

BCS Level 4 Module in Software Developer

Sample Paper A

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

Sample paper only consisting of 40 questions in total across:

- 20 knowledge questions that include a range of question types such as multiple choice, multiple response and fill in the blanks – 1 mark awarded for each question.
- 4 scenario-driven situational judgement assessments each with 5 questions designed to test knowledge, skills and behaviours that 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** (up to **E** in the skills scenarios). A number of 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

Time allowed: 90 Minutes

Copying of this paper is expressly forbidden without the direct approval of BCS, The Chartered Institute for IT.

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 of the following is the **PRIMARY** role of the Software Development Lifecycle (SDLC)?

Select **ONE** of the following.

- A SDLC is a method for outsourcing software development.
- B SDLC provides a structured approach to software development.
- C SDLC prevents the development of large, complex software systems.
- D SDLC 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?

Select **ONE** of the following.

- A Design.
- B Implementation.
- C Development.
- D Feasibility.

3 Which of the following are assessed when conducting a feasibility study?

Select all that apply.

- A Business constraints.
- B Technical constraints.
- C Financial constraints.
- D Maintenance constraints.

4 Which of the following **WOULD** be a reason for a Technical Support department to liaise with software developers before a new system goes live?

Select **ONE** of the following.

- 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 of the following document(s) does the software tester create?

Select all that apply.

- A GANTT chart.
- B Software validation plans and scripts.
- C Use case diagrams.
- D Change management plan.

6 Which of the following describes the function of design patterns?

Select **ONE** of the following.

- 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 In software development, what is **TYPICALLY** meant by authentication?

Select **ONE** of the following.

- A The ability for users to identify themselves to a system.
- B Making code more obscure to protect it from being stolen.
- C A way by which individual users are given permissions.
- D A standard process used to check the skills of developers.

8 Which of the following would **TYPICALLY** occur in a penetration test?

Select all that apply.

- 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.

9 Software is the deliverable from which stage of the SDLC?

Select **ONE** of the following.

- A Testing.
- B Development.
- C Planning.
- D Maintenance.

10 In the context of a software development project, which of the following **BEST** describes the **MAIN** responsibility of a Product Owner??

Select **ONE** of the following.

- A Maximise the value of the delivered product.
- B Manage the development team.
- C Manage application infrastructure.
- D Market the product to investors.

11 Non-functional testing methods evaluate non-functional requirements of software applications, i.e. how the system operates and performs against certain requirements.

Enter the **CORRECT** blank option from the list below to match each definition.
Performance testing, Compatibility testing, Security testing, Usability testing.

- A The method that checks system responsiveness and stability under a particular workload is _____.
- B The method that reveals vulnerabilities that may compromise the protection of data is _____.
- C The method that evaluates ease of use by end users and fitness for purpose is _____.
- D The method that tests how the product operates with other software and hardware is _____.

12 Which of the following is **NOT** a benefit of using design patterns?

Select **ONE** of the following.

- A Providing tested, proven development templates.
- B Enable 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 of the following risks **WOULD** exist if security was not built into an application?

Select **ONE** of the following.

- A The application will have bugs and run slowly.
- B The application source code could be stolen.
- C The application would pose a risk to users.
- D The application will not be permitted online.

14 Which of the following statements **CORRECTLY** describe algorithms?

Select all that apply.

- 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.

15 Which of the following **BEST** describes the adapter pattern in software design?

Select **ONE** of the following.

- A It allows an object to expose a different interface.
- B It encapsulates the logic involved in choosing an appropriate class.
- C It allows two processes to run concurrently.
- D It mutates an object's instance variables.

16 What are the **MAIN** purposes of using naming conventions in software development?

Select all that apply.

- A Reduce ambiguity.
- B Increase security.
- C Increase readability.
- D Increase discoverability.

17 Which statement CORRECTLY describes the purpose of the Software Development Lifecycle?

Select **ONE** of the following.

