First Semester Examination
2021/2022 Academic Session

February/March 2022

EPP331 – Manufacturing Technology II

Duration : 2 hours

Please ensure that this examination paper contains **FOUR (4)** pages and **FOUR (4)** question before you begin the examination.

Instructions : Answer **ALL FOUR (4)** questions.

Answer all questions in **English**.

Each question must begin from a new page.

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1. [a] An economical production quantity in manufacturing a plastic product depends on the equipment cost and the production rate. These factors also play an important role in the sustainable production of plastic products.

(i) Suggest **ONE (1)** manufacturing process that can produce a very high economical production quantity in manufacturing the plastic product. Justify your suggestion by providing **TWO (2)** necessary reasons.

(20 marks)

(ii) With the help of a sketch, explain in detail the process of manufacturing the plastic product based on your suggestion in Q1 [a] (i). Explain your answer using **ONE (1)** real example of a plastic product that can be produced using the suggested process.

(30 marks)

[b] Ceramic is an inorganic and non-metal solid material that requires few processing steps in order to produce a high-quality ceramics product.

(i) Explain in detail the process of manufacturing a ceramic product. Explain your answer using **ONE (1)** real example of a ceramic product.

(30 marks)

(ii) Shrinkage is one type of defect that occurs on ceramic parts during the firing process. Suggest and explain **TWO (2)** solutions that can be applied to improve the quality of the ceramic product explained in Q1 [b] (i) for the sustainable production.

(20 marks)

2. [a] Design for Manufacturing and Assembly (DFMA) is a method applied to minimize the cost of production and time while maintaining an appropriate level of quality. Figure Q2 [a] shows the components in the internal assembly of the controller at the initial design and after redesign using DFMA. Evaluate **FOUR (4)** changes that have been made to improve the design and identify the related DFMA design guidelines that have been applied.

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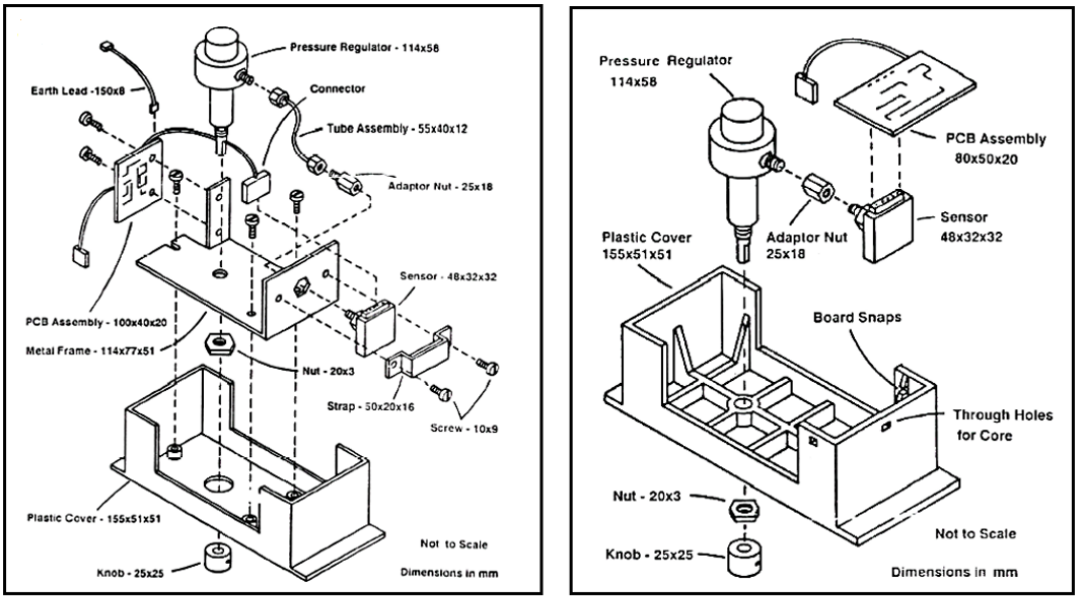

Initial design After redesign

Figure Q2 [a]

(60 marks)

[b] Green manufacturing is very important to ensure environmental sustainability. Explain **TWO (2)** methods in green manufacturing and the benefit of each method.

(40 marks)

3. Answer the following set of questions according to the last digit of the student's matric number.

SET 1 (Last digit of matric number is ODD):

[a] The reduction of energy consumption is one of the methods to improve the sustainability of Rapid Prototyping processes. Select **ONE [1]** Rapid Prototyping process which have been covered in EPP331 lecture and discuss briefly how the sustainability of the selected process can be improved by this method.

(50 marks)

[b] The use of renewable resources is one of the methods to improve the sustainability of Rapid Prototyping processes. Select **ONE [1]** Rapid Prototyping process which have been covered in EPP331 lecture and discuss briefly how the sustainability of the selected process can be improved by this method.

(50 marks)

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SET 2 (Last digit of matric number is EVEN):

[a] The use of machine tool components that can be reused and rework is one of the methods to improve the sustainability of Rapid Prototyping processes. Select **ONE [1]** Rapid Prototyping process which have been covered in EPP331 lecture and discuss briefly how the sustainability of the selected process can be improved by this method.

(50 marks)

[b] The minimization and recycling of wastes is one of the methods to improve the sustainability of Rapid Prototyping processes. Select **ONE [1]** Rapid Prototyping process which have been covered in EPP331 lecture and discuss how the sustainability of the selected process can be improved by this method.

(50 marks)

4.

[a] The release of harmful fumes due to an improper storage and disposition of chemicals is one of the potential hazards in Advanced Machining Processes (AMP). Select **ONE [1]** Advanced Machining process which have been covered in EPP331 lecture that relates to the hazard. Discuss briefly how the hazard can be contributed by the process and provide **ONE [1]** significant action to mitigate the hazard. In the answer, provide **ONE [1]** specific example of fume and **ONE [1]** specific example of chemicals used in the process.

(50 marks)

[b] The exposure to highly powered beam at certain power densities and wavelengths is one of the potential hazards in Advanced Machining Processes (AMP). Select **ONE [1]** Advanced Machining process which have been covered in EPP331 lecture that relates to the hazard. Discuss how the hazard can be contributed by the process and provide **ONE [1]** significant action to mitigate the hazard. In the answer, specify the operating wavelength (in nm) of the high-powered beam applied by the process.

(50 marks)

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