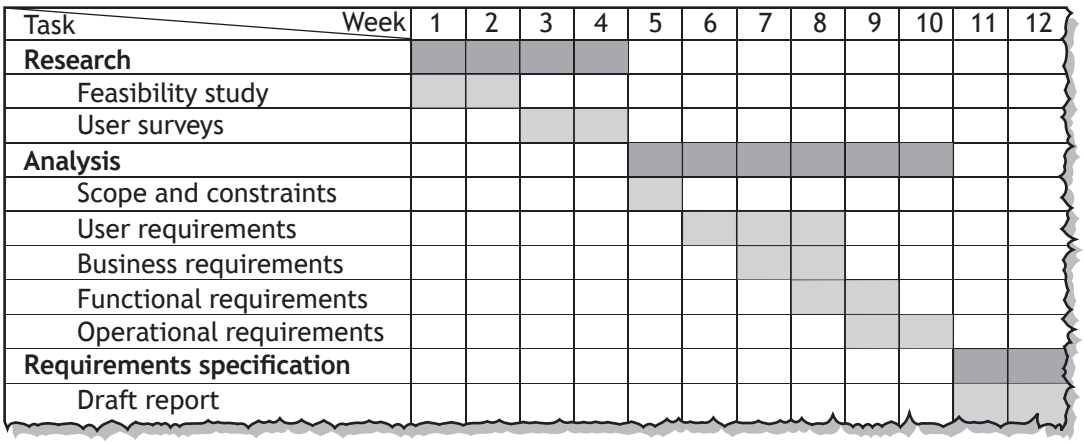
Total marks — 60

Attempt ALL questions

1. A software development company is developing a social media site called "MusicFans". The development project is carried out over a number of weeks and part of the Gantt chart for the project is shown below.



Task \ Week	1	2	3	4	5	6	7	8	9	10	11	12
Research												
Feasibility study												
User surveys												
Analysis												
Scope and constraints												
User requirements												
Business requirements												
Functional requirements												
Operational requirements												
Requirements specification												
Draft report												

(a) User surveys for the "MusicFans" site are completed in weeks 3 and 4 of the project. Describe what information would be gathered and how it would be used in weeks 5 to 12 of the project. **2**

Later in the project, the development company decides to use an object-oriented program to create the social media site.

The program requires a number of classes including `UserProfile` and `Fan`, which are shown on *Page 03*.

1. (continued)

MARKS

DO NOT WRITE IN THIS MARGIN

```
line
1   CLASS UserProfile IS {STRING userID, STRING name, STRING password}
2
3   METHODS
4
5       CONSTRUCTOR UserProfile (STRING u, STRING n, STRING p)
6           DECLARE THIS.userID INITIALLY u
7           DECLARE THIS.name INITIALLY n
8           DECLARE THIS.password INITIALLY p
9       END CONSTRUCTOR
10
11      FUNCTION login (STRING userID, STRING password) RETURNS BOOLEAN
12          DECLARE isValid INITIALLY false
13          <set isValid true if valid user with correct password>
14          RETURN isValid
15      END FUNCTION
16
17  END CLASS
18
19
20  CLASS Fan INHERITS UserProfile WITH {STRING email}
21
22  METHODS
23
24      CONSTRUCTOR Fan (STRING u, STRING n, STRING p, STRING e)
25          DECLARE THIS.userID INITIALLY u
26          DECLARE THIS.name INITIALLY n
27          DECLARE THIS.password INITIALLY p
28          DECLARE THIS.email INITIALLY e
29      END CONSTRUCTOR
30
31      FUNCTION getEmail() RETURNS STRING
32          RETURN THIS.email
33      END FUNCTION
34
35  END CLASS
```

(b) Explain why the `Fan` class only has one instance variable at line 20. **2**

MARKS

DO NOT WRITE IN THIS MARGIN

(c) Kirsty Smith is a music fan. She creates a profile for the "MusicFans" site using the following details:

`userID` "kirsty127"
`password` "pa55w0rd"
`email` "kirsty@scotmail.com"

The `Fan` object that represents Kirsty is being stored in the variable `fan1`. Using the data provided and a programming language with which you are familiar, write code to instantiate the `Fan` object called `fan1`. **2**

(d) (i) Use appropriate line numbers to explain how encapsulation has been used in the creation of the `Fan` class above. **2**

(ii) The `Fan` class has been extended by the addition of the following update e-mail procedure.

```
PROCEDURE updateEmail (STRING newEmail)
        SET THIS.email to newEmail
END PROCEDURE
```

Kirsty needs to update her e-mail to "kirstysmith@scotmail.com".

MARKS

DO NOT WRITE IN THIS MARGIN

Using a programming language with which you are familiar, write code to update the e-mail data of the `fan1` object created in part (c). **2**

(e) A new subclass of the UserProfile class, called `BandProfile` is to be added to the program. The class diagram of `Band` is shown below.

BandProfile
Genre: STRING WebAddress: STRING
getGenre ( ) getWebAddress ( )

Use a programming language with which you are familiar, to write the `BandProfile` class. **3**