

BCS Level 4 Software Developer Module

Sample Paper A

Record your surname / last / family name and initials on the answer sheet.

Sample paper consisting of 40 questions in total, including:

- 20 knowledge questions that include both multiple choice and multiple response question types – 1 mark awarded for each question.
- 4 scenario-driven, situational judgement assessments, each with five questions designed to test knowledge, skills and behaviours. These include a range of question types, such as multiple choice, multiple response, fill in the blanks and ordering question types – 1 mark awarded for each question.

A number of possible answers are given for each multiple choice or multiple response question, indicated by either **A B C or D** (or **E**).

Other questions will require you to re-order a list or fill in the blanks. Your answers should be clearly indicated on your answer sheet.

Pass mark is 26/40

Distinction is 34/40

Time allowed: 90 Minutes

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This is a United Kingdom government regulated qualification which is administered and approved by one or more of the following: Ofqual, Qualifications Wales, CCEA Regulation or SQA.

- 1 Which **one** of the following is the **primary** role of the software development lifecycle?
 - A It is a method for outsourcing software development.
 - B It provides a structured approach to software development.
 - C It prevents the development of large, complex software systems.
 - D It enables software development to take place in isolation.

- 2 The assessment of a range of business factors to establish if a project should be undertaken, is completed at which stage of the software development lifecycle?
 - A Design.
 - B Deployment / Implementation.
 - C Development.
 - D Feasibility.

- 3 Which **one** of the following is **not** assessed when conducting a feasibility study?
 - A Business constraints.
 - B Technical constraints.
 - C Financial constraints.
 - D Maintenance constraints.

- 4 Which **one** of the following would be a reason for a technical support department to liaise with software developers before a new system goes live?
 - A To be made aware of workarounds for known issues.
 - B To be granted access to a documentation repository.
 - C To provide details of the user's security credentials.
 - D To arrange for the system deployment to production.

- 5 Which **two** of the following documents does the software tester typically create?
- A GANTT chart.
 - B Software validation plans and scripts.
 - C Use case diagrams.
 - D Change management plan.
 - E Business requirements document.
- 6 Which **one** of the following describes the function of design patterns?
- A They encourage testing early in development.
 - B They enable rapid requirements engineering.
 - C They represent the best software processes.
 - D They reuse successful software approaches.
- 7 When considering secure development, authentication is concerned with which **one** of the following?
- A Identifying potential security risks early in the development process.
 - B Using coding techniques that reduce the likelihood of introducing vulnerabilities.
 - C Implementing robust mechanisms for verifying users and controlling access.
 - D Configuring software components and systems to minimise security weaknesses.
- 8 Which **two** of the following activities are **most likely** to occur as part of a penetration test?
- A A measurement of the average loading time for a web page.
 - B A test of the password policy.
 - C An attempt at an SQL injection attack.
 - D A social engineering attack against the service desk.
 - E A test to ensure the software deploys correctly.

- 9 Software is the deliverable from which stage of the software development lifecycle?
- A Testing.
 - B Code development.
 - C Design.
 - D Requirements analysis.
- 10 In the context of a software development project, which **one** of the following **best** describes the main responsibility of a product owner?
- A To maximise the value of the delivered product.
 - B To manage the development team.
 - C To manage the application infrastructure.
 - D To market the product to investors.
- 11 Which **one** of the following statements about non-functional testing methods is **correct**?
- A The method that reveals vulnerabilities that may compromise the protection of data is recoverability testing.
 - B The method that checks system responsiveness and stability under a particular workload is performance testing.
 - C The method that evaluates ease of use by end users and fitness for purpose is compatibility testing.
 - D The method that tests how the product operates with other software and hardware is usability testing.
- 12 Which **one** of the following is **not** a benefit of using design patterns?
- A Providing tested, proven development templates.
 - B Enabling consideration of issues that may not become visible until later in the implementation.
 - C Improving code readability for coders who are familiar with the patterns.
 - D Providing specific solutions to a known problem that is unlikely to re-occur.

