Series #CDBA

प्रश्न-पत्र कोड Q.P. Code

104

रोल नं.				
Roll No.				

परीक्षार्थी प्रश्न-पत्र कोड को उत्तर-पुस्तिका के मुख-पृष्ठ पर अवश्य लिखें।

Candidates must write the Q.P. Code on the title page of the answer-book.

ARTIFICIAL INTELLIGENCE

निर्धारित समय: 2 घण्टे अधिकतम अंक: 50

 $Time\ allowed: 2\ hours$ $Maximum\ Marks: 50$

नोट	NOTE
(I) कृपया जाँच कर लें कि इस प्रश्न-पत्र में मुद्रित पृष्ठ 11 हैं।	(I) Please check that this question paper contains 11 printed pages.
(II) कृपया जाँच कर लें कि इस प्रश्न-पत्र में 21 प्रश्न हैं।	(II) Please check that this question paper contains 21 questions.
(III) प्रश्न-पत्र में दाहिने हाथ की ओर दिए गए प्रश्न-पत्र कोड को परीक्षार्थी उत्तर-पुस्तिका के मुख-पृष्ठ पर लिखें। (IV) कृपया प्रश्न का उत्तर लिखना शुरू करने से पहले,	(III) Q.P. Code given on the right hand side of the question paper should be written on the title page of the answer-book by the candidate. (IV) Please write down the serial
उत्तर-पुस्तिका में प्रश्न का क्रमांक अवश्य लिखें।	number of the question in the answer-book before attempting it.

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P.T.O.



General Instructions:

- (i) Please read the instructions carefully.
- (ii) This question paper consists of 21 questions in two sections: Section A & Section B.
- (iii) Section A has objective type questions whereas Section B contains subjective type questions.
- (iv) Out of the given (5 + 16 =) 21 questions, a candidate has to answer (5 + 10 =) 15 questions in the allotted (maximum) time of 2 hours.
- (v) All questions of a particular section must be attempted in the correct order.
- (vi) Section A Objective type questions (24 marks):
 - (a) This section has **05** questions.
 - (b) Marks allotted are mentioned against each question/part.
 - (c) There is no negative marking.
 - (d) Do as per the instructions given.

(vii) Section B - Subjective type questions (26 marks):

- (a) This section has 16 questions.
- (b) A candidate has to do 10 questions.
- (c) Do as per the instructions given.
- (d) Marks allotted are mentioned against each question/part.



Section - A

(Objective Type Questions)

•	Ans	wer a	any 4 out of the given	o questio	ns:	$4 \times 1 - 4$		
	(i)	SM_{2}	SMART method can be used to set goals to make you successful in					
		you	r career and personal	life. Wha	t does 'A' in SMART stand for	?		
		(a)	Abrupt	(b)	Accountable			
		(c)	Achievable	(d)	Admirable			
	(ii)	Whi	ich of the following	is not a	key element of self-manage	ment		
		skil	ls?					
		(a)	Prioritising your wo	rk				
		(b)	Not taking feedback					
		(c)	Goal setting					
		(d)	Staying updated abo	out new p	ractices			
	(iii)	Whi	ich of the following is	a quality	of successful entrepreneurs?			
		(a)	Hard working					
		(b)	Resistance to change	e				
		(c)	Lazy					
		(d)	Less-confident					
	(iv)	The	most important softy	ware in a	ny computer is the	This		
		is th	ne software that starts	working a	as soon as we switch on a comp	uter.		
		(a)	Web Browsers	(b)	Operating System			
		(c)	Office Software	(d)	Designing Software			
	(v)	Whi	ich of the following ty	pes of cor	nmunication takes place when	n one		
		indi	vidual addresses a la	rge gathe	ring?			
		(a)	Written communica	tion				
		(b)	Public communication	on				
		(c)	Small group commu	nication				
		(d)	Interpersonal comm	unication	L			

- (vi) **Assertion (A):** Organic farming technique is an example of a green skill that is essential for sustainable agriculture.
 - **Reason (R)**: Organic farming technique prioritise environment friendly and sustainable practices such as using natural fertilisers, avoiding synthetic pesticides and promoting soil health.
 - (a) Both (A) and (R) are true and (R) is the correct explanation for (A).
 - (b) Both (A) and (R) are true and (R) is not the correct explanation of (A).
 - (c) (A) is true, but (R) is false.
 - (d) (A) is false, but (R) is true.
- 2. Answer any **5** out of given **6** questions :

 $5 \times 1 = 5$

- (i) Which of the following contributes to the efficiency of an AI project?
 - (a) High Model Complexity
 - (b) Relevant and Authentic Training Data
 - (c) Minimal Preprocessing
 - (d) Limited Hardware Resources
- (ii) This real life application of NLP is used to provide an overview of a news item or blog post, while avoiding redundancy from multiple sources and maximising the diversity of content obtained. Which is this application?
 - (a) Chatbot

