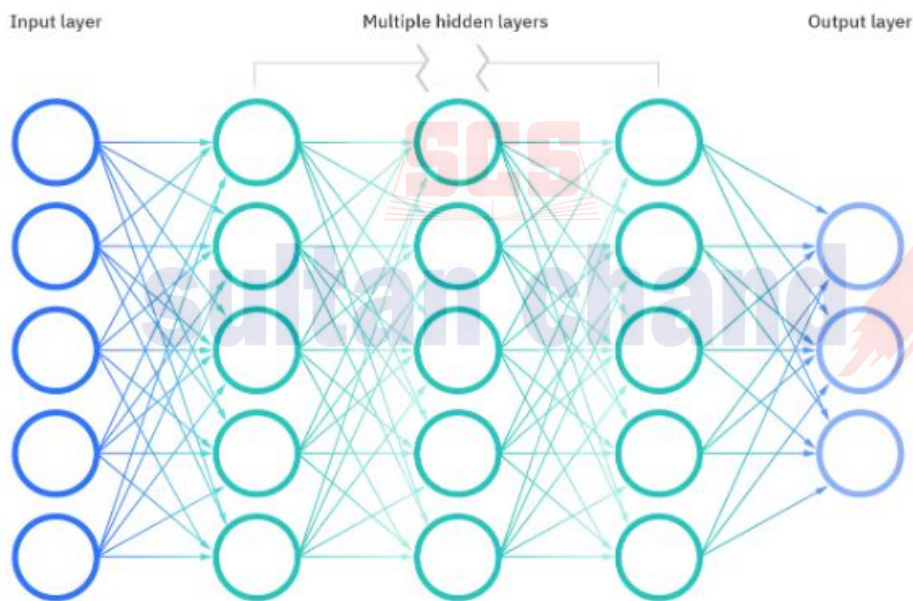| Ans1	
i.	iv.
ii.	Both i and ii
iii.	iii.
iv.	iv.
v.	iii.
vi.	iv.
Ans 2.	
i.	Netflix, Amazon, Spotify, YouTube (any two)
ii.	Interpersonal Intelligence
iii.	iii.
iv.	i.
v.	iii.
vi.	True
Ans 3.	
i.	4W's Problem Canvas
ii.	ii.
iii.	iv.
iv.	iv
v.	iii.
vi.	i.
Ans 4.	
i.	Automatic Summarization
ii.	Natural Language Processing (NLP)
iii.	Text Normalization
iv.	Bag of Words
v.	i.
vi.	Smart bot
Ans 5.	
i.	Overfitting
ii.	1
iii.	ii.
iv.	iii.
v.	ii.
vi.	ii.
	SECTION B: SUBJECTIVE-TYPE QUESTIONS
Ans 6.	While stress is a normal part of life, too much stress is clearly harmful to anybody's physical and mental well-being. Stress isn't always bad. A little bit of stress can help us stay focused, energetic, and able to meet new challenges in life. Stress about career and job inspires and motivates one to stay focused.
Ans 7.	A computer virus is a malicious software which, when executed, attaches itself to other programs, replicates itself and alters their behaviour. Two antivirus packages commonly used are Kaspersky or McAfee Virus Scan.
Ans 8.	Two common myths about entrepreneurship are: i. **Entrepreneurs are born, not made**: This is the common myth that entrepreneurs are born and not made. However, the truth is that almost anyone can become an entrepreneur if they can learn the necessary skills, *i.e.,* entrepreneurship is an acquired skill, not a natural born ability.

	ii. **Huge money involved**: The money used to start a business is called capital. Capital is important for starting. However, every business does not need a lot of capital to start. Depending on how much money we have or can borrow, we can start a business with that much money.
Ans 9.	The ability to work independently can be enhanced by being self-aware and self-motivated. i. **Self-awareness**: It is about being conscious of our own self, skills and feelings. We need to be aware of our strengths and weaknesses and work accordingly. The more aware we are, better the chances of improving and attaining personal growth. ii. **Self-motivation**: Self-motivated individuals have a higher chance of achieving their goals as they have an internal push to do something. They are self-disciplined and work hard towards their goals.
Ans 10.	The relationship between entrepreneurship and society is circular. Entrepreneurs produce goods and services for society while society, in turn, provides resources to business and as a community utilizes those goods and services. Society helps boost entrepreneurship by: • New demand generation • Producing raw materials • Ecosystem and community support • Capital supply • Infrastructure development
Ans 11.	Two applications of AI used in e-shopping are: (i) **Price Comparison Websites:** AI-powered algorithms used in price comparison websites help users to compare prices from various e-commerce websites. (ii) **Recommendation System**: AI-driven product recommendations help ensure customers find products they want to buy quickly and easily.
Ans12.	Whenever we download an app and install it on our smartphones, it asks for several permissions to access our phone's data in different ways. These apps have permission to access various sensors present on our smartphones and gather data about us and our surroundings which then collect user behaviours and patterns and utilize this data to make personalized suggestions as well as recommendations. The vast amounts of data generated from the Internet of Things (IoT), intelligent apps, phone logs, sensors or external sources are already resulting in rising recommendations.
Ans13.	The name of the second stage is data collection. In data collection, we collect relevant data for the problem being scoped in the first step of AI Project life cycle. Different ways to collect data are: • Surveys • Web Scraping • Sensors • Cameras • Observations • API (Application Program Interface)

