Pearson BTEC
Level 3 Nationals
Extended Diploma

Centre Number | Learner Registration Number

**Window for supervised period:
23/04/2019 – 07/05/2019**

Controlled hours: 12 hours | Paper Reference **31725H**

Engineering

Unit 6: Microcontroller Systems for Engineers
Electronic Task Booklet

Part S

You must have: Appropriate hardware (including electronic components), programming and word processing software, a calculator, audio-visual equipment and, if required, the information booklet.

Total Marks

Instructions

- **Fill in the boxes** at the top of this page with your name, centre number and learner registration number.
- Answer **all** activities in this electronic task booklet provided and produce an audio-visual recording of the system in operation.
- **Part S** should be undertaken in 12 hours under supervision over no more than 5 consecutive working days. The supervised sessions take place in the two-week period timetabled by Pearson.

Information

- The total mark for this paper is 80.
- The marks for each activity are shown in brackets
  – *use this as a guide as to how much time to spend on each activity.*

Advice

- Read each activity carefully before you start to answer it.
- Try to answer every activity.
- Check your answers if you have time at the end.

Turn over ▶

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Complete your work in this electronic task booklet.

Activity 1

Task planning and system design changes

You are advised to spend no longer than 1.5 hours on this activity.

At the start of the task, create a short project time plan/Gantt chart and use it to monitor your progress throughout the rest of the task and make any adjustments as required.

During the other activities (2 to 5), you should also **record in the Activity 1 section** of your electronic task booklet:

- What you did in the session,
- Details of any issues encountered in this session and solutions discovered,
- Action points for the next session.

(10)

Initial Task Plan

Instruction – during each session, complete the following logbook, duplicating the table as required for each session (cut and paste the table as required).

Remember to update the project time plan/Gantt chart at the start of each session
Date:
What I have done this session:
Issues encountered this session and solutions with justification:
Action points for the next session:

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Activity 2

Analysis of the brief

You are advised to spend no longer than 1.5 hours on this activity.

* By interpreting the client brief into operational requirements, prepare a technical specification for a user friendly system that can handle some unexpected events.
* Prepare a test plan to check the functionality of the final solution against the technical specification and include some unexpected events.

(9)

Test Plan Template (Activity 2)

Tests can include unexpected events (i.e. non-routine) that are outside the normal operation of the system.

Test number	Purpose of test	Test condition	Expected result

Activity 3

System design

You are advised to spend no longer than 2.5 hours on this activity.

Prepare a user friendly system design that can handle some unexpected events, including:

* The selection and justification of suitable input and output devices.
* A description of the system design covering input and output devices and microcontroller connections.
* A plan for the program structure detailing key system operations.

For **Activity 3** you could provide: written notes, annotated diagrams, flow charts, images, schematics, pseudocode and tables.

(16)

Activity 4

System assembly and programming

You are advised to spend no longer than 2.5 hours on this activity.

Develop a user friendly system that is well organised, structured and formatted, including:

- Producing the software program and annotating the code.
- The assembly of any hardware (if required).
- Refining the system so that it operates as expected and can handle some unexpected events.

For **Activity 4** you could provide: written notes, screenshots, annotated programs/flow charts and images.

(16)

W 6 1 5 8 1 A 0 7 1 0

Activity 5

System testing and results analysis

You are advised to spend no longer than 1.5 hours on this activity.

- Test the system using the test plan (from Activity 2) and include some unexpected events.
- Record the outcome of each test in the template provided.
- Analyse the test results and evaluate the system for conformance against the client brief.

(9)

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Test Plan Template (Activity 5)

Tests can include unexpected events (i.e. non-routine) that are outside the normal operation of the system.

Copy and paste your Test Plan from **Activity 2** into the table below and complete the **Activity 5** columns.

	Activity 2				Activity 5
Test number	Purpose of test	Test condition	Expected result	Actual result	Comments and justification

Activity 6

System in operation

You are advised to spend no longer than 2.5 hours on this activity.

Produce an audio-visual recording that demonstrates the system in operation, which should include:

* Your name, learner registration number and centre number at the start.
* A commentary explaining the operation of the user friendly system and how its behaviour is linked with your chosen hardware and the software program.
* Recorded evidence of the outcome from suitable tests including some unexpected events (from Activity 5).

Please note that the evidence for this activity should be in one separate audio-visual recording of no more than three minutes.

Do not add any comments for Activity 6 into this electronic task booklet.

(20)

W 6 1 5 8 1 A 0 1 0 1 0