- A A mechanism for deploying operational IT systems.
- B A way of capturing customer and user requirements.
- C A set of steps by which software can be produced.
- D A measure of how long a piece of software is viable.

18 Which stage of the Software Development Lifecycle seeks to model the users' requirements?

Select **ONE** of the following.

- A Code development.
- B Design.
- C Feasibility.
- D Implementation.

19 Use cases are a deliverable at the end of which stage of the Software Development Lifecycle?

Select **ONE** of the following.

- A Feasibility.
- B Analysis.
- C Development.
- D Implementation.

20 Which of the following is within the scope of the Code Development phase of the Software Development Lifecycle?

Select **ONE** of the following.

- A Unit testing.
- B Defect tracking.
- C Risk analysis.
- D Paper prototyping.

Scenario 1:

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

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

Select **ONE** of the following.

- 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.
- D** Arrange a meeting with the other developers to scope a solution.
- E** Create a flowchart to represent all of the processes within the solution.

- 22** Following a consultation with staff members about the new scheduling tool, the following problems, constraints or considerations have been raised.

Match the issues with the correct category.

- | | ISSUES: | CATEGORY: |
|----------|--|-----------|
| A | Working time directive.
Data protection. | [] |
| B | Colleague shift preferences.
Family and caring responsibilities. | [] |
| C | Naming conventions.
Secure development practises. | [] |
| D | Colleague calendar sharing and accuracy.
Holiday request notice period. | [] |

CATEGORIES:

1. Business processes
2. Cultural
3. Professional standards
4. Legal

23 In order to ensure that a solution is viable, you must conduct a feasibility study. Which of the following factors must be considered as part of this study?

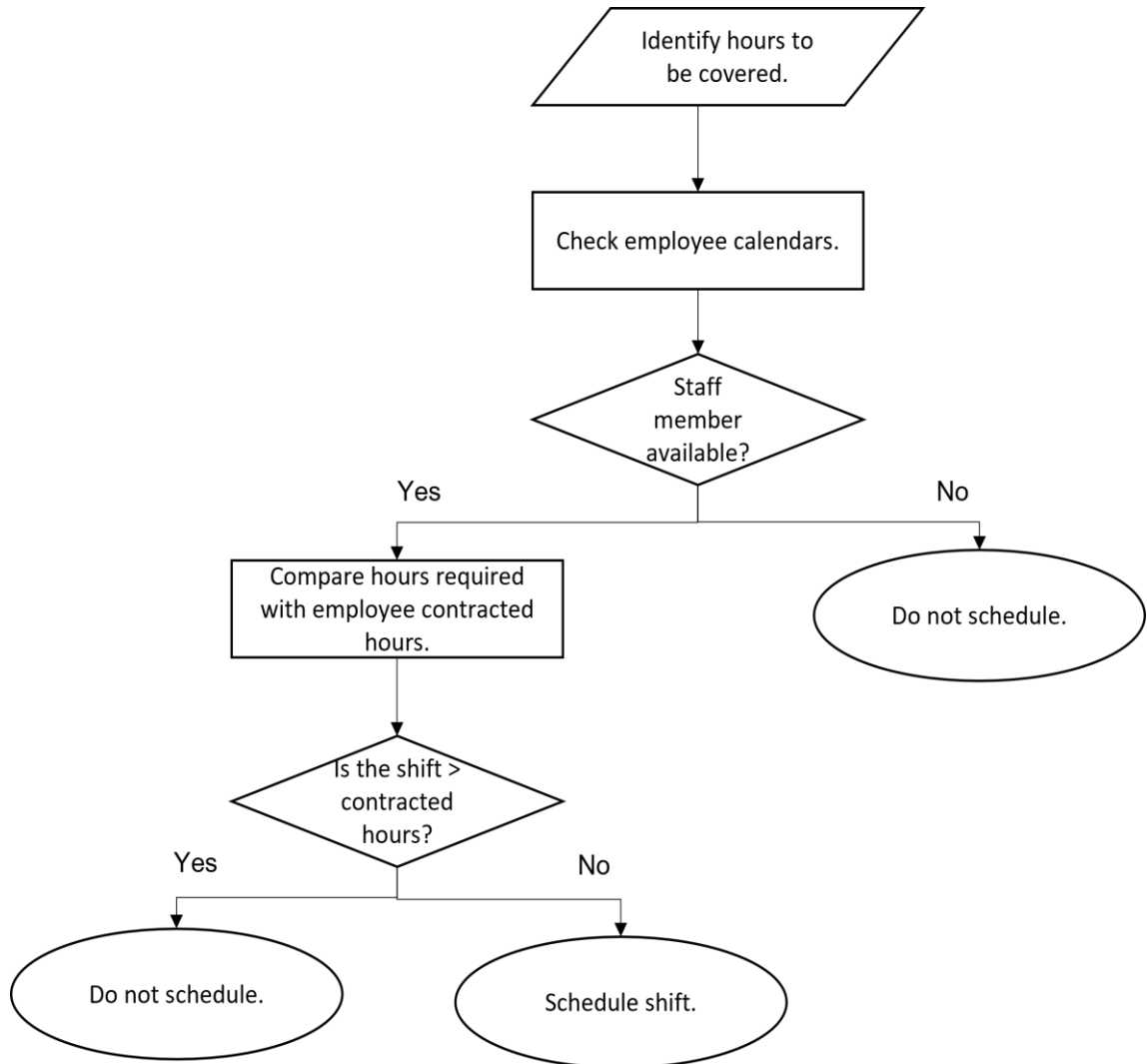
Select all that apply.