- 13** Which **one** of the following statements correctly describes the relationship between organisational policies and procedures?
- A** Policies define how actions are to be performed, and procedures explain why.
 - B** Policies provide detailed step-by-step instructions for procedures to follow.
 - C** Policies ensure rules are adhered to, and procedures define the rules.
 - D** Policies explain why actions are needed, and procedures describe how to do them.
- 14** Which **three** of the following statements about algorithms are **correct**?
- A** Algorithms are a set of instructions for achieving goals.
 - B** Algorithms may be decomposed into component parts (procedures), each of which itself contains an algorithm.
 - C** A single problem may be solved by several different algorithms.
 - D** Different algorithms for the same task will have the same performance characteristics.
 - E** An algorithm can have an infinite number of steps, depending on its complexity.
- 15** “Continuous integration and deployment, with automation, to deliver software quickly.” This statement describes the characteristics of which **one** of the following development methodologies?
- A** Agile.
 - B** DevOps.
 - C** Waterfall.
 - D** Rapid application development

- 16 Which **three** of the following are purposes of using naming conventions in software development?
- A To reduce ambiguity.
 - B To increase security.
 - C To increase readability.
 - D To increase discoverability.
 - E To increase performance.
- 17 Which of the following would be **most** likely to trigger a software development lifecycle process?
- A An operational incident raised by a user.
 - B A software failure during acceptance testing.
 - C A request for change to a web application.
 - D An upgrade received for the operating system software.
- 18 Which **one** of the following statements would appear in a functional specification, in response to a functional requirement?
- A Each input request must be responded to within 0.5 seconds.
 - B The software will be hosted in a private cloud service.
 - C The data displayed on the screen should be sorted into chronological sequence.
 - D The software code should be written in a way that will be easy to maintain.
- 19 Use cases are a deliverable at the end of which stage of the software development lifecycle?
- A Feasibility study.
 - B Requirements analysis.
 - C Code development.
 - D Deployment / Implementation.

- 20** Which **one** of the following is within the scope of the code development phase of the software development lifecycle?
- A** Unit testing.
 - B** Defect tracking.
 - C** Risk analysis.
 - D** Paper prototyping.

Scenario 1

This scenario relates to questions 21 – 25.

You are employed as a software developer by an organisation who are looking for a solution to automate their staff scheduling that will maximise their payroll budget while being considerate of each individual's contracted hours, site opening hours, colleague availability and peak working times.

21 In order to establish the desired functionality of the solution, which **one** of the following would be the **most** suitable action to begin with?

- A** Schedule a meeting with the business analyst to discuss requirements.
- B** Schedule a meeting with the project sponsor to discuss their vision.
- C** Study the business case to understand the expected costs and benefits.
- D** Arrange a meeting with the other developers to scope a solution.

22 Before work on the new solution begins, the organisation is careful to establish clear rules that specify ownership of the scheduling algorithm that will be created.

In which policy will this information to be stated?

- A** Coding standards policy.
- B** Version control policy.
- C** Intellectual property policy.
- D** Data protection policy.

23 As part of the feasibility study, the need to train all managers to be able to use the new solution effectively is raised.

Which **one** of the following areas of feasibility does this fall under?

