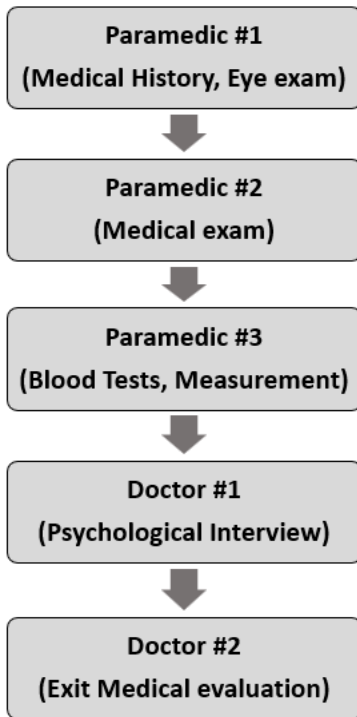**(i) Develop a layout with a precedence diagram and balance the line.**
(ii) How many candidates can be evaluated per hour?
(iii) Which activity accounts for the current bottleneck?
(iv) What is the total idle time per cycle and balance delay? (6+3+3+3)

(i)

(ii) The bottleneck in the layout is medical examination which takes 16 minutes, the turnover of patients per hour is $\frac{60}{16} = 3.75$ patients.

(iii) The bottleneck in the current layout is medical examination which takes 16 minutes.

(iv)

Workstations	Allocation	Idle time
Paramedics 1	Medical history (10) + Eye examination(5)	16- (10+5) = 1
Paramedics 2	Blood tests (8) + Measurements(7)	16- (8+7) = 1
Paramedics 3	Medical examination (16)	16-16=0
Physician 1	Psychological interview(12)	16-12= 4
Physician 2	Exit medical evaluation (10)	16-10 = 6

Total Idle time = 1+1+0+4+6 = 12
Sum of Task times = 10+5+8+7+16+12+10 = 68
Efficiency = 68/ (5×16) = 85%
Balance Delay = 1-0.85 = 15%

2. (c) During June 2021, the income tax return filing portal of Income Tax Department witnessed technical glitches for several weeks. The portal was developed by one of major IT companies named Infosys. What are key challenges for development of e-Governance projects? Which challenges are unique to country like India? How these challenges should be addressed? (20)

The key challenges for the development of e-Governance projects include:
- *Technical Challenges-* including lack of standardization, outdated technology, and limited infrastructure.
- *Organizational Challenges* - including lack of coordination between government departments, resistance to change, and limited capacity.
- *Financial Challenges* - including limited budget allocation for e-Governance initiatives, and difficulty in securing sustainable funding.
- *Legal and Regulatory Challenges* - including a lack of clear regulations and policies, and difficulties in protecting citizens' data privacy.

In India, some unique challenges include:
- *Digital Divide* - including low Internet penetration and unequal access to technology in rural and remote areas.
- *Language Barriers* - with a large population speaking regional languages, it can be difficult to develop e-Governance initiatives that cater to everyone.
- *Resistance to Change* - there can be a cultural resistance to embracing new technologies and processes.

To address these challenges, the following steps can be taken:
- Invest in technology infrastructure and human resources to ensure that the necessary technological capabilities are in place.
- Foster inter-departmental coordination and collaboration to ensure that e-Governance initiatives are developed and implemented in a holistic manner.
- Ensure sustainable funding for e-Governance initiatives to ensure their long-term viability.
- Develop and enforce clear regulations and policies to ensure citizens' data privacy and security.
- Address the digital divide by investing in technology infrastructure and digital literacy programs in rural and remote areas.
- Foster cultural change and awareness by engaging with citizens and stakeholders, and addressing their concerns and needs.

3. (a) Karnal's machine shop sells a variety of tractors for agricultural purposes. A farmer wants to purchase a Mahindra JIVO 474 DI tractor from the shop. The model JIVO 474 DI sells for Rs 1,80,000, but the shop is out of this model. The farmer says he will wait for the shop to get a model JIVO 474 DI in stock. The owner of Karnal's machine shop knows that there is a wholesale market for JIVO 474 DI from which he can purchase. The owner can buy an JIVO 474 DI today for Rs 1,50,000, or he can wait a day and buy an JIVO 474 DI (if one is available) tomorrow for Rs 1,25,000. If at least one JIVO 474 DI is still available tomorrow, the owner can wait until the day after tomorrow and buy an JIVO 474 DI (if one is still available) for Rs 1,10,000.

There is a 0.40 probability that there will be no model JIVO 474 DI available tomorrow. If there are model JIVO 474 DI available tomorrow, there is a 0.70 probability that by the day after tomorrow, there will be no model JIVO 474 DI available in the wholesale market. Three days from now, it is certain that no model JIVO 474 DI will be available on the wholesale market. What is the maximum expected profit that the owner of shop can achieve? What should the owner do? (10)

Cost of buying tractor today = Rs. 1,50,000
Selling price = Rs. 1,80,000
Today expected profit = 1,80,000 – 1, 50,000 = Rs. 30,000
Tomorrow expected profit = $(1,80,000 – 1,25,000) \times (1 – 0.4)$ = Rs. 33,000

Day after tomorrow expected profit = $(1,80,000 – 1,10,000) \times (1 – 0.7)$ = Rs, 21,000

Maximum expected profit is tomorrow and its value is Rs. 33,000

So, the owner should wait for 1 day and buy tomorrow.

3. (b) Demand at Manali Trails Ski Resort has a seasonal pattern. Demand is highest during the winter, as this is the peak ski season. However, there is some ski demand in the spring and even fall months. The summer months can also be busy as visitors often come for summer vacation to go hiking on the mountain trails. The owner of the Resort would like to make a forecast for each season of the next year. Total annual demand has been estimated at 4000 visitors. Given the last two years of historical data, what is the forecast for each season of the next year? (5)

Season	Visitors	
	Year 1	Year 2
Fall	200	230
Winter	1400	1600
Spring	520	580
Summer	720	831

Average demand for each season:

Year 1 = $\frac{2840}{4}$ = 710

Year 2 = $\frac{3241}{4}$ = 810.25

Seasonal index for each season

Season	Year 1	Year 2
Fall	$\frac{200}{710}$ = 0.282	$\frac{230}{810.25}$ = 0.284
Winter	$\frac{1400}{710}$ = 1.972	$\frac{1600}{810.25}$ = 1.975
Spring	$\frac{520}{710}$ = 0.732	$\frac{580}{810.25}$ = 0.716
Summer	$\frac{720}{710}$ = 1.014	$\frac{831}{810.25}$ = 1.026

Average seasonal index for each season:

Season	Average Seasonal Index
Fall	$\frac{0.282+0.284}{2}$ = 0.283
Winter	$\frac{1.972+1.975}{2}$ = 1.973
Spring	$\frac{0.732+0.716}{2}$ = 0.724
Summer	$\frac{1.014+1.026}{2}$ = 1.020

Average demand per season = $\frac{4000}{4}$ = 1000

Forecast for each season of the next year:

Season	Forecast
Fall	0.283×1000 = 283
Winter	1.973×1000 = 1973
Spring	0.724×1000 = 724

Summer	$1.020 \times 1000 = 1020$

3. (c) (i) Explain the term 'concurrent engineering'. Why is it important? What is reverse engineering?
(ii) What is the purpose of phantom bills, K-bills, and modular bills of material? Explain each of them.
(5+5)

(i) Concurrent engineering refers to an approach in product development where multiple departments and design disciplines work together in parallel throughout the design process, rather than working sequentially. This approach allows for the identification and resolution of potential problems early in the design process, leading to a more efficient and effective product development cycle.