- A** Technology.
- B** Finances.
- C** Operational viability.
- D** Stakeholder buy-in.
- E** Value perception.

24 When operating with an Agile development approach, select the CORRECT order in which to complete these activities.

- A** Retrospective activity.
- B** Diagram requirements for initial sprint.
- C** Establish the 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 of the following is NOT demonstrated by this flowchart?

Select **ONE** of the following.

- 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:

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

- 26** In order to establish the desired functionality of the solution, which of the following would be the **MOST** suitable action to begin with?

Select **ONE** of the following.

- A** Schedule a meeting with the agency to establish their specific requirements.
- B** Mock up a solution to present to stakeholders.
- C** Familiarise yourself with the existing website.
- D** Schedule time with the musician to understand the types of videos that fans will upload.
- E** Assess the feasibility of the project.

- 27** Users who pay for a "VIP Membership" to the website have been asked for their input on the proposed new feature. The following problems, constraints or considerations have been raised.

Match the issues with the correct category.

- | | ISSUES: | CATEGORY: |
|----------|--|--------------------------|
| A | Data protection.
Copyright and licensing. | <input type="checkbox"/> |
| B | Suitability of uploads for global audiences.
Typical users of the website. | <input type="checkbox"/> |
| C | Secure development.
The competence of the development team. | <input type="checkbox"/> |
| D | Monitoring the age of the performer(s) in uploads.
Managing explicit content. | <input type="checkbox"/> |

CATEGORIES:

1. Professional standards
2. Cultural
3. Ethical responsibilities
4. Legal

28 As part of your feasibility study, you have been analysing the costs associated with sourcing and implementing the required solution, and if the current website architecture would allow for such a solution. Which of the following areas have been assessed?

Select all that apply.