Ans14.	Script-bot	Smart-bot	
	Script bots are built using sequences of conversational messages based on user intention and selections. They are not created using AI.	Smart bots are built on NLP and ML and constantly learn from user requests and improve their knowledge base with each interaction.	
	Script bots are easy to make.	Smart bots are comparatively difficult to make.	
	Script bot functioning is very limited as they are less powerful.	Smart bots are flexible and powerful.	

Script bots work around a script that is programmed into them	Smart bots work on bigger databases and other resources directly
Limited functionality	Wide functionality

Ans15.	Bag of Words is a Natural Language Processing model which helps in extracting features out of the text which can be helpful in machine learning algorithms. The steps to implement the bag of words algorithm are: (i) Text Normalisation: Collect data and pre-process it (ii) Create a Dictionary: Make a list of all the unique words occurring in the corpus. (Vocabulary) (iii) Create document vectors: For each document in the corpus, find out how many times the word from the unique list of words has occurred. (iv) Create document vectors for all the documents: It gives frequency of these words (number of times it has occurred in the whole corpus)
Ans 16.	According to the question, the AI-based cancer detector model gives 99.8% accuracy which means every patient is healthy even if they have cancer. The various evaluations can be considered: (i) Precision shows what proportion out of all positive predictions are correct. It will not consider False Negative cases. In this case, the machine will predict a person does not have cancer but they actually have it. It may have bad consequences as people will not get needed medical treatment. (ii) Recall shows a proportion of correct positive predictions out of all positive cases. It will not consider False Positive cases. In this model, it is okay if the model diagnoses some healthy people with cancer. They would probably be sent to take some extra tests which is annoying but not critical. (iii) F1 Score is the best-suited parameter to test this AI model, which is the balance between Precision and Recall. It is a measure of a test's accuracy where the highest possible value is 1, which allows you to get results closer to reality.
Ans 17.	(i) **The driver navigated the route using Google Maps on his smartphone**: The technology behind Google Maps is Artificial Intelligence. Google Maps provide useful directions and real-time traffic information to millions of users. (ii) **The door opened automatically:** The automatic door operates with a motion-detecting sensor so it cannot be counted as Artificial Intelligence. The door will open as soon as some pressure or motion is detected and when the sensor can no longer detect anything, the door will close. (iii) **Walked out without going through the cash counter and afterwards her sister scanned a QR code and paid:** This is an example of an Artificial Intelligence-based shop, where cameras are used to track the actions of each customer, sensors are used to track items, QR codes are provided for the payments that can be debited when customers exit the store and send them a receipt. According to the scenario given in the question, Artificial intelligence technology is used in Google Maps and AI-enabled shops while automatic door does not employ this technology.
Ans 18.	i. Applications or apps installed in our smartphones provide a lot of facilities such as customized recommendations and notifications according to our choices. For this, Apps need a lot of data which is collected from the user like details about our face, browsing history, or our geographic location, contact list, etc. ii. Whenever we download an app and install it on our smartphone, it asks for several permissions to access our phone's data. This data is collected with the user's consent which he/she gives at the time of installing an app by clicking on "yes" or "allow" options which clearly means that we ourselves are giving permissions to the Apps. iii. Most of the time, the data collected by various applications are used to provide personalized recommendations and advertisements but sometimes, our data can be shared with no-trusted third-party applications which may lead to unethical use of our data. iv. Recommendation System

