

# National Exams December 2018

04-BS-15, Engineering Graphics and Design Process

3-Hours Duration

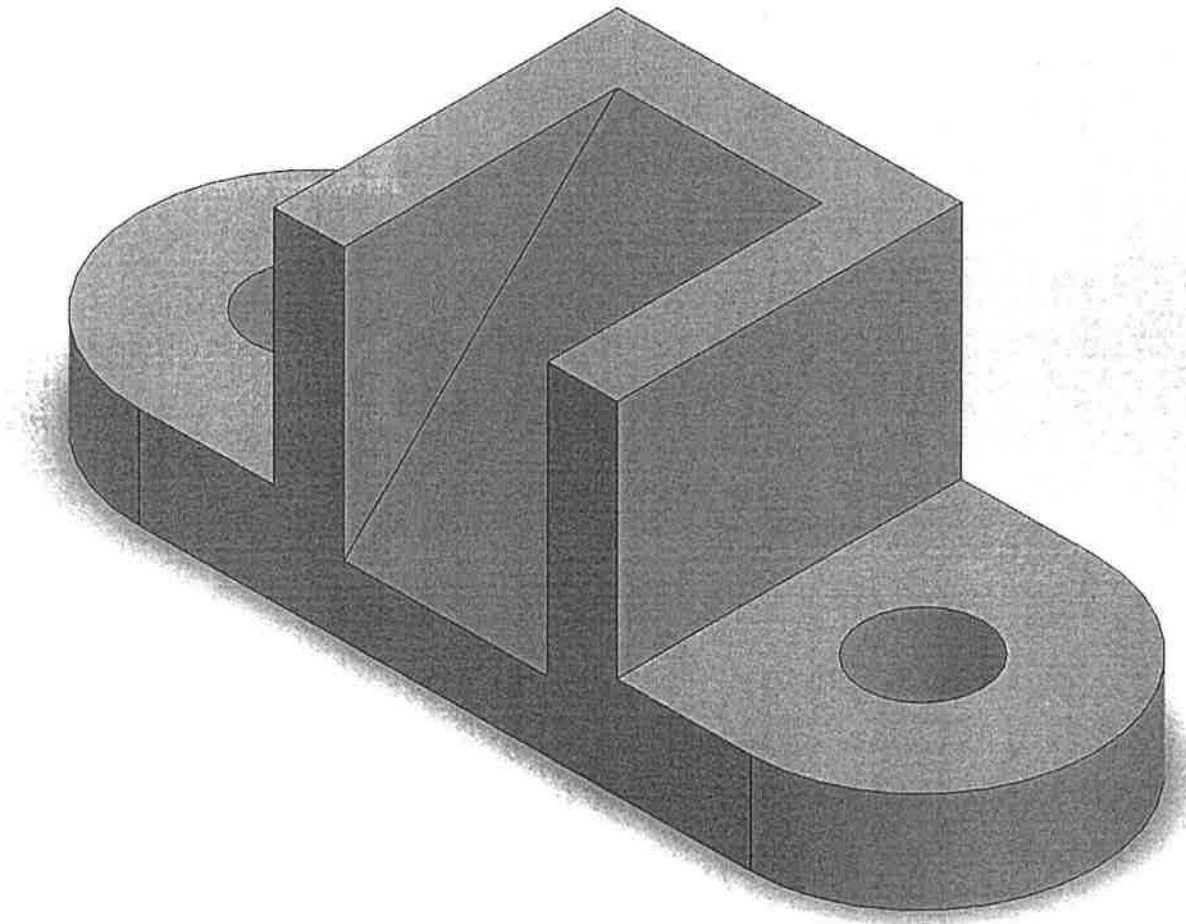
## NOTES

1. If doubt exists as to the interpretation of any question, the candidate is urged to submit with the answer paper, a clear statement of any assumptions made.
2. This is a closed book examination. No calculator is permitted.
3. Five (5) questions constitute a complete exam paper. Clearly label the answers in the answer book.
4. All sketches must be made freehand and must be easy to read and neat. Straightedges may not be used.
5. The exam is out of 100 marks.