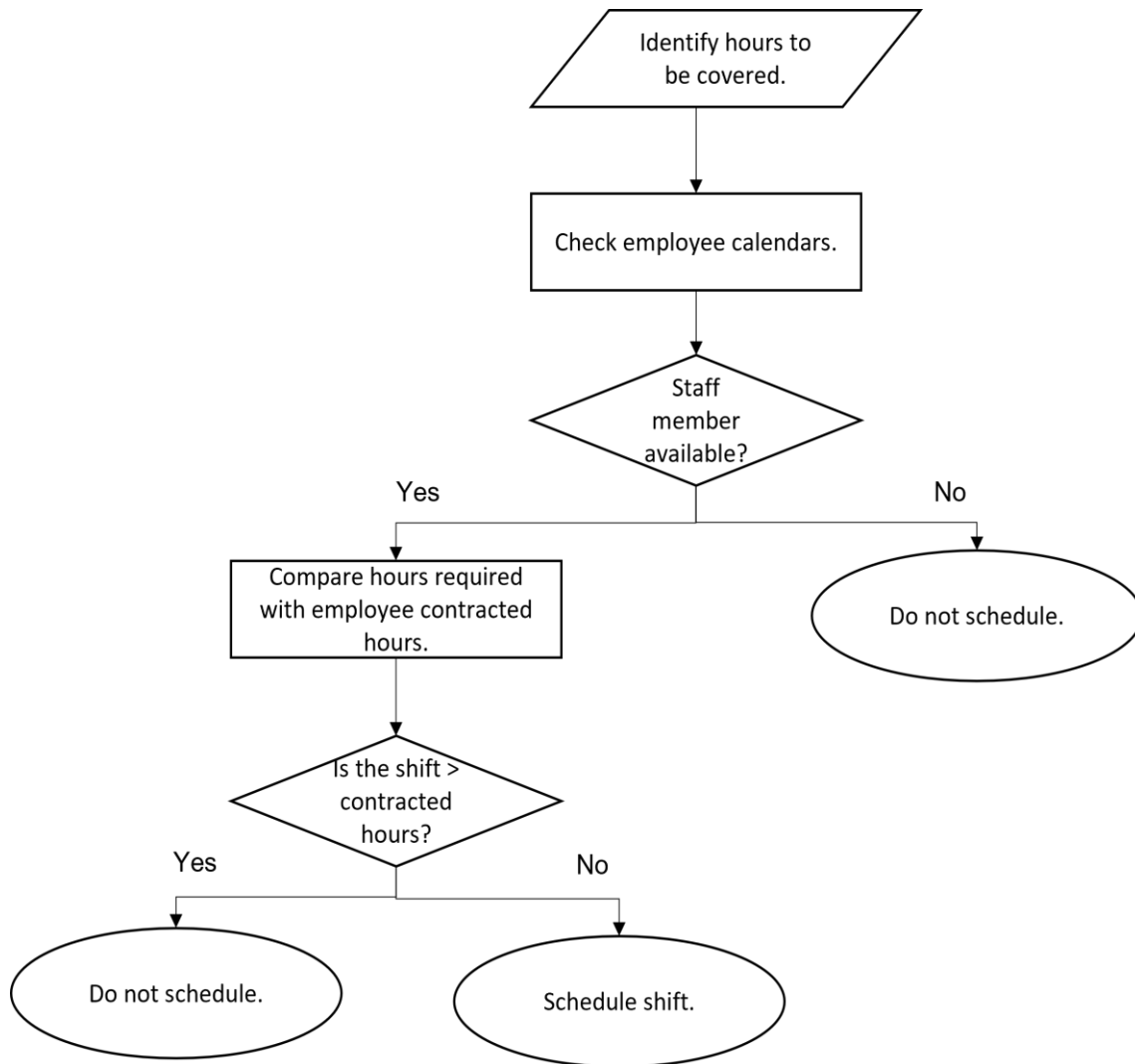
- A** Technical feasibility.
- B** Financial feasibility.
- C** Operational feasibility.
- D** Legal feasibility.

24 The development of the solution is to use an Agile development approach. In what order will the following activities be completed?

Label the answers from 1 to 5 to show the **correct** order, with 1 being the first activity completed.

- A Retrospective activity.
- B Diagram requirements for initial sprint.
- C Establish the minimum viable product (MVP).
- D Define the features of the solution.
- E Commence first sprint.

- 25 A flowchart has been created to demonstrate the process of scheduling an available employee for a given shift, to be reviewed with the technical architect.



Which **one** of the following is **not** demonstrated by this flowchart?

- A Employees who are unavailable will not be scheduled for a shift.
- B Employees may be scheduled for a shift greater than their contracted hours.
- C Employees may not be scheduled for a shift greater than their contracted hours.
- D Staff availability is ascertained through their calendars.

Scenario 2

This scenario relates to questions 26 – 30.

You have been contracted as a software developer by a management agency representing a musician. They would like you to build a tool to allow fans, following a robust moderation process, to upload videos of themselves performing, to a media player embedded on the musician's website.

- 26** Two important considerations for the new tool are the way the user interface is laid out, and the data storage solution that is used for the uploaded videos.

Which **two** of the following roles do these considerations relate **most** closely to?

- A** Requirements engineer.
 - B** Software designer.
 - C** Software release engineer.
 - D** Domain expert.
 - E** Technical architect.
- 27** When considering development methodologies to use, which **one** of the following would make the use of a linear approach favourable?
- A** Incremental delivery of new features is needed in order to meet evolving business needs.
 - B** High collaboration is required between development and operations teams.
 - C** Deliverables at each stage of development require sign off before work progresses.
 - D** There is a pressing need to deliver a functional prototype within a short timeframe.

- 28** All requirements of the new solution have been gathered and analysed, and the database for storing information related to the uploaded videos is now being designed.

Which **one** of the following would be most useful in helping to visualise and define the database design?