Concurrent engineering is important because it enables organizations to bring products to market faster and with greater efficiency. By working collaboratively, teams can identify and resolve problems early on, which reduces the risk of delays and unexpected costs. Additionally, concurrent engineering can help organizations to deliver higher-quality products that meet customer requirements and expectations.

Reverse engineering refers to the process of taking apart a finished product to analyze and understand its design and construction. This information can be used to improve the product, create compatible products, or duplicate the product.

(ii) Phantom bills, K-bills, and modular bills of material are tools used in manufacturing and production to help manage the flow of materials and components in a production system.
Phantom Bills: A phantom bill of material (BOM) is a virtual BOM that represents a sub-assembly or sub-component that is not physically manufactured or assembled, but is used to represent a complex component in the production process. The purpose of a phantom BOM is to simplify the tracking of parts and materials, as well as to break down a complex component into smaller and more manageable parts.
K-Bills: A K-bill is a type of BOM that is used in just-in-time (JIT) production systems. A K-bill contains only the necessary components and materials needed for a particular production run, rather than a complete list of all the components and materials required for a product. The purpose of a K-bill is to reduce inventory levels and improve production efficiency.
Modular Bills of Material: A modular bill of material (BOM) is a type of BOM that represents a product in terms of modular components and sub-assemblies, rather than as a single, integrated unit. The purpose of a modular BOM is to make it easier to track the components and materials used in a product, as well as to make it easier to update or modify the product as needed. Additionally, a modular BOM can be used to create products with interchangeable components, which can simplify production and reduce inventory levels.

3. (d) Vishal produces 300 units of a product per hour and 30 units are needed to fill a container. It takes 15 minutes to receive the materials needed from the previous workstation, in an assembly line. The company currently uses a safely stock of 10 percent. Determine the number of kanbans needed between Vishal's station and the previous process. (10)

D = 300 units per hour
We need to add 10% safety stock
So D per minute will be
= 5 units per minute + 10% safety stock
= 5.5 units/minute
T = 15 minutes
C = 30 units per container

$N = \frac{5.5 \times 15}{30} = 2.75$ containers

3. (e) The electricity department of a small town tracks the consumer complaints received per week.

Week	No. Of complaints
1	4
2	5
3	4
4	11
5	3
6	9

(i) What type of control chart would you use to monitor this process? Give Reasons.
(ii) What are the three-sigma control limits for this process? Assume that the historical complaint rate is unknown.
(iii) Is the process in control, according to the control limits? Why or why not?
(iv) Assume that the historical complaint rate has been four calls a week. What would the 3-sigma control limits for this process be now? Has the process been in control according to the control limits? (3+5+4+3)

(i) We will use a 'c' chart. A c chart, also known as a count chart, is used in statistical process control to monitor the number of defects/complaints or nonconformities in a constant sample size of a product or process. It helps to detect any unusual increases in the number of defects, indicating potential problems with the process and allowing for corrective actions to be taken.

(ii) Mean number of complaints, $\bar{c} = \frac{4+5+4+11+3+9}{6} = 6$
Control Limit, CL = $\bar{c}$ = 6
Upper Control Limit, UCL = $\bar{c} + 3 \times \sqrt{\bar{c}} = 13.35$
Lower Control Limit, LCL = $\bar{c} - 3 \times \sqrt{\bar{c}} = 0$ (because we get -1.35)

(iii) Yes, the number of complaints is within control limit for all 6 weeks.

(iv) Historic mean number of complaints, $\bar{c} = 4$
Upper Control Limit, UCL = $\bar{c} + 3 \times \sqrt{\bar{c}} = 10$
Lower Control Limit, LCL = $\bar{c} - 3 \times \sqrt{\bar{c}} = 0$ (because we get -2)
No, the number of complaints is not within control limit on fourth week.

4. (a) Professor J.K. Mitra teaches two sections of Strategic Management at FMS Delhi, which combined will result in 130 final exams to be graded. Professor Mitra has two teaching assistants (TAs), Juhi and Ankur, who will grade the final exam. There is a three-day period between the time the exam is administered and when final grades must be posted. During this period Juhi has 14 hours available and Ankur has 12 available hours to grade the exams. It takes Juhi an average of 8.4 minutes to grade an exam, and it takes Ankur 15 minutes to grade an exam; however, Juhi's exams will have errors that will require Professor Mitra to ultimately regrade 12% of his exams, while only 5% of Ankur's exams will require regrading. Professor Mitra wants to know how many exams to assign to each TA to grade in order to get all of them graded, but he also wants to minimize the number of exams that he will be required to

regrade. Formulate a linear programming model for this problem. Solve this model using graphical analysis. (15)

Exams graded by Juhi $= x_1$
Exams graded by Ankur $= x_2$
Minimize $z = 0.12x_1 + 0.05x_2$
Subject to $x_1 + x_2 = 120$
$8.4x_1 \le 14 \times 60$
$15x_2 \le 12 \times 60$
$x_1 \ge 0, x_2 \ge 0$
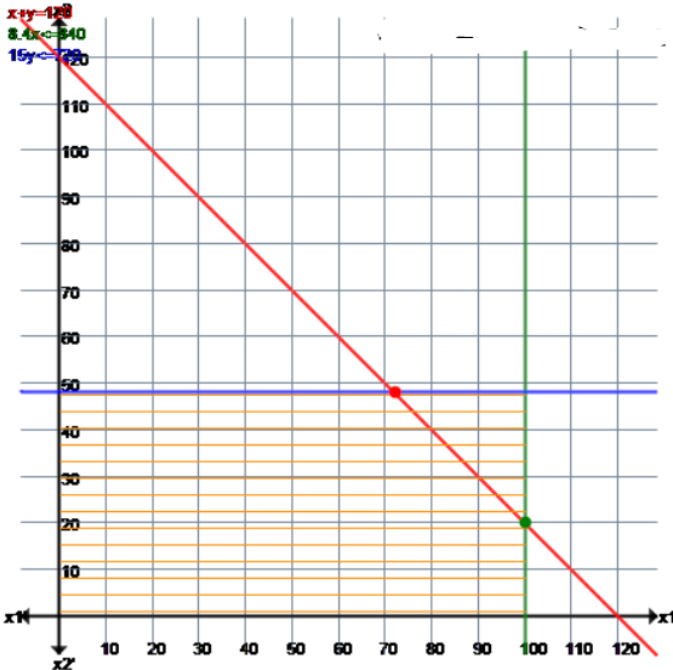
Corner points are (72, 48) and (100, 20),
The value of z is minimized at (72, 48)
Juhi will grade 72 exam and Ankur will grade 48 exams.
Minimum $z = 0.12 \times 72 + 0.05 \times 48 = 8.64 + 2.4 = 11.04$

4. (b) A regional distributor purchases discontinued appliances from various suppliers and then sells them on demand to retailers in the region. The distributor operates 5 days per week, 52 weeks per year. Only when it is open for business can orders be received. Management wants to re-evaluate its current inventory policy, which calls for order quantities of 440 counter-top mixers. The following data are estimated for the one product, mixer:
Average daily demand = 100 mixers
Standard deviation of daily demand = 30 mixers
Lead time = 3 days
Holding cost = Rs 9.40/unit/year
Ordering cost = Rs 35/order
Cycle-service level = 92 percent
The distributor uses a continuous review system.
(i) What order quantity Q, and reorder point, R, should be used?
(ii) What is the total annual cost of the system?