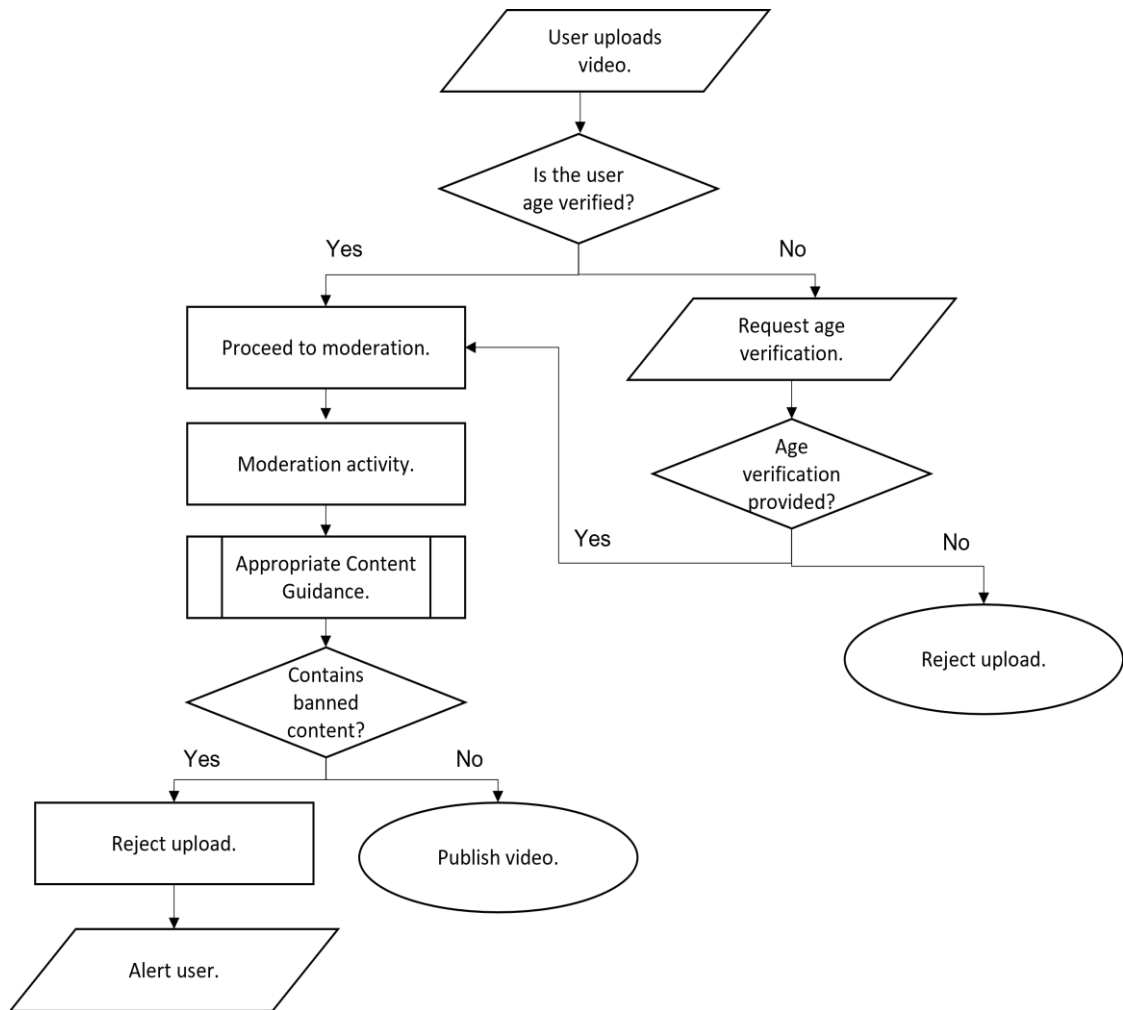
- A** User experience.
- B** Impact of not implementing the solution.
- C** Operational implementation.
- D** Technical feasibility.
- E** Financial viability.

29 You have been advised to undertake the development in a linear manner. CORRECTLY order the following steps.

- A** Test the solution.
- B** Deploy the solution.
- C** Define the features of the complete solution.
- D** Design the solution.
- E** Commence build.

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

Select ONE item on the flowchart which represents a process which has already been established.



Scenario 3:

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

Select **ONE** of the following.

- A** Schedule a meeting with the requirements engineer to discuss requirements.
- B** Schedule a meeting with a sample of the end users to discuss their needs.
- C** Study the business case.
- D** Arrange a meeting with the rest of the development team to scope a solution.
- E** Create a series swim lane diagrams to model each of the processes within the solution.