**QUESTION 1 (50 MARKS)**

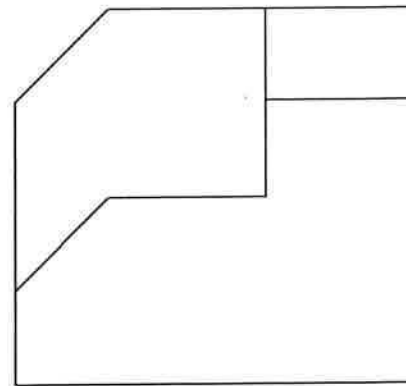
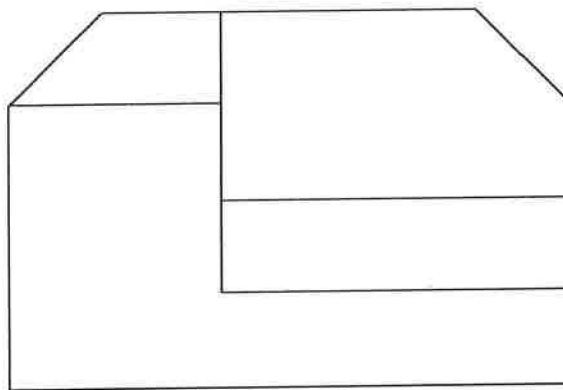
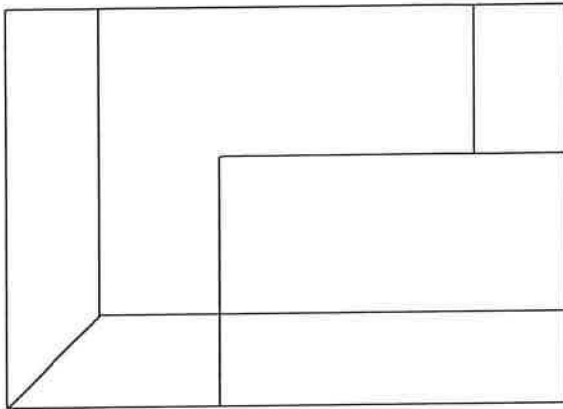
For the part shown below,

- a) Sketch an appropriate set of orthographic views, using third-angle projection. (10 marks)
- b) Fully dimension the sketch in part a) using professional standards. Use "xx" in place of numerical values in the dimensions. (10 marks)
- c) Describe and sketch an appropriate sequence of feature-based solid modelling operations that could be used to create this geometry using parametric, feature-based solid modelling CAD software. (15 marks)
- d) Describe and discuss appropriate manufacturing methods for this part, and any issues that might arise. (15 marks)



**QUESTION 2 (10 MARKS)**

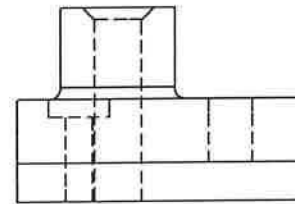
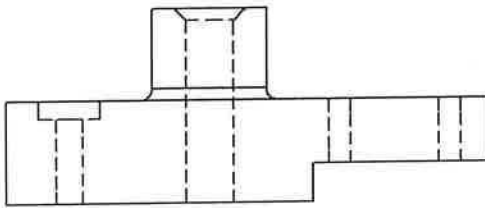
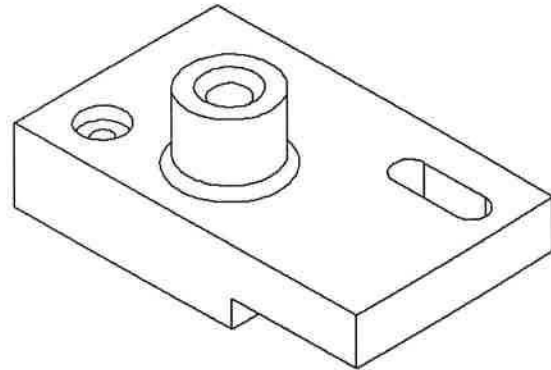
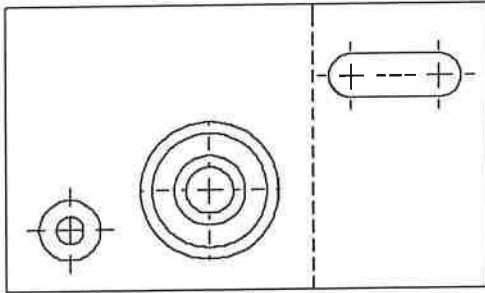
The multiview drawing below uses 3<sup>rd</sup>-angle projection. Sketch an isometric view.

**QUESTION 3 (10 MARKS)**

Explain the meaning of clearance fits, transition fits and interference fits, and give examples of appropriate applications of each type of fit. Use sketches as needed to support your answer.

**QUESTION 4 (10 MARKS)**

Sketch an appropriate section view for the part shown below.

**QUESTION 5 (20 MARKS)**

In the engineering design process, customer requirements or needs are used to establish design specifications.

- Define "customer requirements" and "design specifications", and describe their characteristics and purpose. (10 marks)
- Discuss or describe a systematic process for establishing design specifications based on customer requirements. (10 marks)