(iii) If on-hand inventory is 40 units, one open order for 440 mixers is pending, and no backorders exist, should a new order be placed? (5+3+2)

(i) Annual demand, D = (5 days/week) (52 weeks/year) (100 mixers/day) = 26000 mixers/year

$$EOQ = \sqrt{\frac{2DS}{H}} = \sqrt{\frac{2 \times 26000 \times 35}{9.40}} \approx 440 \text{ mixers}$$

The standard deviation of the distribution of demand during lead time is

$\sigma_{dLT} = \sigma_d \sqrt{L} = 30 \sqrt{3} = 51.96$

At 92% cycle-service level corresponds to z = 1.41

Safety stock = z σ_{dLT} = 1.41 × 51.96 ≈ 73 mixers

Average demand during the lead time, $\overline{dL} = 100 \times 3 = 300$ mixers

Reorder point, R = Average demand during the lead time + Safety stock

= 300 + 73 = 373 mixers

With a continuous review system, Q = 440 and R = 373

(ii) Total annual cost for the Q systems is

$C = \frac{Q}{2} \times H + \frac{D}{Q} \times S + H \times$ Safety stock)

$= \frac{440}{2} \times 9.40 + \frac{26000}{440} \times 35 + 9.40 \times 73 = $ Rs. 4822.38

(iii) Inventory position, IP = On hand inventory + Scheduled receipts – Backorders

= 40 + 440 – 0 = 480 mixers

Since, inventory position exceeds reorder point, do not place a new order.

4. (c) The Information Systems plan should be linked to the strategic plan for the overall organization. Why is this important? Discuss the role of the Chief Information Officer (CIO) and the implications of this role to the objectives of the form. (10)

Let's say that a company's overall strategic plan is to increase sales by 20% in the next three years. To achieve this goal, the company needs to invest in technology that will improve its customer relationship management (CRM) system and make it easier for customers to purchase products online.

In this scenario, the Information Systems (IS) plan should align with the overall organizational strategy by incorporating technology investments and initiatives that support the goal of increasing sales. For example, the IS plan may include upgrading the company's CRM system, improving the online purchasing process, and investing in data analytics tools to help the company better understand its customers and their buying behaviours.

Therefore, Linking the information systems plan to the overall organizational strategic plan is important. It ensures that the goals and objectives of the information systems are aligned with the overall direction and goals of the organization. This alignment helps to ensure that the information systems are being used to support the organization's strategic goals and objectives.

The Chief Information Officer (CIO) plays a crucial role in linking the IS plan to the overall organizational strategy. The CIO is responsible for developing and implementing the IS plan, and for ensuring that the technology investments and initiatives in the IS plan support the company's goal of increasing sales by 20%. The CIO also ensures that the IS plan is updated regularly to reflect changes in the company's goals and strategies.

The role of the CIO has significant implications for the objectives of the organization. For example, if the CIO fails to align the IS plan with the overall organizational strategy, the company may invest in technology that does not support its goal of increasing sales. On the other hand, if the CIO successfully links the IS plan to the overall organizational strategy, the company is more likely to achieve its goal of increasing sales by 20% in the next three years.

In conclusion, linking the IS plan to the overall organizational strategy is important because it ensures that technology investments and initiatives are aligned with the organization's goals and objectives. The role of the CIO is critical in ensuring that the IS plan supports the overall organizational strategy and that technology resources are used effectively to support the organization's goals.

4. (d) (i) What is the difference between authorized and authenticated users?
(ii) Identify the five factors that contribute to the increasing vulnerability of information resources and how a firm can address these vulnerabilities?
(iii) What is big data? Identify three characteristics associated with big data. What is Hadoop? (5+5+5)

(i)

Authorized Users	Authenticated Users
Users who have been granted permission to access a system, network, or application	Users who have been verified as having the appropriate credentials to access a system, network, or application
Users who have been granted the right to perform specific tasks or access specific resources	Users who have successfully provided their credentials, such as a username and password, and have been verified as having the appropriate permissions
Authorized users have been granted access based on a set of predefined rules and policies	Authenticated users have been verified as having the appropriate credentials and are allowed to access the system, network, or application

In other words, authorized users are those who have been granted the right to access a system or resource, while authenticated users are those who have successfully provided the necessary credentials and have been verified as having the right to access that system or resource. Authorization and authentication are two distinct steps in the process of granting access to a system, network, or application.

(ii) The five factors that contribute to the increasing vulnerability of information resources are:
1. *Complexity of systems:* As systems become more complex, it becomes more difficult to secure them against threats.
2. *Interconnectivity:* The increasing interconnectedness of systems and networks makes it easier for threats to spread from one system to another.
3. *Dependence on technology:* As organizations become increasingly dependent on technology, they become more vulnerable to attacks that target technology.
4. *Insufficient security measures:* Organizations may not have adequate security measures in place to protect their information resources.
5. *Human error:* People can make mistakes that can lead to vulnerabilities, such as weak passwords, falling for phishing scams, or leaving sensitive information in unsecured locations.

To address these vulnerabilities, a firm can:
- *Implement strong security measures:* This includes using strong passwords, encrypting sensitive information, and regularly updating software to fix vulnerabilities.
- *Educate employees:* Train employees on how to recognize and avoid security threats and what to do if they encounter one.

- *Conduct regular risk assessments:* Assess the organization's security posture and identify potential vulnerabilities.
- *Regularly update security measures:* Regularly update software and systems to fix vulnerabilities and protect against new threats.
- *Work with security experts:* Partner with security experts to ensure that the organization's security measures are effective and up to date.

(iii) Big data refers to extremely large and complex data sets that traditional data processing and management techniques are unable to handle effectively. It is characterized by volume, velocity, and variety.
Three characteristics associated with big data are:

1. *Volume:* Big data refers to the large amount of data generated by various sources such as social media, IoT devices, and online transactions.
2. *Velocity:* The speed at which big data is generated and processed is extremely high, making it challenging for traditional systems to keep up.
3. *Variety:* Big data comes in many forms, including structured data (e.g., databases), semi-structured data (e.g., XML files), and unstructured data (e.g., images and text).

Hadoop is an open-source software framework used for storing and processing large amounts of data. It was developed by the Apache Software Foundation and is designed to scale up from a single server to thousands of machines, each offering local computation and storage. Hadoop's main component, the Hadoop Distributed File System (HDFS), provides a way to store large amounts of data across many commodity servers, while its processing engine, MapReduce, enables parallel processing of large data sets on the HDFS.

