**Design & Technology**

**Modelling the costing of projects to achieve optimum outcome**

**Materials required for questions**

* Pencil
* Rubber
* Calculator

**Instructions**

* Use black ink or ball-point pen
* Try answer all questions
* Use the space provided to answer questions
* Calculators can be used if necessary
* Use a cross in the box to mark you answer

**Advice**

* Marks for each question are in brackets
* Read each question fully
* Try to answer every question
* Don’t spend too much time on one question

**Good luck!**

**Q1**. What is a cost that is not accounted for when budgeting a project

**A** Staff hours

**B** Machinery costs

**C** Unplanned expenses

**Q2**. When planning for a project budget why is it important to know the scale of production being used

**A** So the cost of manufacturing can be estimated

**B** So the machinery needed can be ordered in time

**C** So the timescale of the project is known

**Q3**. Which scale of production will have the highest set up costs

**A** One-off production

**B** Batch production

**C** Mass production

**Q4**. Modelling the cost of projects such as car manufacturing can be done completely by CAD software

**A** True

**B** True

**Q5**. Explain two advantages in terms of cost of using an automated closed loop control system, compared to an open loop control system, in production. **(2 marks)**

1.

2.

**Q6**. Evaluate the cost implications to a business of running effective quality control systems. **(6 marks)**

**Q7**. When planning for production there are areas that need to be considered such as the equipment available for scale of production.

Name 2 other areas that need to be considered **(2 marks)**

1.

2.

**Q8**. Name 3 costs that need to be considered when modelling the cost of a project **(3 marks)**

1.

2.

3.

**Q9.** Evaluate the decision to use injection moulding to create the drill body shown by the image below **(9 marks)**

A green and black object parts

Description automatically generated

**Q10.** Outline considerations that need to be considered when preparing budgets **(6 marks)**

**Answers**

**Q1.** C

**Q2.** A

**Q3.** C

**Q4.** A

**Q5.**

* Reduced labour/wages costs
* Increased/faster productivity/cost saving

**Q6.**

Any six of the following but must include one from each to gain full marks:

**Negatives**

* Running QC systems costs extra money /reduces profits. (1)
* Increases selling price / price themselves out of the market / competitor products are cheaper. (1)
* Set up costs eg. Equipment / training costs. (1)
* Running costs eg. Labour/ energy /maintenance/ destructive testing/ etc. (1)
* Slower production rate / time consuming / time needed to check every component / less products manufactured / sold. (1)

**Positives**

* High quality / more reliable products produced. (1)
* Good reputation/quality marks gained (BSI, ISO4000, etc). (1)
* Leading to increased profits /higher value product / increased sales / money saved. (1)
* Less returned products/ replacement products supplied. (1)
* Sampling / computer driven /automated monitoring systems are cheaper to run.(1)
* Increased QC checks will reduce the waste incurred when faulty goods are further processed/ faulty goods are disposed of / leads to increased productivity. (1)

**Q7.**

* Material costs (quality of product)
* Labour/Wages (automation vs high skilled)
* Premises

Do not accept Equipment available for scale of production

**Q8.**

• Start-up costs (legal/insurance/stock/advertising/permits/wages)

• Sales (predict sales)

• Expenses (wages/advertising/vehicles/accounting/legal fees)

• Cost of goods (COGS) (materials/packaging/transport/commission)

• Cash flow (tell you how much cash your expecting/help make decisions)

**Q9.**

Candidates might refer to the following in their responses:

* the drill body has a thin wall section/complex shape and profile
* the body will be required in high volume
* the design requires cores/bushes/inserts/ components/fastenings.
* a range of colours can be offered
* cost of mould/skilled labour required
* speed of production
* energy costs
* environmental influences.

Expansion that can be used to justify judgments relating to positive or negative points:

* the form can be achieved with a highly complex mould
* does not need any additional surface finishing
* injection moulding process can deliver the product to consistent level of quality time after time/suitable for high volume/the body will need to fit other components so must be same every time
* cores/inserts/components/fastenings can easily be moulded into the drill body, which allows it to be produced in one process
* the initial cost of the mould is expensive, requiring high volume to recoup costs
* colour can be changed without need for additional moulds
* a fast process allowing rapid volume production
* the level of detail and craftsmanship/knowledge required to make the mould is expensive/limited number of people capable
* if the process is 24/7 then it is more efficient than a costly start-up period each day, but this must be weighed against 24/7 labour costs
* ambient temperature/viscosity changes/mould temperature variations are all factors that can have an adverse effect on the moulding process and need careful monitoring/environmental control systems.

**Q10.**

* Set-up costs (1)
* Material costs (1)
* Labour costs (1)
* Transportation costs (1)
* Training and development costs (1)
* Manufacturing costs (1)
* Overhead costs / facilities costs (1)
* Sales and marketing costs /market research (1)
* Production capacity (1)
* Market trends (1)
* Break even output (1)
* Product retail price / affordability (1)
* Quality (1)
* Market demand / expected production output (1)
* Storage costs (1)
* Packaging costs (1)
* Energy costs (1)
* Inflation impacting on costs (1)
* Profit forecasts and requirements (1)
* Government policies (1)
* Long term aims and objectives (1)
* Contingencies / allowance for unexpected events (1)