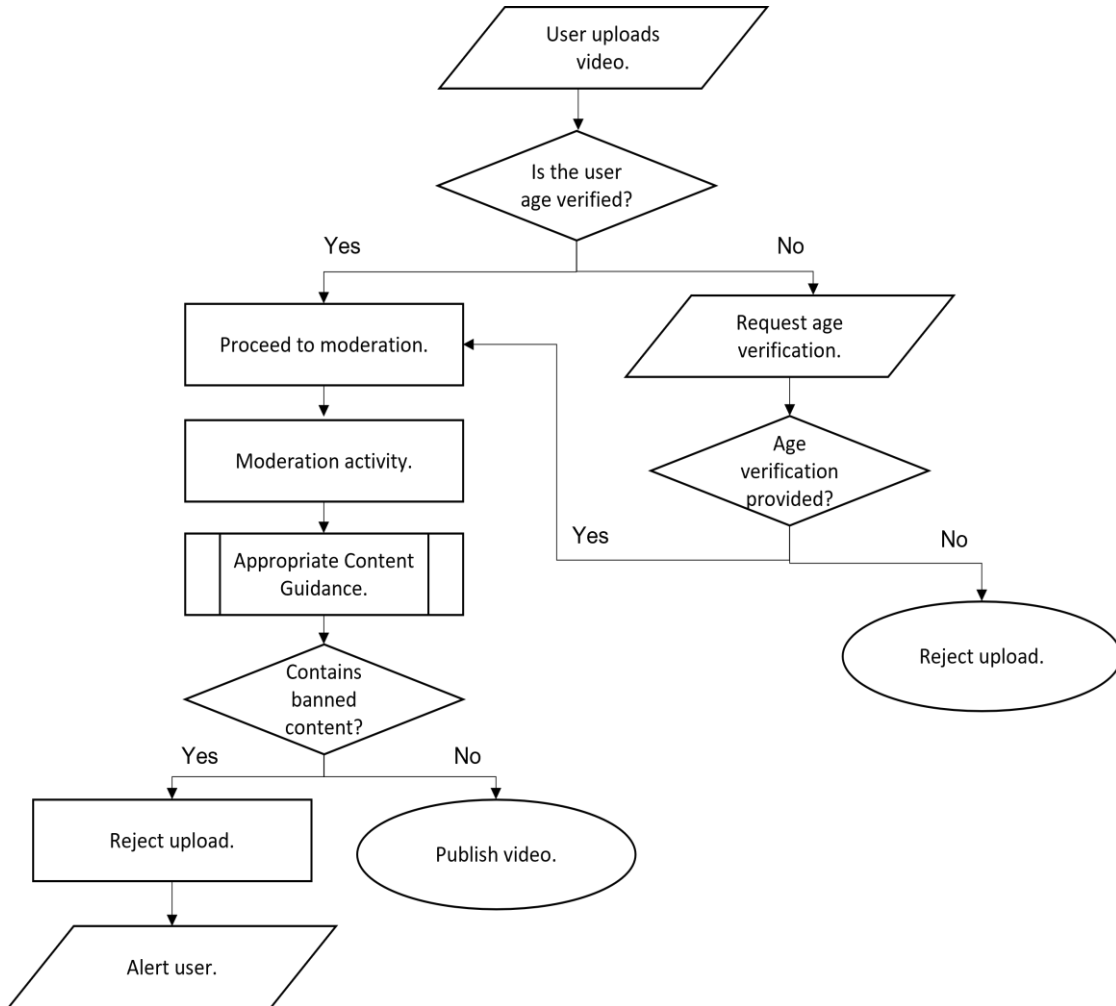
- A** Network topology diagram.
- B** Business process model.
- C** Traceability matrix.
- D** Entity-relationship diagram.

- 29** As part of the process of uploading videos, fans may be required to give personal information, such as names, email addresses, and other identifying details.

Which policy should define the way in which this information is collected, stored and processed?

- A** Intellectual property policy.
- B** Data protection policy.
- C** Acceptable use policy.
- D** Incident response policy.

30 A flowchart has been created to demonstrate the video age verification and moderation process, to be reviewed with the technical architect.



Mark **one** item on the flowchart that represents a policy that has already been established.

Scenario 3:

This scenario relates to questions 31 – 35.

You are employed in an organisation who would like to implement a bespoke solution for a ticketing system, for use by the IT support team. They are a small team, responsible for the queries generated by a field-based team, spread across the country. The system should be used to log, prioritise and trace all queries throughout the resolution process.

- 31** When the final ticketing solution is deployed and operational, it is anticipated that programmers / coders will interact with the system when undertaking second line support.

In which **one** of the following software development lifecycle stages will this interaction be triggered?

- A** Maintenance.
- B** Code development.
- C** Design.
- D** Testing.

- 32** The organisation has a policy which states that all its software will be easy to maintain.

Which **three** of the following procedures contribute to implementing this policy?

- A** Procedure for version control to track code changes.
- B** Procedure for intuitive user interface design.
- C** Procedure for the standard naming of variables in code.
- D** Procedure for writing effective code documentation and comments.
- E** Procedure for training end-users to use the software effectively.