Section B

5. (a) List down objectives of the Information Technology Act 2000. What is digital signature and how it works? (10)

The objectives of the Information Technology Act 2000 in India are:

1. To provide a legal framework for e-commerce and e-governance activities in India
2. To recognize and enforce electronic contracts and digital signatures
3. To provide for the secure and confidential handling of electronic records and sensitive information
4. To prevent and control cybercrime and electronic fraud
5. To promote electronic governance and improve the delivery of public services
6. To provide a framework for electronic certification and accreditation services
7. To provide for the protection of privacy and personal data in the electronic form
8. To promote the development and use of secure electronic payment systems
9. To provide for the establishment of a regulatory framework for the growth and development of the Information Technology sector in India

A digital signature is an electronic method used to verify the authenticity of a digital document or message. It is used to ensure that the document or message has not been tampered with and to confirm the identity of the sender.

A digital signature works by using a combination of public key cryptography and hashing algorithms. When a document is signed with a digital signature, a hash value is generated from the contents of the document. This

hash value is then encrypted using the private key of the sender. The encrypted hash value, along with the public key of the sender, is appended to the original document to create a signed document.

When the recipient receives the signed document, they use the public key of the sender to decrypt the encrypted hash value. They then generate their own hash value from the contents of the document and compare it to the decrypted hash value. If the two hash values match, it means that the document has not been tampered with, and the signature is valid.

5. (b) Resource-based view theory asserts that resources are actually what helps a firm exploit opportunity and neutralize threats. Examine. How does VRIO framework helps in identifying competencies? (10)

The Resource-based View (RBV) theory asserts that a firm's resources and capabilities play a significant role in its ability to create and sustain a competitive advantage. The theory posits that a firm's resources and capabilities, if they are valuable, rare, inimitable, and well-organized, can give a firm a sustainable competitive advantage and help it to exploit opportunities and neutralize threats in the market.

VRIO framework is used to assess the value, rarity, inimitability, and organizational support of a firm's resources and capabilities. The VRIO framework helps identify the competencies of a firm by examining the following:
1. *Value*: Does the competency allow the company to differentiate itself from its competitors and create value for its customers?
2. *Rarity:* Is the competency rare or difficult for competitors to imitate?
3. *Imitability:* Is it difficult for competitors to imitate the competency?
4. *Organization:* Does the company have the necessary systems and processes in place to utilize the competency effectively?

By using the VRIO framework, a firm can identify its competencies, which are the resources and capabilities that contribute to its competitive advantage.
Example: Consider Apple Inc. The company's resources, such as its design and engineering capabilities, its supply chain and distribution network, and its brand, are valuable, rare, inimitable, and well-supported by the company's organizational structure, systems, and culture. These resources and capabilities allow Apple to create and sustain a competitive advantage in the market, by producing high-quality and innovative products that are difficult for competitors to imitate.

5. (c) Using the concepts of Purchasing Power Parity (PPP) and law of one price, explain how changes in the exchange rate between two countries' currencies is linked to changes in the countries' price levels. (10)

Purchasing Power Parity (PPP) is an economic theory that states that the exchange rate between two currencies should be equal to the ratio of their price levels. This means that the same basket of goods should cost the same in both countries, after converting the price of the basket into each country's currency.
The law of one price states that in a perfectly competitive market, the same good should have the same price in all countries, after accounting for transportation costs and any tariffs or taxes.
When the exchange rate between two countries changes, it can affect the price level in each country. For example, if the value of one country's currency decreases relative to another country's currency, it makes imports into the first country more expensive and exports from the first country cheaper. This can cause the price level in the first country to rise and the price level in the second country to fall.

Let's consider an example to illustrate this. Suppose the exchange rate between the US dollar (USD) and the Indian rupee (INR) is 1 USD = 75 INR. Now, if the value of the INR decreases relative to the USD, the exchange

rate might become 1 USD = 80 INR. This means that the price of goods in India has increased relative to the price of goods in the US, making imports into India more expensive and exports from India cheaper. As a result, the price level in India will increase.

In conclusion, the PPP theory and the law of one price suggest that changes in the exchange rate between two countries' currencies are linked to changes in their price levels. When the exchange rate changes, it affects the relative price of goods and services between the two countries, leading to changes in the price level in each country.

5. (d) List at least three Chambers of Commerce and Industry in India. How are these chambers aiding in facilitating interactions between the Business and Government? (10)

Three Chambers of Commerce and Industry in India along with how they help in facilitating interactions between the Business and Government.
- Confederation of Indian Industry (CII):
    - One of the largest and oldest business organizations in India
    - Represents the interests of Indian industry across sectors
    - Works closely with the government to promote business-friendly policies
    - Provides a platform for business-government interactions, such as roundtable discussions, workshops, and meetings
- Federation of Indian Chambers of Commerce and Industry (FICCI):
    - A leading business organization in India
    - Represents the interests of a wide range of industries and sectors
    - Regularly organizes business-government interactions
    - Provides feedback to the government on policy issues affecting the business community
- Associated Chambers of Commerce and Industry of India (ASSOCHAM):
    - One of the oldest and largest chambers of commerce in India
    - Represents the interests of the business community across the country
    - Regularly interacts with the government
    - Provides policy inputs to promote the growth and development of Indian industry

Examples:
- CII may work with the government to promote the implementation of a Goods and Services Tax (GST) to simplify the tax system and reduce the cost of doing business in India.
- FICCI may organize a roundtable discussion between business leaders and government officials to discuss the challenges faced by the manufacturing sector and to identify potential solutions.
- ASSOCHAM may provide policy inputs to the government on the need for more favorable regulations for startups and new businesses, to encourage entrepreneurship and innovation in India.

In summary, these chambers of commerce and industry play a vital role in facilitating interactions between the business and government by providing a platform for communication and collaboration. They work to ensure that the government's policies are supportive of the business community and that the needs and perspectives of businesses are taken into account.

5. (e) What reasons account for firms' decisions to use acquisition strategies as one means of achieving strategic competitiveness? Explain with examples from Indian context. (10)

There are several reasons why firms may choose to use acquisition strategies to achieve strategic competitiveness:

- *Access to new markets:* By acquiring a company that operates in a new market, the acquiring firm can quickly enter and establish a presence in that market without having to start from scratch. For example, in India, Tata Motors acquired the British luxury car brand, Jaguar Land Rover, in 2008 to enter the luxury car market.
- *Acquiring complementary resources:* Firms may choose to acquire companies that have complementary resources or skills to their own. For example, in India, HDFC Bank acquired Centurion Bank of Punjab in 2008 to increase its reach in the retail banking market and acquire additional resources and expertise.
- *Gaining economies of scale:* Acquiring a company can help a firm achieve economies of scale, by reducing costs through shared resources and combined operations. For example, in India, Reliance Industries acquired several smaller companies in the telecommunications industry to create a pan-India network and achieve economies of scale.
- *Enhancing competitiveness:* Firms may acquire other companies to enhance their competitiveness by acquiring new technology, products, or intellectual property. For example, in India, Bharti Airtel acquired the African operations of Zain Telecom to enhance its competitiveness in the African market and gain access to new technology.
- *Increasing market power:* By acquiring companies with significant market power, firms can increase their bargaining power and influence over suppliers, customers, and competitors. For example, in India, Reliance Retail acquired several regional retail chains to increase its market power and reach in the Indian retail market.

Overall, acquisition strategies are a means for firms to achieve strategic competitiveness by acquiring new markets, resources, skills, and technology, and by increasing market power.