- (b) Virtual Assistant
- (c) Sentiment Analysis
- (d) Automatic Summarisation
- (iii) Which of the following represent a machine that is smart but not considered Artificial Intelligence (AI) enabled?
 - (a) A robotic vacuum cleaner that can navigate and clean floors autonomously.
 - (b) A chatbot that engages in natural language conversations and answers questions.
 - (c) A smartphone with facial recognition for unlocking the device.
 - (d) A digital alarm clock that rings at a set time every morning.
- (iv) Which of the following words represent an example of a lemma resulting from lemmatisation for "caring" in context to Natural Language Processing (NLP)?
 - (a) Care

(b) Cared

(c) Cares

(d) Car

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- (v) Intrapersonal Intelligence is a concept that:
 - (a) Measures an individual's ability to understand others' emotions and feelings.
 - (b) Assesses one's proficiency in mathematics and logical reasoning.
 - (c) Describes the level of self-awareness someone has, starting from realizing weaknesses, strengths, to recognizing their own feelings.
 - (d) Evaluates an individual's spatial navigation and visualisation skills.
- (vi) For Data Science, usually the data is collected in the form of tables. These tabular datasets can be stored in different formats. Which of the following formats is not used for storing data in a tabular format?
 - (a) CSV

(b) Website

(c) SQL

- (d) Spreadsheet
- 3. Answer any **5** out of given **6** questions:

 $5 \times 1 = 5$

- (i) _____ is one of the parameter for evaluating a model's performance and is defined as the fraction of positive cases that are correctly identified.
 - (a) Precision
- (b) Accuracy

(c) Recall

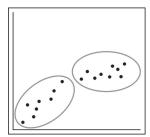
- (d) F1
- (ii) In the AI project cycle, which of the following represents the correct order of steps?
 - (a) Data Exploration, Problem Scoping, Modelling, Evaluation, Data Acquisition.
 - (b) Problem Scoping, Data Acquisition, Data Exploration, Modelling, Evaluation.
 - (c) Modelling, Data Acquisition, Evaluation, Problem Scoping, Data Exploration.
 - (d) Data Acquisition, Data Exploration, Problem Scoping, Modelling, Evaluation.

(iii)		is a concept to ur	nify s	tatistics, data analysis, machine				
	learning and their related methods in order to understand and							
	anal	nalyse actual phenomena with data.						
	(a)	Computer Vision	(b)	Natural Language Processing				
	(c)	Data Science	(d)	Computer Science				
(iv)	In co	_	the fo	llowing tasks is used for multiple				
	(a)	Classification	(b)	Classification + Localisation				
	(c)	Instance Segmentation	(d)	Localisation				
(v)	_	pam email detection, which se Negative"?	ch of t	the following will be considered as				
	(a)	When a legitimate email	is acc	curately identified as not spam.				
	(b)	When a spam email is m	istake	enly identified as legitimate.				
	(c) When an email is accurately recognised as spam.							
	(d) When an email is inaccurately labelled as important.							
(vi)		Which of the following applications is not associated with Natural Language Processing (NLP)?						
	(a)	Sentiment Analysis	(b)	Speech Recognition				
	(c)	Spam Filtering in emails	s (d)	Stock Market Analysis				
Ansv	ver a	ny ${f 5}$ out of the given ${f 6}$ qu	estion	as: $5 \times 1 = 5$				
(i)	Stat	tement 1 : Confusion mat	rix is	an evaluation metric.				
	Statement 2: Confusion Matrix is a record which helps in evaluation.							
	(a)	Both Statement 1 and St	atem	ent 2 are correct.				
	(b)	Both Statement 1 and St	atem	ent 2 are incorrect.				
	(c)	Statement 1 is correct an	nd Sta	tement 2 is incorrect.				
	(d)	Statement 2 is correct an	nd Sta	tement 1 is incorrect.				

4.



(ii) Which form of unsupervised learning does the following diagram indicate?



- (a) Clustering
- (b) Regression
- (c) Reinforcement learning (d)
- d) Classification
- (iii) Bag of Words is a _____ model which helps in extracting features out of the text which can be helpful in machine learning algorithms.
 - (a) Data Science (DS)
 - (b) Virtual Reality (VR)
 - (c) Natural Language Processing (NLP)
 - (d) Computer Vision (CV)
- (iv) Which of the following represents an example of a recommendation system?
 - (a) An online clothing store that offers a wide variety of clothing options.
 - (b) A search engine that retrieves relevant web pages based on user queries.
 - (c) An e-commerce website that displays customer reviews and ratings for products.
 - (d) A music streaming platform that suggests songs and playlists based on user listening history.
- (v) Name any two search engines.
- (vi) What is the primary need for evaluating an AI model's performance in the AI Model Development process?
 - (a) To increase the complexity of the model.
 - (b) To visualize the data.
 - (c) To assess how well the chosen model will work in future.
 - (d) To reduce the amount of data used for training.