- 33** As part of the feasibility study, the scalability of the system is analysed to determine whether it can handle the volume of tickets generated by the field team, and whether it can accommodate future growth in the number of users and volume of tickets.

Which area of feasibility has been investigated?

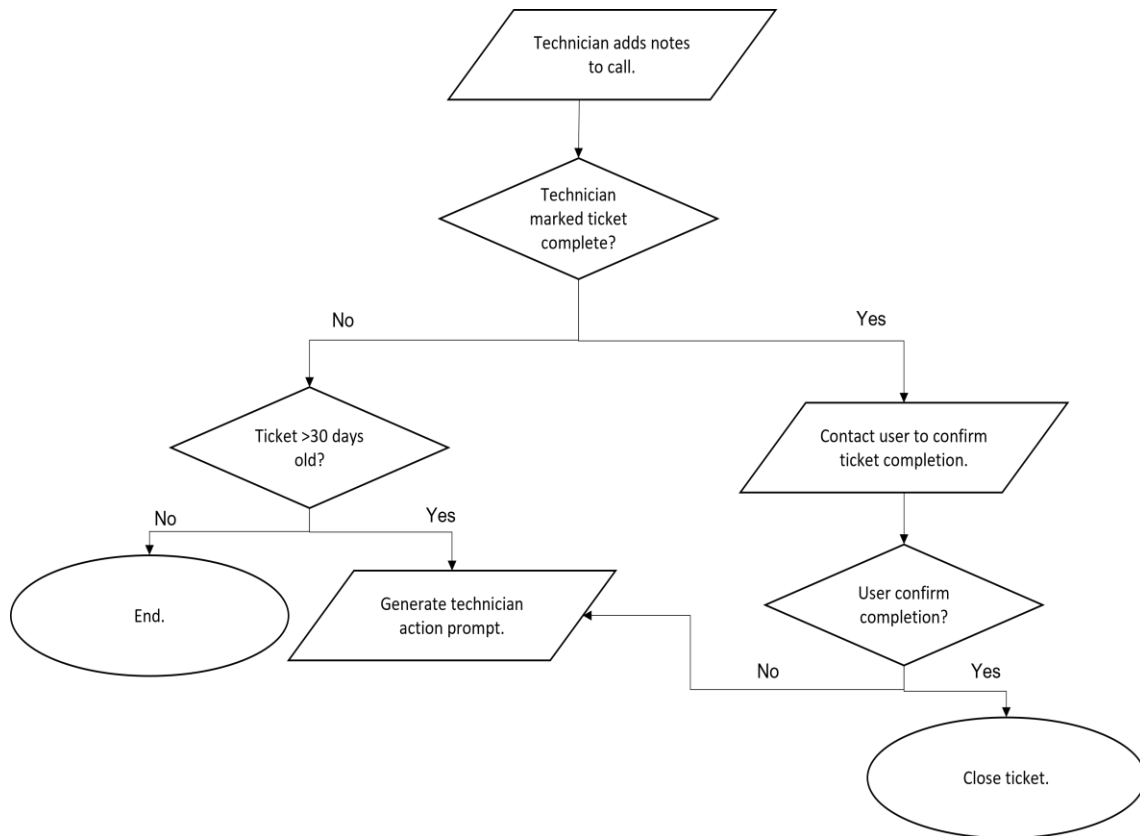
- A** Technical feasibility.
- B** Operational feasibility.
- C** Financial feasibility.
- D** Legal feasibility.

- 34** Once the requirements for the new solution have been captured and agreed upon, they are organised into a prioritised list of work for the development team.

When using an Agile development approach, which term defines this list of prioritised items that represent the work to be done?

- A** Acceptance criteria.
- B** User story.
- C** Sprint retrospective.
- D** Product backlog.

35 A flowchart has been created to demonstrate the process for closing a completed ticket, to review with the process owner.



Mark the area of the diagram which shows no action is required of live tickets that are less than 30 days old.

Scenario 4:

This scenario relates to questions 36 – 40.

You have been contracted as a software developer by an organisation who run an online learning platform that hosts content from various training providers, for a maintenance fee.

They have tasked you with developing a software solution for gathering and collating feedback from as many users as possible, throughout their learning journey. Currently, feedback is obtained by contacting a random, small sample of users via telephone, upon completion of their course.

36 Match the following activities carried out by the business analyst for the project to the stages of the software development lifecycle in which they would be carried out.