6. (a) What are the challenges for the development of backward regions in India? Give a brief account on Transformation of Aspirational District programme. (15)

The challenges for the development of backward regions in India include:
- *Lack of infrastructure:* Many backward regions lack basic amenities such as roads, electricity, and healthcare facilities, hindering the development process.
- *Poor Education:* Low literacy rates and a lack of educational institutions prevent people from acquiring the necessary skills to participate in the development process.
- *Lack of industry:* Backward regions often lack industrial development, leading to high levels of unemployment and poverty.
- *Agricultural Challenges:* Agriculture is the main source of livelihood in many backward regions, but it is often beset by problems such as low productivity, lack of access to credit, and poor market linkages.

The Transformation of Aspirational Districts programme was launched by the Government of India in 2018 with the aim of rapidly transforming 115 backward districts across the country. The programme focuses on key development areas such as health and nutrition, education, agriculture, and financial inclusion.

The objectives of the programs are:
- Improving quality of life in backward districts through addressing key development challenges such as health, nutrition, education, agriculture, and financial inclusion.
- Creating a replicable model of accelerated and inclusive development.
- Building a partnership between central government, state governments, and local communities.
- Promoting the use of technology and data-driven decision making.
- Encouraging private enterprise and entrepreneurship to create job opportunities and stimulate economic growth.

- Ensuring benefits of development reach all sections of society, including women, children, and marginalized communities.

6. (b) How 'Essential Commodity' is defined in the Essential Commodities Act, 1955? Highlight the objectives of the Essential Commodities Act, 1955. (10)

The Essential Commodities Act, 1955 defines an "Essential Commodity" as any commodity specified in the Schedule to the Act, which is considered essential for life and is subject to price control. The Schedule includes commodities such as foodstuffs, fertilizers, petroleum and petroleum products, and other essential items.

The main objectives of the Essential Commodities Act, 1955 are:
- To control the production, supply, distribution, trade, and prices of essential commodities in order to ensure their availability at fair prices to consumers.
- To prevent hoarding and black marketing of essential commodities and to protect consumers against exploitation.
- To regulate the production, supply, and distribution of essential commodities in the public interest.
- To empower the Central and State Governments to take measures necessary for maintaining or increasing supplies of essential commodities and for securing their equitable distribution and availability at fair prices.

In summary, the Essential Commodities Act, 1955 aims to regulate the production, supply, distribution, trade, and prices of essential commodities to ensure their availability at fair prices to consumers and to prevent hoarding, black marketing, and exploitation.

6. (c) As per a report published by PIB in August 2021, in India, 84 Public Sector Undertakings (state-run companies) were in a loss as of 31ˢᵗ March 2020, with their total stress amounting to over Rs 44,000 crore collectively. Out of these, state-run carrier Air India, telecom companies Bharat Sanchar Nigam Ltd (BSNL) were the top two loss-making PSUs. Suggest a turnaround plan for any one of these two companies. (15)

A turnaround plan for Air India could include the following steps:
1. Cost Reduction:
    - Implement fuel-efficient practices to reduce fuel costs, such as optimizing flight routes and reducing engine idling times.
    - Negotiate better deals with suppliers, such as aircraft manufacturers and maintenance providers.
    - Streamline the workforce through attrition, early retirement, and reducing redundant positions.
2. Revenue Generation:
    - Diversify the airline's offerings, such as adding new destinations, providing premium services, and developing a loyalty program.
    - Maximize ancillary revenue by offering in-flight services such as meals, Wi-Fi, and entertainment.
    - Explore new business models, such as codeshare agreements and interline arrangements, to increase connectivity and expand customer base.
3. Fleet Modernization:
    - Evaluate the existing fleet and make a plan for retiring older, less fuel-efficient aircraft and replacing them with more modern, fuel-efficient ones.

- Upgrade the existing fleet with modern avionics, cabins, and interiors to provide a better customer experience.
4. Route Optimization:
    - Analyze the current route network and adjust it to focus on high-demand routes and minimize unprofitable routes.
    - Consider offering new, profitable routes, particularly to emerging markets with growing demand for air travel.
5. Customer Service Improvement:
    - Enhance the customer experience by investing in modern check-in systems, baggage handling systems, and in-flight services.
    - Train the staff to provide a high level of customer service, with a focus on empathy, efficiency, and attention to detail.
    - Improve the airline's reputation by providing reliable, on-time flights and prompt resolution of customer complaints.

Here is a suggested turnaround plan for a public sector telecom company:
1. Increase Investment in Network Infrastructure:
    - Upgrade existing networks to support advanced services, such as 5G and high-speed broadband
    - Increase investment in fiber optic networks to support data and internet services
2. Expand Service Offerings:
    - Diversify product portfolio to offer new services, such as internet of things (IoT), cloud services, and digital media
    - Launch new services to increase revenue streams
3. Streamline Operations:
    - Implement process improvements to reduce costs and increase efficiency
    - Use technology, such as automation and artificial intelligence, to optimize operations
    - Outsource non-core functions to reduce costs
4. Improve Customer Service:
    - Invest in training and development of customer service teams
    - Use technology, such as self-service portals and chatbots, to improve the customer experience
    - Respond to customer complaints and feedback in a timely and effective manner
5. Increase Marketing Efforts:
    - Develop targeted marketing campaigns to increase brand awareness and attract new customers
    - Increase investment in digital marketing and social media marketing
    - Leverage partnerships and sponsorships to reach new audiences
6. Partner with Other Companies:
    - Explore partnerships with other companies to expand offerings and reach new customers
    - Collaborate with companies in complementary industries to offer bundled services
    - Consider merging or acquiring other companies to increase market share and expand services

BSNL (Bharat Sanchar Nigam Limited), a public sector telecom company, has implemented several initiatives to improve operations, increase revenue streams, and improve customer service. This includes the launch of 4G services, the deployment of fiber optic networks, the outsourcing of non-core functions, the development of self-service portals, and the implementation of process improvements.

6. (d) Analyze the factors and implications of India's decision of opting out from the Regional Comprehensive Economic Partnership (RCEP). (10)

India's decision to opt out of the Regional Comprehensive Economic Partnership (RCEP) in November 2019 has several factors and implications that are worth analyzing. Here is a summary of the key factors and implications:
Factors:
- *Concerns over Market Access:* India was concerned about opening up its market to countries such as China, which already has a trade surplus with India, without receiving adequate market access in return.
- *Fear of Flooding of Imports:* India was concerned that RCEP would lead to an influx of cheap goods from countries such as China, leading to job losses and a decline in the domestic manufacturing sector.
- *Agriculture and Dairy Concerns*: India was worried that RCEP would lead to an influx of cheap agricultural products and dairy products, which would negatively impact the livelihoods of millions of small farmers and dairy farmers.
- *Lack of Adequate Protections:* India was also concerned that the RCEP agreement did not have adequate provisions to protect its intellectual property rights and domestic industries.

Implications:
- *Loss of Economic Benefits:* India's decision to opt out of RCEP means that it will miss out on potential economic benefits such as increased trade and investment flows, job creation, and technological transfer.
- *Reduced Global Influence:* India's decision to opt out of RCEP could be perceived as a sign of reduced global influence and a lack of commitment to regional economic integration.
- *Increased Protectionism:* India's decision to opt out of RCEP could lead to increased protectionist measures and trade barriers, which could negatively impact trade and investment flows in the region.
- *Opportunity for Alternative Agreements*: India's decision to opt out of RCEP provides an opportunity for the country to negotiate alternative trade agreements that are more favorable and protect its domestic industries and workers.