- 32** A consultation with the IT service desk team and a sample of end users has taken place and the following issues, suggestions or considerations have been raised.

Match the issues with the correct category.

- | | ISSUES: | CATEGORY: |
|----------|--|-----------|
| A | Data protection.
Identity fraud. | [] |
| B | Allowing remote access to company devices. | [] |
| C | Secure development practices.
Sharing solutions for common problems. | [] |
| D | Concerns around queue jumping.
Service level agreement for resolution turnaround. | [] |

CATEGORIES:

1. Security
2. Business processes
3. Professional standards
4. Legal

33 As part of your feasibility study, you have analysed the existing hardware, storage limitations and scalability of your intended solution. Which area of feasibility have you investigated?

Select **ONE** of the following.

- A** Technical viability.
- B** Stakeholder engagement.
- C** Return on investment.
- D** Financial resources.
- E** Operational implementation.

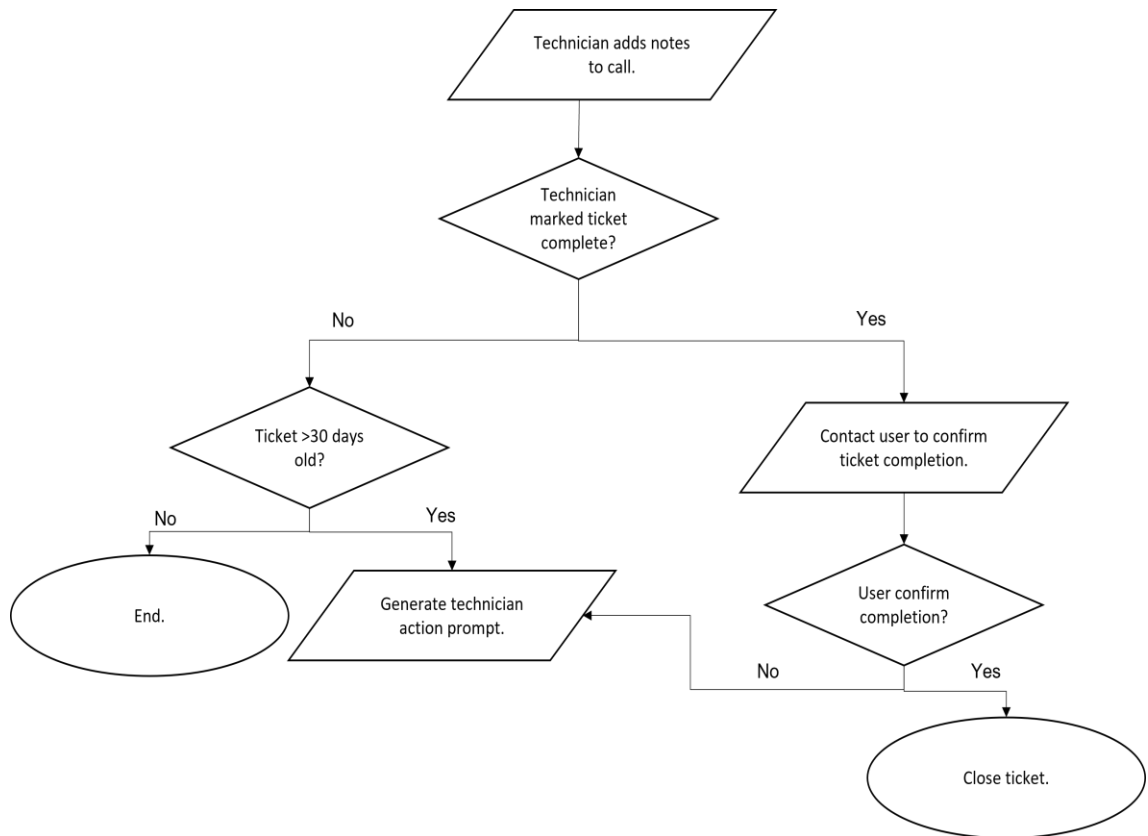
34 Upon completion of the first sprint, a retrospective activity shall take place, to reflect upon the sprint. Which of the following factors **WOULD** you discuss during this activity?