ISSUES:

- | | |
|--|-----|
| A Creating a functional specification. | [] |
| B Overseeing a set of users trying out the solution for ease of use. | [] |
| C Attending a demonstration of part of the solution with coders and customer representatives. | [] |
| D Creating a document explaining how to use the platform. | [] |
| E Liaising with the customer to understand their budget availability for the work. | [] |

CATEGORY:

CATEGORIES:

1. Deployment / Implementation.
2. Testing.
3. Requirements analysis.
4. Feasibility.
5. Code development.

- 37** The organisation anticipate that customer feedback will be received in many different formats, including free-form text comments, ratings and reviews, social media posts, and emails.

Given the unstructured nature of the data sources, which **one** of the following is **most** suitable for the new software solution?

- A** Relational database management system.
- B** Flat file system.
- C** NoSQL database system.
- D** Data warehouse.

- 38** After initial development of the feedback submission feature, black box testing is carried out on the new solution.

Which **one** of the following describes an appropriate black box testing approach?

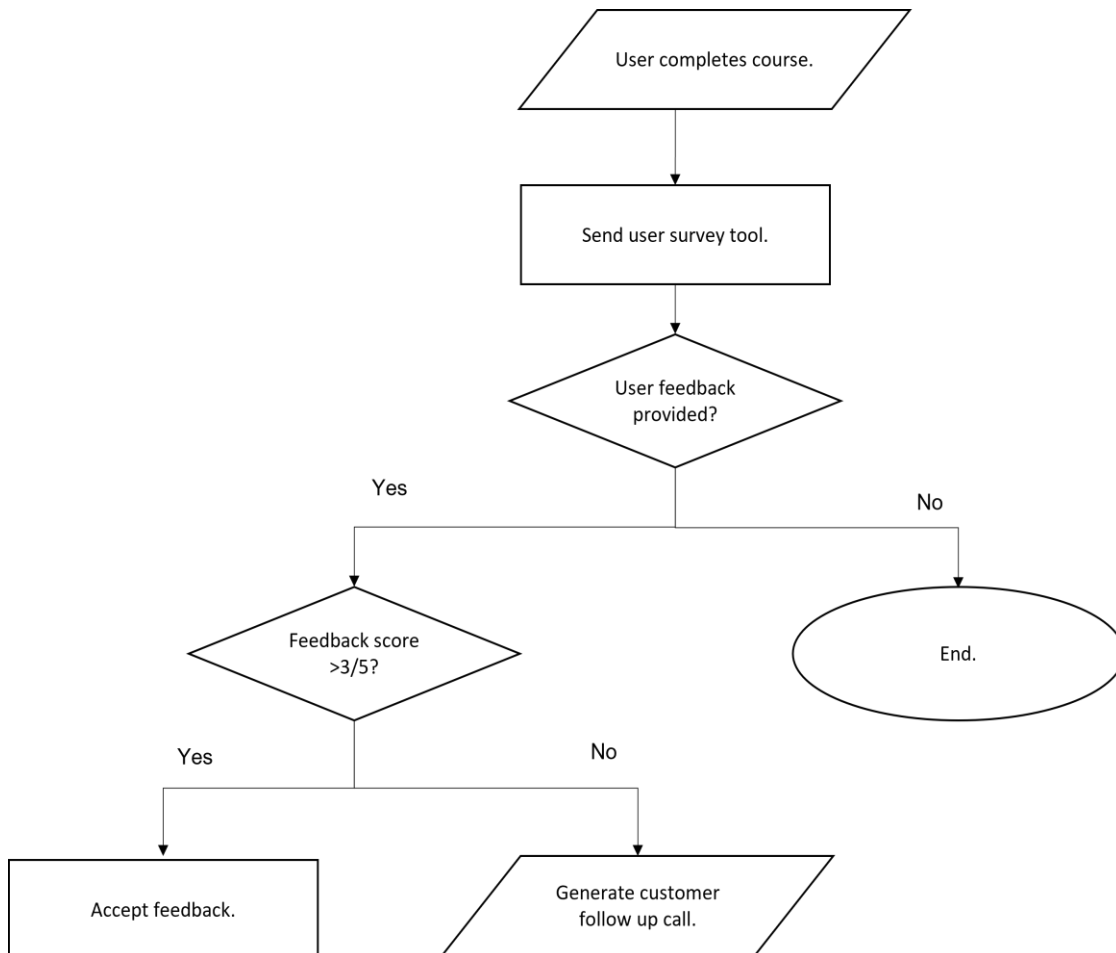
- A** Analysing the internal code structure to ensure feedback data is stored correctly in the database.
- B** Verifying that feedback submission forms correctly accept and validate inputs like text comments, ratings, and email addresses.
- C** Debugging the software to find and fix errors in the feedback collection algorithms.
- D** Writing unit tests to ensure each function involved in feedback processing works as intended.