In conclusion, India's decision to opt out of the RCEP was motivated by concerns over market access, fear of flooding of imports, agriculture and dairy concerns, and a lack of adequate protections. The decision has implications for India's economic benefits, global influence, protectionism, and the potential for alternative trade agreements.

7. (a) What is meant by public asset? Do you think Public-Private Partnership (PPP) is making public asset more efficient? Justify your argument. Discuss various types of PPP Model. (20)

Public assets are assets owned by the government, for the benefit of the general public. These assets are often managed by the government or by a government-owned entity. Examples of public assets include schools, roads, bridges, hospitals, parks, water systems, and other infrastructure.

Regarding Public-Private Partnership (PPP), it can be argued that PPP can make public assets more efficient, as the private sector can bring in their expertise, resources and investment to the development, construction, financing and management of public assets. The government benefits from the private sector's efficiency and ability to manage risks, and the private sector benefits from long-term, predictable revenue streams and an opportunity to earn a profit.

However, some argue that PPPs can also lead to a transfer of public assets to the private sector, which can limit public control and access to those assets. Additionally, PPPs can also be more expensive for the government in the long run, as private partners may charge higher prices for the services provided.

There are following types of PPP models, including:
1. *Build-Operate-Transfer (BOT) model* - In this model, a private company is contracted to design, build, finance and operate a public asset for a specified period of time, after which the asset is transferred back

to the public sector. Example: The construction of a new airport terminal and its operation for 25 years, after which it will be transferred back to the public sector.

2. *Build-Own-Operate-Transfer (BOOT) model* - Similar to the BOT model, in this model the private company not only builds and operates the public asset but also owns it. Example: The construction and operation of a toll road, where the private sector owns the road and collects tolls for a specified period of time, after which the road is transferred back to the public sector.

3. *Design-Build-Finance-Operate (DBFO) model* - In this model, the private sector is responsible for the design, construction, financing and operation of a public asset, with the public sector providing the necessary land and other resources. Example: The construction and operation of a new hospital, where the private sector designs, builds, finances and operates the facility.

4. *Public-Private Partnership (PPP) Concession model* - In this model, the private sector is contracted to operate and maintain a public asset for a specified period of time. Example: The operation and maintenance of a park, where the private sector is responsible for maintaining the park and providing services to the public.

5. *Joint Venture (JV) model* - In this model, the public and private sectors form a joint venture company to design, build, finance and operate a public asset. Example: The construction and operation of a new sports stadium, where the public and private sectors form a joint venture company to design, build, finance and operate the facility.

7. (b) Peter Drucker says the "primary task of Strategic Management is thinking through the overall mission of a business". What is strategic intent? How does mission statement help in Strategic Management? Compare and contrast vision statements with mission statements, with examples. (15)

Strategic Intent refers to a company's long-term goals and aspirations, which are usually expressed in a vision statement. It outlines the company's purpose, direction, and aspirations and serves as a guide for decision-making and strategy formulation.

Mission Statement:

- o A statement of the purpose of a company, organization, or individual.
- o Defines the organization's reason for existence, what it wants to achieve, and what values it will uphold in order to achieve its goals.
- o Helps align all aspects of the organization with its purpose and goals.
- o Example: Google's mission statement is "To organize the world's information and make it universally accessible and useful."

Vision Statement:

- o A company's long-term aspirations and what it wants to become in the future.
- o Outlines the company's purpose, direction, and aspirations and serves as a guide for decision-making and strategy formulation.
- o Example: Amazon's vision statement is "To be Earth's best customer-centric company, where customers can find and discover anything they might want to buy online."

	Vision Statement	Mission Statement
Definition	A statement that describes a desired future state	A statement that defines an organization's purpose and its approach to achieve that purpose
Focus	The future state or desired outcome	The present and ongoing operations
Examples	"To be the world leader in sustainable energy solutions." - Tesla	"To empower people to live healthier, longer lives by providing innovative, high-quality healthcare solutions." - Johnson & Johnson

Purpose	To inspire and guide the organization towards a desirable future	To provide clarity and direction to the organization and its stakeholders
Time Horizon	Long-term, usually 10-20 years	Short-term to medium-term, usually 2-5 years

In conclusion, Strategic Intent, Mission Statements, and Vision Statements are all critical components of effective Strategic Management. They help organizations define their purpose and goals, align their actions towards achieving them, and provide a roadmap for decision-making and strategy formulation.

7. (c) Established in 1906, Hong Kong based Li & Fung is now one of the largest multinational trading companies in the developing world, with annual sales of more than $7 billion in 2020, up from just $1.2 billion in 2015. It sees itself as an expert in supply chain management for its 500 or so customers. These customers are a diverse group and include clothing retailers and consumer electronics companies. Li & Fung takes orders from customers and then shifts through its network of 7,500 independent suppliers located in 40 countries to find the right manufacturing enterprises to produce the product for customers at the most attractive combination of cost and quality. One of its customers is The Limited, Inc., a large U.S.-based chain of retail clothing stores. The Limited outsources much of its manufacturing and logistics functions to Li & Fung. The process starts when The Limited comes to Li & Fung with designer sketches of clothes for the next fashion season. Li & Fung takes the basic product concepts and researches the market to find the right kind of yarn, dye, buttons, and so on; it then assembles these into prototypes that The Limited can inspect. Once The Limited has settled on a prototype, it will give Li & Fung an order and ask for delivery within 5 weeks. The short time between an order and requested delivery is necessitated by the rapid rate of product obsolescence in the fashion clothing industry. With order in hand, Li & Fung distributes the various aspects of the overall manufacturing process to different producers depending on their capabilities and costs. For example, Li & Fung might decide to purchase yarn from a Korean company but have it woven and dyed in Taiwan. So, Li & Fung will arrange for the yarn to be picked up from Korea and shipped to Taiwan. The Japanese might have the best zippers and buttons, but they manufacture them mostly in China. So, Li & Fung will go to YKK, a big Japanese zipper manufacturer, and order the right zippers from its Chinese plants. Then Li & Fung might decide that due to constraints imposed by export quotas and labor costs, the best place to make the final garments might be in Thailand. So, everything will be shipped to Thailand. In addition, because The Limited, like many retail customers, needs quick delivery, Li & Fung might divide the order across five factories in Thailand. Five weeks after the order has been received, the garments will arrive on the shelves of The Limited, all looking like they came from one factory, with colors perfectly matched. The result is a product that may have a label that says "Made in Thailand," but it is a global product. To better serve the needs of its customers, Li & Fung is divided into numerous small, customer-focused divisions. Thus, Li & Fung uses information systems to manage, coordinate, and control the globally dispersed design, production, and shipping process to ensure that the time between receipt of an order and delivery is minimized, as are overall costs.