Select all that apply.

- A** What went well.
- B** Project budget tracker.
- C** What could be improved in the next sprint.
- D** Start, stop, continue activities.
- E** Questions from team members.

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

Select the area of the diagram which shows no action is required of live tickets, less than 30 days old.



Scenario 4:

You have been contracted as a software developer by an online learning platform who host 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** In order to establish the desired functionality of the solution, which of the following would be the **MOST** suitable action to begin with?

Select **ONE** of the following.

- A** Mock up a solution to present to stakeholders.
- B** Assess the feasibility of the project by assessing the existing feedback process.
- C** Familiarise yourself with the existing website.
- D** Schedule a meeting with the online learning platform team to establish their requirements.
- E** Create a flowchart to represent all of the processes within the solution.

- 37** Following a consultation with staff members about the new scheduling tool, the following problems, constraints or considerations have been raised.

Match the issues with the correct category.

- | | ISSUES: | CATEGORY: |
|----------|---|--------------------------|
| A | Data Protection.
Copyright and licensing. | <input type="checkbox"/> |
| B | Anonymity.
Unwanted contact. | <input type="checkbox"/> |
| C | File naming conventions.
Secure development practices. | <input type="checkbox"/> |
| D | Registering course completions.
Poor feedback follow-up. | <input type="checkbox"/> |

CATEGORIES:

1. Legal
2. Ethical
3. Professional standards
4. Business processes

- 38** One of your peers has conducted a feasibility study to assess the practicalities of implementing the solution. However, the output of the study is excessive and too many factors appear to have been considered. Which of the following SHOULD NOT be included in the feasibility study?

Select all that apply.

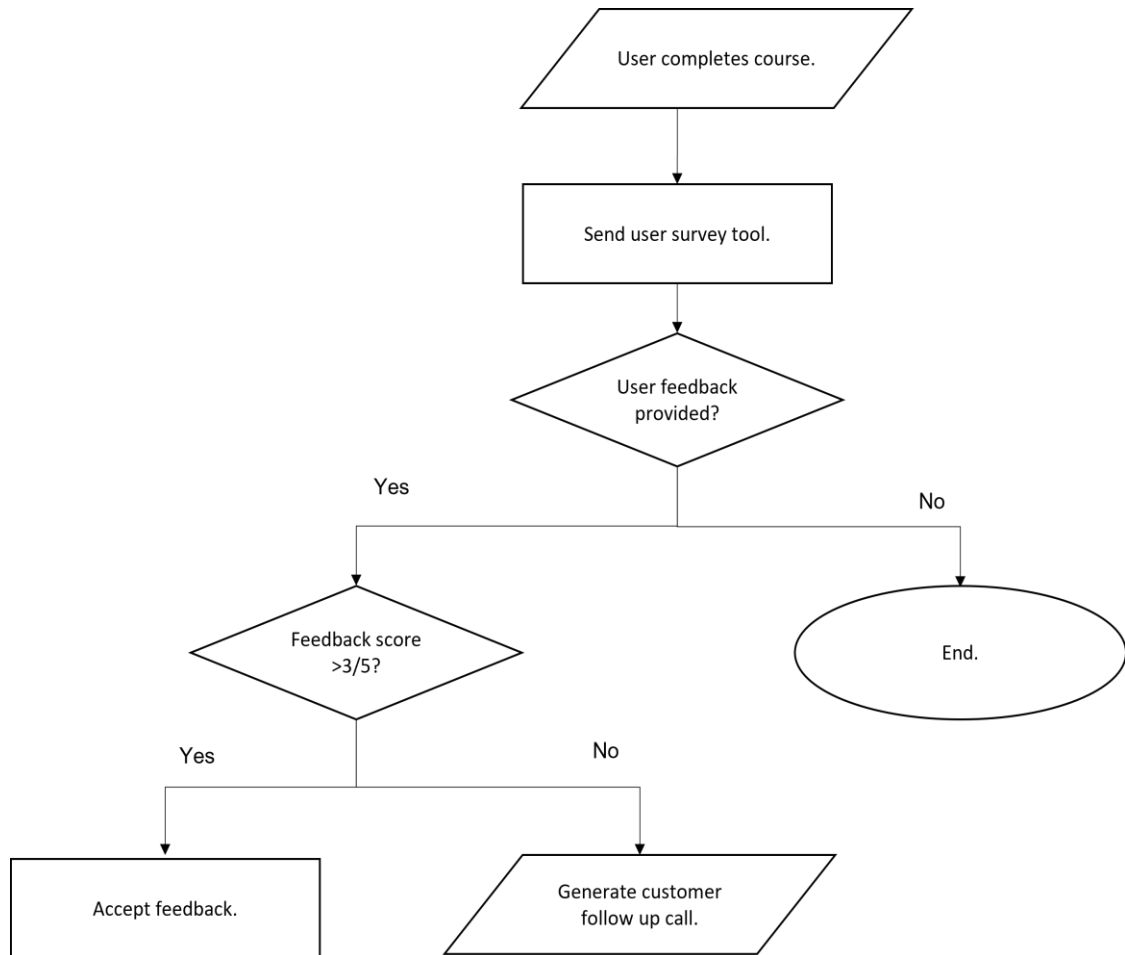
- A** Technical viability.
- B** Financial viability.
- C** Operational implementation.
- D** Customer experience.
- E** Return on investment.