- 39** The algorithm for the new software solution repeatedly executes a set of instructions that process, analyse and store each piece of feedback received.

Which **one** of the following constructs is being described?

- A** Sequence.
- B** Iteration.
- C** Selection.
- D** Recursion.

- 40 A flowchart has been created to demonstrate the process for following up on low customer feedback scores, to be confirmed with the business analyst.



Based on the flowchart, which **one** of the following statements is **incorrect**?

- A The feedback survey is sent to users upon completion of a course.
- B A user who does not provide feedback shall receive a follow up call.
- C A user who provides feedback score of greater than 3/5 does not require a follow up call.
- D Feedback with a score greater than 3/5 shall be accepted.

End of Paper

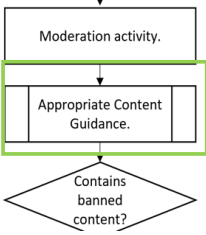

**BCS Level 4 Module in Software Development
Answer Key and Rationale**

Question	Answer	Explanation / Rationale	Syllabus Section
1	B	The software development lifecycle adds structure and a consistent approach to the development of software solutions.	1.1
2	D	The feasibility stage helps one to understand whether a project is technically, financially and operationally possible.	1.2
3	D	Maintenance is not considered as part of this study.	1.2
4	A	Technical support should be made aware of common/likely issues and how to resolve them prior to launch so they can effectively support users.	2.1
5	B, C	The creation of A, D and E should be the responsibility of other roles in the project team.	2.1
6	D	Design patterns can improve the speed of development by repurposing designs which have proven to be successful in similar projects.	5.3
7	C	Authentication involves verifying the identity of users, processes, or devices attempting to access a system or resource. It ensures that only authorised entities are granted access, based on their credentials.	6.3
8	C, D	The other activities would not be classed as penetration testing, although they may be undertaken at other times.	10.2
9	B	In the code development stage, the actual coding and creation of the software take place, based on the requirements and design specifications established in the earlier stages. The resulting software is then passed on to the testing stage for verification and validation.	1.4
10	A	The product owner is responsible for the value – real and perceived – of the product.	2.1, 2.2

Question	Answer	Explanation / Rationale	Syllabus Section
11	B	<p>Performance testing checks system responsiveness and stability under a particular workload.</p> <p>Security testing is the method that reveals vulnerabilities that may compromise data protection, not recoverability testing.</p> <p>Usability testing evaluates ease of use by end users and fitness for purpose.</p> <p>Compatibility testing tests how the product operates with other software and hardware.</p>	10.2
12	D	Using design patterns is a reusable solution to commonly occurring problems, therefore would provide no value if the problem does no re-occur.	5.3
13	D	<p>Policies outline the high-level rules and principles that govern actions and behaviour. They set the overall direction and provide a rationale for why certain actions are required.</p> <p>Procedures provide detailed, step-by-step instructions for carrying out specific tasks or activities. They specify how to implement the policies in practice.</p>	6.1
14	A, B, C	Different algorithms may complete the same task, however they may not have the same performance characteristics. They must only have a finite number of steps.	7.1
15	B	DevOps combines software development and IT operations to shorten the systems development life cycle and deliver software continuously and more reliably. It emphasises automation, continuous integration, continuous deployment, and collaboration between development and operations teams.	4.1
16	A, C, D	Use of appropriate naming conventions enable readability by third party applications and developers; clarity is enhanced, particularly where ambiguity may be present; and locating of files is facilitated.	6.3

Question	Answer	Explanation / Rationale	Syllabus Section
17	C	An incident would initially trigger an incident or problem management process, and, depending on its nature, may lead to a software change later. A failure during acceptance testing is within an existing software development lifecycle. An upgrade to an operating system would trigger a maintenance process, probably automated - this is external software.	1.1
18	C	Functional requirements describe what the system must do to satisfy the users' needs or objectives. The corresponding functional specification provides detailed descriptions of how these requirements will be implemented or achieved in the software.	9.2
19	B	Use cases are used during the requirements analysis stage to identify, clarify and organise system requirements.	1.4
20	A	Unit testing involves testing individual units or components of the software to ensure they function correctly, according to the design and requirements. It is typically within the scope of the code development phase of the software development lifecycle.	1.3
21	A	Establishing and discussing the requirements would take place before any other development activity from these options, as the requirements would need to be understood before a solution could be planned.	2.1, 2.2
22	C	An intellectual property policy defines ownership rights and governs the use and protection of intellectual assets.	6.2, 6.3
23	C	Operational feasibility assesses whether the proposed solution can be smoothly integrated into the existing operations and processes of the organisation.	1.2, 1.4