Answer following questions.
(i) What are the everyday issues being faced by Li & Fung in managing its global production?
(ii) How should a globally dispersed supply chain be managed, and what is the role of Internet-based information technology in the management of global logistics?
(iii) Should the firm manage global logistics itself, or should it outsource? Discuss pros and cons of both approaches. (3+7+5)

(i) Everyday issues faced by Li & Fung in managing its global production:

- *Coordination across multiple countries:* Li & Fung needs to coordinate activities across its global supply chain network, which includes sourcing materials and components, managing production schedules, and ensuring timely delivery of finished goods.
- *Balancing cost and quality:* Li & Fung need to find the right suppliers that can offer the right combination of cost and quality. For example, it might decide to purchase yarn from a Korean company but have it woven and dyed in Taiwan, to balance cost and quality.
- *Responding to rapidly changing market demands:* The fashion industry is characterized by a rapid rate of product obsolescence, and Li & Fung needs to respond quickly to changing customer requirements and market demands.
- *Ensuring product quality, consistency, and uniformity:* Li & Fung's customers expect the final product to look like it came from one factory with colors perfectly matched, and Li & Fung needs to ensure quality and consistency across its global supply chain.
- *Managing global production risks:* Li & Fung needs to manage the risks associated with the global production process, such as currency fluctuations, political instability, and transportation disruptions. For example, a transportation disruption could delay the delivery of raw materials, affecting the production schedules and overall costs.

(ii) To manage a globally dispersed supply chain effectively, the following steps should be taken:
1. *Define clear roles and responsibilities:* Clearly assign roles and responsibilities to different members of the supply chain team, including suppliers, manufacturers, and logistics providers.
2. *Establish robust communication channels:* Ensure that all stakeholders in the supply chain have clear and effective channels of communication.
3. *Use technology:* Utilize technology to manage the supply chain, such as enterprise resource planning (ERP) systems and transportation management systems (TMS).
4. *Implement visibility and transparency:* Ensure that all members of the supply chain have real-time visibility into inventory levels, production schedules, and transportation plans.
5. *Foster relationships:* Build strong relationships with suppliers and other partners in the supply chain to ensure a consistent and reliable flow of goods and services.
6. *Monitor and adjust:* Continuously monitor the performance of the supply chain and adjust processes and systems as needed to ensure efficiency and effectiveness.
7. *Have contingency plans:* Prepare for potential disruptions by having contingency plans in place for handling unexpected events.
8. *Regularly review and optimize:* Regularly review the supply chain to identify areas for improvement and optimize processes to increase efficiency and effectiveness.

Role of internet-based information technology: The role of internet-based information technology in the management of global logistics is critical, as it allows for real-time communication and collaboration across the entire supply chain network. For example, Li & Fung uses information systems to manage, coordinate, and control the globally dispersed design, production, and shipping process, ensuring timely and accurate information flow.

(iii) The decision to manage global logistics in-house or to outsource it depends on various factors such as the size, nature, and complexity of the firm's operations, as well as its resources, capabilities, and goals.

Pros of managing logistics in-house:
- Control: The firm has complete control over the logistics process and can make decisions and changes as needed.
- Flexibility: The firm can respond quickly to changing conditions or needs in the supply chain.

- Confidentiality: The firm can keep sensitive information confidential, as it does not have to share it with third-party logistics providers.
- Customization: The firm can tailor logistics processes to its specific needs.

Cons of managing logistics in-house:
- Cost: Managing logistics in-house can be more expensive than outsourcing, as the firm has to invest in infrastructure, technology, and personnel.
- Complexity: Logistics can be complex and time-consuming, requiring specialized knowledge and skills.
- Scalability: The firm may struggle to handle increased volume or complexity in the supply chain without investing in additional resources.

Pros of outsourcing logistics:
- Cost: Outsourcing can be more cost-effective than managing logistics in-house, as the firm can take advantage of economies of scale and expertise.
- Specialization: Third-party logistics providers have specialized knowledge and skills in logistics, which can help the firm improve the efficiency and effectiveness of its supply chain.
- Flexibility: The firm can adjust the scope and level of outsourcing as needed to match changes in the business.

Cons of outsourcing logistics:
- Lack of control: The firm may have less control over the logistics process and may be dependent on the third-party provider for decision-making.
- Quality: The quality of service provided by the third-party provider may vary, and the firm may not have complete control over the logistics process.
- Confidentiality: The firm may have to share sensitive information with the third-party provider, which could compromise its confidentiality.

In conclusion, both in-house management and outsourcing have their pros and cons, and the right choice depends on the firm's specific needs, resources, and goals.

8. (a) The first formal regulatory framework for listed companies specifically for Corporate Governance was established by the SEBI in February 2000, following the recommendations of Kumarmangalam Birla Committee Report. What have been key initiatives by the Government or Regulator since 2000 till now on Corporate Governance? What is Corporate Governance? (10)

Key initiatives by the Government or Regulator since 2000 till now on Corporate Governance:
- The Ministry of Corporate Affairs had appointed a Naresh Chandra Committee on Corporate Audit and Governance in 2002 in order to examine various corporate governance issues. It made recommendations in two key aspects of corporate governance: financial and non-financial disclosures: an independent auditing and board oversight of management. It is making all efforts to bring transparency to the structure of corporate governance through the enactment of Companies Act and its amendments.
- RBI constituted an advisory Group headed by *Dr. R. H. Patil* in 2001. The recommendations of this Group, covered some more codes and principles of private sector companies including consolidation of accounts incorporating performance of subsidiaries, criteria of independent Directors and disclosures.
- To introduce Corporate Governance practices in the banking sector, a working group of Directors of Banks and Financial Institutions was set up. The group named *Ganguly Committee* submitted its report in 2002.

- Thereafter, SEBI had set up another Committee in 2003 under the Chairmanship of *N. R. Narayana Murthy,* to review Clause 49, and suggest measures to improve Corporate Governance standards. Some of the major recommendations of the Committee primarily related to audit committees, audit reports, independent Directors, related party transactions, risk management, directorships and Director compensation, codes of conduct and financial disclosures.
- The "Corporate Governance – Voluntary Guidelines 2009", have been proposed for voluntary adoption by the Corporate Sector of Public Companies and possibly by large private companies. The Guidelines have taken into account the recommendations of the Task Force set up by CII under Chairmanship of *Naresh Chandra* in February, 2009 to recommend ways to further improve Corporate Governance standards and practices. The recommendations of this Task Force were placed on the Ministry's website for wide stakeholders consultations.
- In 2013, *the Companies Act, 2013* was enacted which envisaged radical changes in the sphere of Corporate Governance in India. It provided a major overhaul in Corporate Governance norms and would have far-reaching implications on the manner in which a corporate operates in India in coming times. The Companies (Amendment) Act, 2017 consisting of 93 amendments to the 2013 Companies Act, further resulted in changes related to legal definitions (related party, subsidiary company, associate company, independent Directors, etc.), Corporate Governance (for example, ratification of auditors' appointment and role of audit committee) and Management compliance. It impacts different aspects of business Management in India, including key structuring, disclosure, and compliance requirements.
- In 2015, with a view to consolidate and streamline the provisions of existing listing agreements for different segments of the capital market and the provisions pertaining to listed entities with the Companies Act, 2013, the SEBI notified *Listing Obligations and Disclosure Requirements* (LoDRs) Regulations, 2015 for the listed entities.
- The SEBI formed 21-member Committee on Corporate Governance headed by banker *Uday Kotak,* which submitted its report to the SEBI in 2017. Based on this Report, the SEBI released Securities and Exchange Board of India (Listing Obligations and Disclosure Requirements) (Amendment) Regulations, 2018 w.e.f. 01st April, 2019.
- In August 2019, the Securities and Exchange Board of India (SEBI) announced monetary reward for *whistleblowers,* for cases in which the whistleblower's information leads to a disgorgement of at least Rs. 1 crore. The total amount of monetary reward will be 10% of the monies collected, or a maximum of Rs. 1 crore.

