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CODING & ROBOTICS OLYMPIADS ANSWERS

GRADE 4

SECTION A (20 marks)

1. (B) A clear set of ordered steps to solve a problem
2. (B) CPU
3. (C) Keyboard
4. (B) To repeat instructions
5. (B) Detect changes in its surroundings
6. (D) Mouse
7. (B) Binary
8. (B) It helps programmes run while the computer is on
9. (B) To tell hardware what to do
10. (B) Writing instructions for devices
11. (C) If statement
12. (B) Event block
13. (B) Multiple actions happen at the same time
14. (C) Asking permission before downloading
15. (C) Causes movement or action
16. (B) Storing values that can change
17. (C) Controller
18. (B) To find and correct errors
19. (B) A robot repeating a task without help
20. (B) Robots follow programmed instructions

SECTION B (5 marks)

1. True
2. False
3. True
4. False
5. True

SECTION C (10 marks)

Question 1: Write the steps for a Scratch programme where a sprite moves left and right when arrow keys are pressed. **(5)**

Code:

- When green flag clicked
- When left arrow key pressed
- Move (-10) steps
- When right arrow key pressed
- Move (10) steps

Question 2: Create an algorithm where a sprite counts points when it touches an object. List the blocks used. **(5)**

Code:

- When green flag clicked
- Set score to 0
- If touching block
- Change score by 1
- Repeat / Forever loop

SECTION D (15 marks)

Question 1: A robot must follow a straight path and stop when it reaches an obstacle. Write the algorithm steps. **(7)**

Code:

- Start / when programme begins
- Move forward
- Check sensor
- If obstacle detected
- Stop movement
- Wait
- End / stop programme

"Wait" may be credited wherever it is reasonably placed in the sequence.

Question 2: Design a Scratch animation where two sprites take turns moving when a key is pressed. Order the blocks. **(8)**

Code:

- When green flag clicked
- When key pressed
- Sprite 1 moves
- Wait block
- Sprite 2 moves
- Repeat or forever loop
- Correct order of actions
- Logical interaction between sprites

The mark for logical interaction between sprites is awarded when the learner shows that the two sprites are working together in a sensible and planned way. This means the sprites respond to the same event (such as a key press) or act in a clear sequence, for example one sprite moves first and then the other follows after a short wait. The interaction must show coordination or cause-and-effect, rather than the sprites moving randomly or independently. Learners do not need advanced coding techniques, they need to demonstrate that the sprites' actions are connected and make sense together.

The 8 marks are holistic (sequence + coordination), not one-per-block.

TOTAL MARKS: 50

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GRADE 5

SECTION A (20 marks)

1. (B) To manage hardware and software
2. (C) Microsoft Word
3. (B) Instructions needed to start the computer
4. (D) Keyboard
5. (B) To follow clear, ordered steps
6. (B) Managing memory
7. (C) Repeating instructions
8. (A) They help robots sense their environment
9. (B) When key pressed
10. (A) To send messages between sprites
11. (B) Output
12. (D) To make decisions
13. (D) Bytes
14. (B) Finding and fixing errors
15. (C) CPU
16. (B) Repeats code continuously
17. (C) To measure how far objects are
18. (B) Network interface
19. (D) The sprite's appearance
20. (B) Control

SECTION B (5 marks)

1. True
2. True
3. False
4. True
5. True

SECTION C (10 marks)

Question 1: Using the blocks listed above, write a Scratch program that makes a sprite count down from 5 to 1 and say each number out loud. **(5)**

Code:

- 'when green flag clicked' block
- 'set counter to 5' block
- 'say (counter) for 1 second' block
- 'change counter by -1' block
- 'repeat 5 times' block

Question 2: Using the blocks listed above, design a sequence of steps to instruct a robot to move in a path that alternates direction. **(5)**

Code:

- 'when green flag clicked' block
- 'move forward 60 units' block
- 'turn right 45 degrees' block
- 'turn left 45 degrees' block
- 'repeat 4 times' block

SECTION D (15 marks)

Question 1: A motion sensor must trigger an alarm when movement is detected. Write the steps and logic you would use in Scratch to programme this behaviour. **(7)**

Code:

- 'when green flag clicked' block
- 'forever' block
- 'if <motion sensor detects movement>' block
- 'play alarm sound' block
- 'else' block
- 'stop sound' block
- 'end if' block

Question 2: Design a Scratch game where a character moves left and right to collect stars. Each time a star is collected, the score increases. The game continues until the player presses the stop key. **(8)**

Code:

- 'when green flag clicked' block
- 'if <left arrow key pressed>' block
- 'change x by -10' block
- 'if <right arrow key pressed>' block
- 'change x by 10' block
- 'if <sprite touching star>' block
- 'change score by 1' block
- 'forever' block