Ans 19.	Neural networks reflect the behaviour of the human brain, allowing AI models to recognize patterns and make predictions. The key advantage of neural networks is that they are able to extract data features automatically without needing the input of the programmer. A neural network is essentially a system of organizing machine learning algorithms to perform certain tasks. It is a fast and efficient way to solve problems for which the dataset is very large, such as in images. A Neural Network is divided into multiple layers and each layer is further divided into several blocks called nodes. Each node has its own task to accomplish which is then passed to the next layer. A neural network consists of three important layers: • **Input Layer:** The first layer of a Neural Network is known as the input layer. The job of an input layer is to accept all the inputs provided by the programmer and feed it to the Neural Network. No processing occurs at the input layer. • **Hidden Layer:** Between the input and the output layer is a set of layers known as hidden layers. The name essentially means that this layer is hidden and is not visible to the user. Each node of the hidden layer has its own machine-learning algorithm which executes the data received from the input layer. In this layer, computations are performed which result in the output. The processed output is then fed to the subsequent hidden layer of the network. There can be multiple hidden layers in a neural network and their number depends upon the complexity of the function for which the network has been configured. • **Output Layer:** The last hidden layer passes the final processed data to the output layer which then gives it to the user as the final output. Like the input layer, the output layer too does not process the data which it acquires. It is meant for user-interface. Layers in Neural Network
Ans 20.	We undergo several steps to implement bag of words algorithm and create Document Vector Table. The various steps are: 1. **Tokenization:** In tokenization, each sentence is divided into tokens. Tokens is a term used for any word or number or special character occurring in a sentence. Under tokenisation, every word, number and special character is considered separately and each of them is now a separate token. The different tokens in three documents are: Priya, and, Ridhi, are, sisters, Priya, likes, coffee, and, Ridhi, likes, tea, Priya, likes, pizza, and, Ridhi, likes, burger 2. **Removal of stopwords:** In this step, the tokens which are not necessary are removed from the token list. So, the words and, are, to, an (Punctuation) will be removed. Note: Here we have small documents, so we delete only the repeated words. Priya, Ridhi, sisters, Priya, likes, coffee, Ridhi, likes, tea, Priya, pizza, Ridhi, likes, burger

3. **Converting text to a common case:** After the stop words removal, we convert the whole text into a similar case, preferably lowercase.

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priya, ridhi, sisters, priya, likes, coffee, ridhi, likes, tea, priya, pizza, ridhi, likes, burger

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4. Stemming/Lemmatization: In this step, the remaining words are reduced to their root words. In other words, stemming or lemmatization is the process in which the affixes of words are removed and the words are converted to their base form.

priya, ridhi, sister, priya, like, coffee, ridhi, like, tea, priya, pizza, ridhi, like, burger
Bag of Words

Based on the documents provided in the question, the various steps to implement the Bag of Words algorithm are:

Step1: Collecting data and pre-processing it.
Document 1: Priya and Ridhi are sisters.
Document 2: Priya likes coffee and Ridhi likes tea.
Document 3. Priya likes pizza and Ridhi likes burger.

Step2: Create dictionary
List down all the words which occur in all the three documents.

priya	ridhi	sister	like	coffee	tea	pizza	burger

Step3: Create document Vector

priya	and	ridhi	are	sister	like	coffee	tea	pizza	burger
1	1	1	1	1	0	0	0	0	0
1	1	1	0	0	1	1	1	0	0
1	1	1	0	0	1	0	0	1	1

Ans 21.

i. Accuracy is defined as the percentage of correct predictions out of all the observations. The accuracy of the AI model (which is supposed to predict if a newly released smartphone will be popular during the festive season sale) is calculated using the formula:

Confusion Matrix		Reality	
		True	False
Predicted	Positive	510	40
	Negative	20	230

$$Accuracy = \frac{Correct\ Prediction}{Total\ Cases} * 100$$

Or

$$Accuracy = \frac{TP + TN}{TP + TN + FP + FN} * 100$$

Where,
TP = True Positives,
TN = True Negatives,
FP = False Positives,
FN = False Negatives.
Here, the accuracy will be,

$$Accuracy = \frac{510 + 230}{510 + 230 + 40 + 20} * 100$$

$$= \frac{740}{800} * 100$$

=92.5%

The accuracy of the model is 92.5% which implies that the model correctly predicted 92.5% of the total observations.

ii.

Precision is defined as the percentage of True Positive cases versus all the cases where the prediction is true. It considers the True Positives and False Positives where True Positive means that the prediction matches the actual values and False Positive means that the prediction does not match the actual values. Too many False Positives may cause the wrong prediction and hence Precision is not usable.

Recall is defined as the fraction of positive cases that are correctly identified. It considers the True Positives and False Negatives where True Positive means that the prediction matches the actual values and False Negative means that the actual value was positive but the model predicted a negative value.

Hence **F1 Score** is the best-suited parameter to test this AI model, which is the balance between Precision and Recall. The F1 score is a number between 0 and 1 and is the harmonic mean of precision and recall When we have a value of 1 (that is 100%) for both Precision and Recall. The F1 score would also be an ideal 1 (100%). It is known as the perfect value for F1 Score. As the values of both Precision and Recall range from 0 to 1, the F1 score also ranges from 0 to 1.