Corporate governance refers to the system of rules, practices, and processes by which a company is directed and controlled. It involves balancing the interests of a company's many stakeholders, such as shareholders, management, customers, suppliers, financiers, government, and the community.

8. (b) Write short note on the following strategy evaluation and control techniques:
(i) Balanced scorecard
(ii) McKinsey 7 S model (8+7)

(i) The Balanced Scorecard is a strategic management tool used to help organizations align their actions with their vision and strategy. It balances financial measures with non-financial measures in four perspectives: financial, customer, internal process, and learning and growth. The idea is that by considering performance in these four areas, organizations can get a more comprehensive picture of their overall performance.
The balanced scorecard consists of four perspectives:

- *Financial Perspective:* This perspective focuses on the financial performance of the organization, including financial metrics such as revenue, profit, and return on investment.

- *Customer Perspective:* This perspective focuses on the satisfaction and loyalty of the organization's customers, and includes metrics such as customer satisfaction and market share.
- *Internal Process Perspective:* This perspective focuses on the effectiveness and efficiency of the organization's internal processes, and includes metrics such as cycle time and productivity.
- *Learning and Growth Perspective:* This perspective focuses on the organization's capacity for growth and learning, and includes metrics such as employee satisfaction and training programs.

The balanced scorecard provides a framework for measuring performance that is more comprehensive and strategic than traditional financial performance measures. It helps organizations align their strategies, goals, and metrics, and provides a framework for continuous improvement by regularly monitoring performance from multiple perspectives.

(ii) The McKinsey 7-S model is a framework for evaluating the internal alignment of an organization. The model suggests that there are seven key elements that need to be aligned for an organization to be successful: strategy, structure, systems, shared values, style, staff, and skills.
1. *Strategy:* The overall plan for how the organization will achieve its goals.
2. *Structure:* The organizational design, including the arrangement of departments and the reporting relationships between them.
3. *Systems:* The processes and procedures that support the day-to-day operations of the organization.
4. *Shared Values:* The beliefs and values that are shared by all members of the organization.
5. *Style:* The leadership approach and management style of the organization.
6. *Staff:* The human resources of the organization, including the skills and abilities of its employees.
7. *Skills:* The specific capabilities and competencies of the organization that enable it to achieve its goals.

The McKinsey 7-S model is used to assess the internal alignment of an organization and to identify areas where changes may be necessary. By aligning the seven elements of the model, organizations can improve their overall performance and achieve their goals more effectively.

For example, a company may use the McKinsey 7 S model to assess its current state and determine where improvements can be made. The company may find that while its strategy is strong, its structure is not aligned with its strategy, which is leading to inefficiencies and problems. By realigning its structure and making changes to other elements as needed, the company can improve its overall effectiveness and achieve its goals.

8. (c) "Operating internationally exposes managers to diverse and conflicting pressures from wide-ranging groups in different nations." Enumerate the factors that affect managers decision making in international business? Describe the steps involved in assessing country risk once all relevant factors have been gathered. (15)

Factors that affect managers decision making in international business
- *Cultural Differences:* Cultural differences can have a significant impact on decision making in international business, as cultural norms, values, and beliefs can influence how people think, communicate, and make decisions.
- *Political and Legal Environment:* The political and legal environment in a foreign market can greatly affect decision making, as laws and regulations can limit what a company can do or require specific actions to be taken.
- *Economic Factors:* Economic conditions in a foreign market, such as inflation, exchange rates, and economic stability, can influence a manager's decisions.

- *Competitive Environment:* The level of competition in a foreign market can also affect decision making, as managers must consider the presence and actions of competitors when making strategic decisions.
- *Technological Environment:* Technological advancements can create new opportunities or challenges for companies operating in international markets, and managers must consider the impact of technology on their operations.
- *Infrastructural Environment:* The level of infrastructure development in a foreign market, such as transportation and communication systems, can affect a manager's decision making.
- *Market Demands and Customer Needs:* Understanding customer needs and demands in a foreign market is crucial for decision making, as managers must tailor their offerings to meet the needs of specific markets.
- *Logistics and Supply Chain Considerations:* Decisions related to logistics and supply chain management can have a significant impact on the success of international operations, and managers must consider factors such as transportation costs and delivery times.

By considering these factors, managers can make informed decisions that align with the unique demands and challenges of the international business environment.

Steps involved in assessing country risk:
1. Gather information on the political, economic, legal, cultural, and technological environment of the country.
2. Evaluate the stability and predictability of the country's political and economic conditions.
3. Assess the risks associated with the country's legal and cultural environment.
4. Evaluate the availability and quality of technology in the country.
5. Use a combination of quantitative and qualitative analysis to generate a comprehensive risk assessment.
6. Use the risk assessment to determine the likelihood of successful operations in the country, and the resources required to manage risk effectively.
7. Continuously monitor the country's environment and adjust the risk assessment as necessary.

8. (d) "People living and working in foreign environments should be sensitive to the dangers of excessive polycentrism and excessive ethnocentrism. In such cases, usually, geocentrism is a safer approach." Do you agree with this statement? Give reasons to support your answer. (10)

Geocentrism, polycentrism, and ethnocentrism are all ways of viewing the world and approaching cultural differences.

Geocentrism refers to viewing the world from a global perspective and valuing the needs and perspectives of diverse cultures equally. This approach promotes cross-cultural understanding and respect and can be useful for individuals living and working in foreign environments.

There are several reasons why a geocentric approach might be considered a safer approach in foreign environments. First, it can help organizations avoid cultural insensitivity, which can alienate customers, employees, and other stakeholders in the local market. Second, it can help organizations better understand local market dynamics and adapt their strategies accordingly. Finally, a geocentric approach can help organizations better manage risk, as they are less likely to prioritize the interests of one culture or market over others.

In conclusion, the statement that a geocentric approach is a safer way to navigate cultural differences in foreign environments may have some validity, as it can help organizations better balance their interests with those of the local market, reduce cultural insensitivity, and manage risk more effectively.

Example :Consider a multinational corporation that sells consumer goods in several countries around the world. The corporation wants to expand its market into a new country, but the local culture values tradition and has a strong preference for locally made goods.

If the corporation were to adopt an ethnocentric approach, it might assume that its existing product line will be successful in the new market, regardless of local preferences. This could result in poor sales and a loss of reputation in the new market.

If the corporation were to adopt a polycentric approach, it might try to adapt its product line to the local market by offering a separate product line for the new market. However, this could result in increased costs and a complex supply chain, making it difficult for the corporation to manage its operations effectively.

If the corporation were to adopt a geocentric approach, it might try to balance its interests with those of the local market by offering a product line that incorporates elements of the local culture while still meeting the standards and expectations of the corporation. This could result in a successful market entry and a positive reputation in the new market.