Question	Answer	Explanation / Rationale	Syllabus Section
24	See explanation	<p>Logically in an Agile development environment, the desired features of the solution would be established, and from this an MVP could be derived. The requirements for the first sprint would be established and then undertaken, with retrospective activity last, to reflect and make improvements.</p> <ol style="list-style-type: none"> 1. Define the features of the solution. (D) 2. Establish the MVP. (C) 3. Diagram requirements for initial sprint. (B) 4. Commence first sprint. (E) 5. Retrospective activity. (A) 	3.4, 4.1
25	B	The flowchart would prevent a colleague being assigned a shift longer than their contracted hours, demonstrated by the decision diamond.	9.1
26	B, E	<p>The software designer would be responsible for designing the user interface and overall user experience (UX) of the video upload tool.</p> <p>The technical architect would focus on designing the underlying system architecture that supports the video upload and storage functionalities.</p>	2.1
27	C	Linear development methodologies, such as waterfall, are favourable where phases like requirements gathering, design, development, testing, and deployment follow a predefined sequence and require formal sign-off before proceeding.	4.1, 4.2
28	D	An entity-relationship diagram (ERD) is helpful in database design as they provide a clear and structured representation of how data entities relate to each other and how they will be stored in the database.	8.1
29	B	A data protection policy outlines an organisation's approach to handling personal data, ensuring compliance with data protection laws and regulations. It specifies how personal data should be collected, stored, processed, and protected to ensure privacy and security.	6.2, 6.3

Question	Answer	Explanation / Rationale	Syllabus Section
30	<p>'Appropriate Content Guidance' item</p>  <pre> graph TD A[Moderation activity.] --> B[Appropriate Content Guidance.] B --> C{Contains banned content?} </pre>	The notation used identifies the Appropriate Content Guidance as a pre-existing policy.	9.1
31	A	Support issues and queries are raised as part of the maintenance stage. Depending on the nature of issue / query, this may lead to other stages of the software development lifecycle, but the trigger will be maintenance.	2.2
32	A, C, D	Version control systems help maintain the integrity of the code, understanding the history of changes, and facilitating easier rollbacks or bug fixes. Standardised naming conventions improve code readability and make it easier for developers to understand and maintain code written by others. Good documentation helps developers understand the purpose and functionality of the code, making it easier to maintain and extend.	6.1, 6.3
33	A	Scalability focuses on whether the system can handle current and future demands and is a core component of technical feasibility. It involves assessing the technical capabilities and limitations of the system to ensure it can scale up as needed without performance degradation.	1.2,1.3
34	D	The product backlog is a prioritised list of features, enhancements, bug fixes, and other work that needs to be done to deliver a product.	4.1
35	<p>'End' oval</p>  <pre> graph TD A{Ticket > 30 days old?} -- No --> B([End.]) A -- Yes --> C[Generate technician action prompt.] </pre>	The 'End' oval shows that tickets under 30 days old do not require any further action.	9.1

Question	Answer	Explanation / Rationale	Syllabus Section
36	See explanation	<p>Creating a functional specification (A) = Requirements analysis.</p> <p>Overseeing a set of users trying out the solution for ease of use (B) = Testing.</p> <p>Attending a demonstration of part of the solution with coders and customer representatives (C) = Code development.</p> <p>Creating a document explaining how to use the platform (D) = Deployment / Implementation.</p> <p>Liaising with the customer to understand their budget availability for the work (E) = Feasibility.</p> <p>During the deployment/implementation stage, the system is delivered to its intended users and made operational. As part of this, documentation such as user guides will be created and distributed, and training sessions will take place for end users.</p>	2.1, 2.2
37	C	NoSQL databases are designed to handle unstructured data efficiently. They offer flexible schema designs that can accommodate diverse data formats without requiring a predefined schema for each type of data.	8.1, 8.3
38	B	Black box testing focuses on validating the functionality of software without knowledge of its internal code structure. Testing the input validation and acceptance ensures the feedback collection feature works as intended from a user perspective.	10.1
39	B	Iteration involves repeatedly executing a set of instructions or a block of code until a specific condition is met or a certain number of iterations is completed.	7.2
40	B	If the user does not provide feedback, the process ends, as shown by the 'End' oval.	9.1