TOTAL MARKS: 50

CODING & ROBOTICS ANSWERS

GRADE 6

SECTION A (20 marks)

1. (B) To process inputs and control outputs
2. (B) Logical thinking
3. (D) To store values that may change
4. (C) Forever loop with an if block
5. (B) The amount of data that can be transferred in a given time
6. (A) Translates and runs code line by line
7. (B) Data and applications are accessed through the Internet
8. (B) A group of eight bits
9. (A) Microcontroller
10. (D) Modify and share the programme legally
11. (B) It combines tools for writing, testing, and debugging programmes
12. (C) 3D graphics programming
13. (C) User experience and ease of use
14. (D) To reduce file size
15. (B) A set of rules for data communication
16. (C) Keyboard
17. (B) Systems learn patterns from data
18. (A) To block unauthorised access
19. (B) They select relevant content for users
20. (B) Modem

SECTION B (5 marks)

1. True
2. False
3. False
4. True
5. True

SECTION C (10 marks)

Question 1: Create a Scratch programme where a sprite moves continuously and changes direction when it touches the edge of the screen. List the steps and blocks you would use. **(5)**

Code:

- 'when green flag clicked' block
- 'forever' block
- 'move (10) steps' block
- 'if on edge, bounce' block
- 'turn (15 degrees)' block

Question 2: Design a Scratch programme where a sprite changes costume and plays a sound when a key is pressed. List the blocks used. **(5)**

Code:

- 'when green flag clicked' block
- 'when key pressed' block
- 'next costume' block
- 'play sound' block
- 'wait (0.5) seconds' block

SECTION D (15 marks)

Question 1: In a Scratch project, programme a robot sprite to patrol an area and turn away when it detects an obstacle. Order the blocks needed to achieve this behaviour. **(7)**

Code:

- 'when green flag clicked' block
- 'forever' block
- 'move (10) steps' block
- 'if <touching obstacle>' block
- 'turn right (90 degrees)' block
- 'wait (0.1) seconds' block
- 'end if' block

Question 2: Create a Scratch game where a player controls a character to avoid falling objects. If the character is hit, a 'Game over' message appears. Sequence the blocks correctly. **(8)**

Code:

- 'when green flag clicked' block
- 'forever' block
- 'if <left arrow key pressed>' block
- 'change x by (-10)' block
- 'if <right arrow key pressed>' block
- 'change x by (10)' block
- 'if <object touching sprite>' block
- 'say "Game Over" for 2 seconds' block

TOTAL MARKS 50

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CODING & ROBOTICS ANSWERS

GRADE 7

SECTION A (20 marks)

1. (A) To remove unnecessary details and focus on key features
2. (B) Light sensor
3. (B) Processing inputs and controlling outputs
4. (D) Movement or action is produced
5. (B) Pattern recognition
6. (C) Microcontroller
7. (B) To calculate the most efficient routes
8. (C) Conditional
9. (C) True or False
10. (B) To identify and correct errors early
11. (C) Actuator
12. (A) Programming environment
13. (D) Movement information
14. (B) Human involvement
15. (A) They allow complex repeated actions
16. (B) While loop
17. (D) To keep values for later use
18. (B) They organise and reuse code
19. (A) Input values
20. (B) It makes programmes easier to manage and update

SECTION B (5 marks)

1. True
2. False
3. True
4. False
5. True

SECTION C (10 marks)

Question 1: Using the blocks above, design a Scratch programme where a sprite moves in a circular pattern. **(5)**

Code:

- When green flag clicked
- Forever loop
- Move (5) steps
- Turn (30 degrees)
- Change colour effect by (15) **or** wait (0.2 seconds)

Question 2: Using the blocks above, design a Scratch programme that counts points each time a key is pressed. **(5)**

Code:

- When green flag clicked
- Set score to 0
- When key pressed
- Change score by (1)
- Say score for 1 second

SECTION D (15 marks)

Question 1: A robot sprite must follow a line and stop when the line ends. Order the blocks needed to create this behaviour. **(7)**

Code:

- When green flag clicked
- Forever loop
- Move (10) steps
- If <not touching line>
- Stop movement
- Wait (0.1 seconds)
- End if

Question 2: Create a Scratch game where a player controls a character to collect points while avoiding hazards. If the character touches a hazard, the score resets. Sequence the blocks correctly. **(8)**

Code:

- When green flag clicked
- Forever loop
- If <left arrow key pressed>
- Change x by (-10)
- If <right arrow key pressed>
- Change x by (10)
- If <touching hazard>
- Set score to 0

TOTAL MARKS 50