- 39** You have been advised to undertake the development in a linear manner.

CORRECTLY order the following steps.

- A** Design the solution.
- B** Test the solution.
- C** Deploy the solution
- D** Commence build.
- E** Define the features of the complete solution.

- 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.



Which of the following statements is incorrectly represented in the flowchart?

Select **ONE** of the following.

- 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.

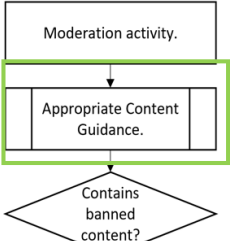
End of Paper

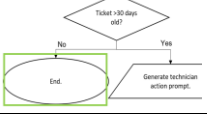
BCS Level 4 Module in Software Developer Answer Key and Rationale

Question	Answer	Explanation / Rationale	Syllabus Section
1	B	Software Development Life Cycle 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	A,B,C	Maintenance is not considered as part of this study.	1.3
4	A	Technical support should be made aware of common/likely issues and how to resolve them prior to launch.	2.1
5	B, C	The creation of A and D should be the responsibility of other roles in the project team.	2.2
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	A	Authentication ensures the identity of the user is known.	6.3
8	C and D	The other activities would not be classed as penetration testing, although they may be undertaken at other times.	10.2
9	B	Software is classed as a deliverable at this stage, with maintenance, etc coming thereafter.	1.4
10	A	The Product Owner is responsible for the value – real and perceived – of the product.	2.2
11	See explanation	Performance testing checks system responsiveness and stability under a particular workload. Security testing reveals vulnerabilities that may compromise data protection.	10.2

Question	Answer	Explanation / Rationale	Syllabus Section
		Usability testing evaluates ease of use by end users and fitness for purpose. Compatibility testing tests how the product operates with other software and hardware.	
12	D	Using design patterns is a reusable solution to commonly occurring problems, therefore would provide no value if the problem does not re-occur.	5.3
13	C	Building security into an application does not increase the risk of bugs, slow speed or the source code being stolen. Applications without security however do pose risks to users in terms of unauthorised access to sensitive data.	6.3
14	A,B,C	Different algorithms may complete the same task however will not have the same performance characteristics.	7.1
15	A	By allowing an object to expose a different interface, adapter pattern enables classes to work together that could not otherwise because of incompatible interfaces.	5.3
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
17	C	Software Development Lifecycle is a process that defines the stages in the development of software for delivering a high-quality product from inception to retirement.	1.1
18	B	During the design stage, requirements and details of the design are discussed with the user(s) in order to support a successful outcome. The feasibility study assesses the measure of suitability of the development process prior to modelling the user requirements. Code development cannot start until the design is agreed and it would be too	1.2

