

Candidate Name

--

Candidate Number

--

Centre Name

--

Centre Number

--

**Paper 3: Advanced Theory**

**Sample Paper**

**2 hours 30 minutes**

It is necessary to respond on the answer sheets provided alongside this question paper. Additionally, you must have a soft pencil (preferably of type B or HB), a clean eraser and a dark blue or black pen.

**INSTRUCTIONS:**

- You must write your name, candidate number, centre name and centre number on the answer sheets in the designated spaces.
- It is important to follow the instructions provided on the answer sheets.
- Answer all questions.
- Use clear, concise language.
- Use diagrams, bullet points, or examples where appropriate.
- All answers must be your own and reflect independent thinking.
- Do not use correction fluid.
- Avoid writing on any bar codes.

**INFORMATION:**

- This paper has a total of 80 marks.

The number of marks assigned for every question or its parts is indicated within brackets [ ]

## **Section A: Short Structured Questions**

**[30 marks]**

**Answer all 3 questions.**

### **Q1. Classical vs Sub-symbolic AI (10 marks)**

- a) Describe one symbolic and one sub-symbolic method used in AI. (4 marks)
- b) Compare their strengths and limitations in terms of interpretability and real-world use cases. (6 marks)

### **Q2. Neural Architectures (10 marks)**

- a) Describe the key differences between convolutional neural networks (CNNs) and recurrent neural networks (RNNs). (6 marks)
- b) Identify a task best suited to each and explain why. (4 marks)

### **Q3. Decision Modelling and Explainability (10 marks)**

- a) Define two performance metrics used in classification models and explain their purpose. (4 marks)
- b) Explain the importance of explainability in AI and name one method that enhances model transparency. (6 marks)

## **Section B: Extended Analytical Questions**

**[50 marks]**

**Answer all 5 questions. Each question is worth 10 marks.**

### **Q4. AI Regulation and Safety (10 marks)**

Discuss the role of international regulations such as the GDPR or EU AI Act in shaping AI system design. Evaluate one strength and one challenge of enforcing such frameworks globally.

### **Q5. Reinforcement Learning (10 marks)**

Explain the key components of a reinforcement learning system and evaluate the benefits and limitations of using model-free methods such as Q-learning in high-risk domains.

**Q6. Interdisciplinary AI Applications (10 marks)**

Choose **two sectors** (e.g., healthcare, finance, sustainability). Compare how AI is used differently in each, considering data constraints, interpretability needs, and ethical considerations.

**Q7. Software Development and AI Integration (10 marks)**

Explain how AI tools (e.g., code assistants) are changing the role of software developers. Evaluate the risks and benefits of using AI in agile or collaborative development environments.

**Q8. Future Trends and Careers in AI (10 marks)**

Identify two emerging trends in AI (e.g., foundation models, autonomous agents). Explain how these may impact professional roles in AI and what ethical responsibilities future practitioners should uphold.

**End Of Paper 3**