5.	Ans	wer a	any ${f 5}$ out of the given ${f 6}$ qu	aestio	ns:	$5 \times 1 = 5$				
	(i)	Ass	ertion (A) : The term us	sed to	refer to the number of pixels i	n an				
			image is resolution.							
		Reason (R): Resolution in an image denotes the total nur								
			resented as height × width.							
		(a)	Both (A) and (R) are tru	e and	(R) is the correct explanation	for (A).				
		(b)	Both (A) and (R) are tru	ie an	d (R) is not the correct explana	ation				
			for (A).							
		(c)	(A) is true, but (R) is fal	se.						
		(d)	(A) is false, but (R) is true	ue.						
	(ii)	Whe	en a machine possesses	the a	bility to mimic human traits,	i.e.,				
		mak	ce decisions, predict the f	future	e, learn, and improve on its ow	n, it				
		is sa	aid to have:							
		(a)	Computational Skills	(b)	Learning Capability					
		(c)	Artificial Intelligence	(d)	Cognitive Processing					
	(iii)	Sta	tement 1 : To evaluate	a mo	dels' performance, we need e	ither				
			precision or recall.							
		Sta	tement 2: When the val	lue of	both Precision and Recall is 1	, the				
			F1 score is 0.							
		(a)	Both statement 1 and st	tatem	ent 2 are correct.					
		(b)	Both statement 1 and st	tatem	ent 2 are incorrect.					
		(c)	Statement 1 is correct, b	out st	atement 2 is incorrect.					
		(d)	Statement 1 is incorrect	t, but	statement 2 is correct.					
	(iv)	The	concept of is used	d to a	apply face filters on various s	ocial				
		med	lia platforms.							
		(a)	NLP	(b)	Computer Vision					
		(c)	Data Science	(d)	Block chain Technology					
	(v)	The	4 W's Problem Canvas	help	s in identifying the key elem	ents				
		related to the given problem.								
		Which of the following is NOT one of the blocks of the Prob								
		Can	vas?							
		(a)	When	(b)	Where					
		(c)	What	(d)	Why					
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- (vi) Which domain of AI is used for interacting with virtual assistants such as Siri and Alexa?
 - (a) Machine Learning (ML)
 - (b) Computer Vision (CV)
 - (c) Natural Language Processing (NLP)
 - (d) Technical Vision (TV)

Section - B

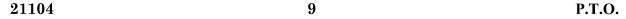
(Subjective Type Questions)

Answer any 3 out of given 5 questions on Employability Skills. Answer each question in 20-30 words. $3 \times 2 = 6$

- 6. Give any two examples of how individual choices and behaviours can contribute in achieving sustainable development.
- 7. List any two common misconceptions about entrepreneurship.
- 8. What is the importance of time management in effectively dealing with stress? Provide any one strategy for improving time management skills to reduce stress.
- 9. Mention any two measures that individuals or organisations can take to protect their data from theft and viruses.
- 10. The method of communication that you choose could affect the relationship with your peers, superiors and customers. Write the four factors on the basis of which you can choose the right method of communication.

Answer any 4 out of given 6 questions in 20-30 words each. $4 \times 2 = 8$

- 11. Differentiate between Machine Learning (ML) and Deep Learning (DL).
- 12. What are the primary differences between Script-bots and Smart-bots?
- 13. What do you mean by Evaluation of an AI model? Also explain the concept of overfitting with respect to AI model Evaluation.





- 14. For a healthcare organisation's objective of predicting disease outbreaks and efficiently allocating resources through the analysis of medical records, would you recommend using supervised learning or unsupervised learning as the preferred machine learning approach? Explain your choice briefly.
- 15. What role does data play in AI based applications? Name any two sources of online data collection for building any AI based application.
- 16. Differentiate between grayscale and RGB images.

Answer any 3 out of given 5 questions in 50-80 words each.

 $3 \times 4 = 12$

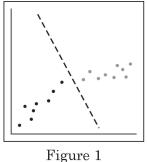
- 17. What are Neural networks? Briefly explain all the layers of a neural network.
- 18. Give any four examples of applications of AI that we see around us.
- 19. Consider the following two documents:

Document 1: ML and DL are part of AI.

Document 2: DL is a subset of ML.

Implement all four steps of the Bag of Words (BoW) model to create a document vector table. Depict the outcome of each step.

20. Consider the following graphs (Figure 1 and Figure 2) that demonstrate the two types of Supervised Learning Models of Artificial Intelligence. Identify and explain each model giving suitable examples of each.



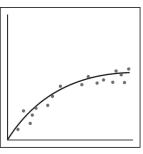


Figure 2



21. A binary classification model has been developed to classify news articles as either "Fake News" or "Real News". The model was tested on a dataset of 500 news articles, and the resulting confusion matrix is as follows:

Confusion Mat	Reality		
Comusion Mad	Yes	No	
Predicted	Yes	45	15
Tredicted	No	20	420

- (A) How many total cases are True Negative in the above scenario?
- (B) Calculate Precision, Recall and F1-Score.