Question	Answer	Explanation / Rationale	Syllabus Section
		late to model requirements at the implementation stage.	
19	B	Use cases are used during the analysis stage to identify, clarify and organize system requirements.	1.4
20	A		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	See explanation	WTD and DP are legal requirements. Working preferences and individual responsibilities are not legally required, but they do influence business culture. Updating calendars and following the holiday request process are not legally required but they are expected business processes. Naming conventions and developing in a secure manner are expectations of an IT professional.	6.2, 6.3
23	A, B, C	A feasibility assessment would always include those three elements. Value perception and stakeholder buy-in may be measured in other areas.	1.2, 1.3
24	See explanation	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. <ol style="list-style-type: none"> 1. Define the features of the solution. 2. Establish the MVP. 3. Diagram requirements for initial sprint. 4. Commence first sprint. 5. Retrospective activity. 	3.4, 4.1, 4.3
25	B	The flowchart would prevent a colleague being assigned a shift longer than their contracted hours, demonstrated by the decision diamond.	9.1

Question	Answer	Explanation / Rationale	Syllabus Section
26	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
27	See explanation	Data protection and copyright are legal issues. The suitability of the uploaded content (post moderation) may not align with the values of all cultures and even website users. The management of explicit content and the age of the performers in the music videos would be an ethical concern, but not necessarily legal. Secure development of the solution and competence of the developers are professional standards issues.	6.2,6.3
28	D, E	This cost would be considered under the financial elements of a feasibility study, and the architecture of the current offering would be technical.	1.2,1.3
29	See explanation	Logically in a waterfall development environment, the stages of development would be completed in order as per the SDLC, with no iterations or MVP. <ul style="list-style-type: none"> 1. Define the features of the complete solution. 2. Design the solution. 3. Commence build. 4. Test the solution. 5. Deploy the solution. 6. 	3.4, 4.1, 4.3
30	<p>'Appropriate Content Guidance' item</p> 	The notation used identifies the Appropriate Content Guidance as a pre-existing process.	9.1
31	A	Establishing and discussing the requirements would take place before any other development	2.1,2.2

Question	Answer	Explanation / Rationale	Syllabus Section
		activity from these options, as the requirements would need to be understood before a solution could be planned.	
32	See explanation	DP and identify fraud risks are legal issues. Remotely accessing devices and restricting access to particular functions are security measures. Secure dev and sharing knowledge and good professional standards. Ensuring all requests go through the ticketing process and agreeing an SLA are business processes.	6.2, 6.3
33	A	These areas would be categorised as technical in a feasibility assessment.	1.2,1.3
34	A,C,D,E	Budget would not generally be discussed as part of a sprint retrospective.	3.4, 4.1, 4.3
35	'End' oval 	The 'End' oval shows that tickets under 30 days old do not require any further action.	9.1
36	D	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
37	See explanation	Protecting the anonymity of the user and ensuring unwanted contact are avoided are ethical concerns. File naming conventions and dev practises relate to professional IT standards. Data protection and copyright issues are legal concerns, and course completions and feedback rely on business processes.	6.2,6.3
38	D,E	CX and ROI would be measured in other areas.	1.2,1.3

Question	Answer	Explanation / Rationale	Syllabus Section
39	See explanation	<p>Logically in a waterfall development environment, the stages of development would be completed in order as per the SDLC, with no iterations or MVP.</p> <ol style="list-style-type: none"> 1. Define the features of the complete solution. 2. Design the solution. 3. Commence build. 4. Test the solution. 5. Deploy the solution 	3.4, 4.1, 4.3
40	B	If the user does not provide feedback, the process end, as shown by the 'End' oval.	9.1