



北京邮电大学

# BBC5200 A

For examiners' use only

1	
2	
3	
Total	

Joint Programme Examinations 2022/23

BBC5200 Introduction to Internet of Things

Paper A

Time allowed 2 hours

Answer ALL questions

Complete the information below about yourself very carefully.

QM student number

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BUPT student number

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Class number

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**NOT allowed: electronic calculators and electronic dictionaries.**

## INSTRUCTIONS

1. You must **NOT** take answer books, used or unused, from the examination room.
2. Write only with a black or blue pen **and in English**.
3. Do all rough work in the answer book – **do not tear out any pages**.
4. If you use Supplementary Answer Books, tie them to the end of this book.
5. Write clearly and legibly.
6. **Read the instructions on the inside cover.**

**Examiners**

Dr Haitao Zhang, Dr Dong Zhao

# Instructions

## Before the start of the examination

- 1) Place your BUPT and QM student cards on the corner of your desk so that your picture is visible.
- 2) Put all bags, coats and other belongings at the back/front of the room. All small items in your pockets, including wallets, mobile phones and other electronic devices must be **placed in your bag in advance. Possession of mobile phones, electronic devices and unauthorised materials is an offence.**
- 3) Please ensure your mobile phone is switched off and that no alarm will sound during the exam. **A mobile phone causing a disruption is also an assessment offence.**
- 4) Do not turn over your question paper or begin writing until told to do.

## During the examination

- 1) You must not communicate with or copy from another student.
- 2) If you require any assistance or wish to leave the examination room for any reason, please raise your hand to attract the attention of the invigilator.
- 3) If you finish the examination early you may leave, but not in the first 30 minutes or the last 10 minutes.
- 4) For 2 hour examinations you may **not** leave temporarily.
- 5) For examinations longer than 2 hours you **may** leave temporarily but not in the first 2 hours or the last 30 minutes.

## At the end of the examination

- 1) You must stop writing immediately – **if you continue writing after being told to stop, that is an assessment offence.**
- 2) Remain in your seat until you are told you may leave.

**Question 1: Give a design solution of indoor underground intelligent parking management system, and the requirements are as follows: [30 marks]**

- (1) The overall design objectives and functional requirements of the system are introduced in detail. (5 marks)
- (2) According to the architecture of the Internet of Things, the system architecture is introduced in detail, including: the system hardware connection diagram and its description, the system functional hierarchy architecture diagram and its description. (8 marks)
- (3) The design scheme of the system's core functions is introduced in detail, including: the system workflow for function implementation, the key technologies used in each step of the workflow, the reasons for the technologies being adopted and the rationality of the technical scheme. (8 marks)
- (4) In point (3) above, at least three sensing technologies introduced in Chapter 2 shall be used. (4.5 marks)
- (5) In point (3) above, at least one wireless network technology introduced in Chapter 3 shall be adopted. (1.5 marks)
- (6) In point (3) above, at least two information processing technologies described in Chapter 5 shall be adopted. (3 marks)

[illegible]

[illegible]

[illegible]

**Question marking:**  $\overline{30}$

**Question 2: Give a design scheme of a typical application system based on wireless sensor network, and the requirements are as follows: [30 marks]**

- (1) Customize a system application scenario, and introduce the design objectives and functional requirements of the system in detail. (5 marks)
- (2) According to the architecture of the Internet of Things, the system architecture is introduced in detail, including: the system hardware connection diagram and its description, the system functional hierarchy architecture diagram and its description. (8 marks)
- (3) The core function design scheme of the system is introduced in detail, including: the system workflow of function implementation, the Internet of Things information processing technology used in the workflow (at least three information processing technologies introduced in Chapter 5 are used), the reasons for the technologies being adopted and the rationality of the technical scheme. (8 marks)
- (4) Analyze the main aim of topology control for the WSN in the system. (3 marks)
- (5) Choose a reasonable coverage evaluation method for the WSN in the system, and explain it. (3 marks)
- (6) Choose a reasonable time synchronization method for the WSN in the system, and explain it. (3 marks)

[illegible]

[illegible]

[illegible]

**Question marking:**  $\overline{30}$



**Question 3: Give a design scheme of cloud computing based crowd sensing system, and the requirements are as follows: [40 marks]**

- (1) Customize a system application scenario, and introduce the design objectives and functional requirements of the system in detail. (5 marks)
- (2) According to the architecture of the Internet of Things, the system architecture is described in detail, including: the system hardware connection diagram and its description, the system functional hierarchy architecture diagram and its description. (8 marks)
- (3) The core function design scheme of the system is introduced in detail, including: the system workflow of function implementation, the key technologies used in the workflow, the reasons for the technologies being adopted and the rationality of the technical scheme. (8 marks)
- (4) In point (3) above, introduce which sensing technologies are used (Chapter 2). (3 marks)
- (5) In point (3) above, introduce which networking technologies are used (Chapter 3). (3 marks)
- (6) In point (3) above, introduce which information processing technologies are used (Chapter 5). (3 marks)
- (7) In point (3) above, introduce how to use cloud computing technology to support the system. (5 marks)
- (8) In point (3) above, introduce what security problems may exist in the system and their solutions. (5 marks)

[illegible]

[illegible]

[illegible]

**Question marking:**  $\overline{40}$

Do not  
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**Rough Working**  
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