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UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
SEMESTER I
SESSION 2018/2019**

COURSE NAME : PLANT FABRICATION
TECHNOLOGY

COURSE CODE : BNL 20303

PROGRAMME CODE : BNL

EXAMINATION DATE : DECEMBER 2018 / JANUARY 2019

DURATION : 3 HOURS

INSTRUCTION : ANSWER ALL QUESTIONS

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THIS QUESTION PAPER CONSISTS OF FIVE (5) PAGES

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- Q1** (a) The location of the plant can have a crucial effect on the profitability of a project, and the scope for future expansion. Many factors must be considered when selecting a suitable site. State **FOUR (4)** principal factors to be considered. (4 marks)
- (b) The economic construction & efficient operation of a process unit will depend on how well the plant & equipment specified on the process flow-sheet is laid out. The principal factors to be considered includes cost, operation and safety. Discuss these factors in detail. (6 marks)
- (c) Based on **Figure Q1 (c)**, identify component B & C. (2 marks)
- (d) Natural gas is a naturally occurring hydrocarbon gas mixture consisting primarily of methane. Based on **Figure Q1 (c)**, illustrate the steps while compressing natural gas. (8 marks)
- Q2** (a) It is essential that the specifications on product and waste quality are met in separation process. Propose a control system for the distillation column where the flow to the column comes from a storage tank, the product, acetone, is sent to storage and the waste to an effluent pond. (9 marks)
- (b) In choosing the material to fabricate a distillation column, its mechanical properties are considered. State **THREE (3)** mechanical properties. (3 marks)
- (c) The life of equipment subjected to corrosive environments can be increased with proper attention to the design details. Discuss **THREE (3)** principles in designing for corrosion resistance. (6 marks)
- (d) In sheet and plate metalwork, roll bending machine is used. State the different type of roll bending machine for sheet metal and plate metal. (2 marks)

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Q3 (a) Based on P&ID drawing shown in **Figure Q3 (a)**, show the following component by letter or number.

- (i) Tank
- (ii) Centrifugal pump
- (iii) Heat exchanger
- (iv) Reactor
- (v) Tower
- (vi) Furnace
- (vii) Boiler
- (viii) Drum
- (ix) Vacuum pump
- (x) Cooling tower
- (xi) Flow sensor
- (xii) Control valve
- (xiii) Globe valve
- (xiv) Check valve
- (xv) Butterfly valve
- (xvi) Diaphragm valve

(16 marks)

(b) Analyze condition of valve suitable to be used and justify your answer for the following situation.

- (i) A valve controlling the flow rate of a treated wastewater stream that is being released into a nearby river.
- (ii) A valve controlling the flow of cold water entering a heat exchanger.

(4 marks)

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- Q4**
- (a) Sheet metal joint can be self-secured joint or non-self-secured joint. State **TWO (2)** types of self-secured joints. (2 marks)
 - (b) Identify suitable methods (locking devices) of preventing threaded connection working loosely in below situation. Justify your answers.
 - (i) High vibration environments on non-safety critical applications
 - (ii) Common in aerospace, defense, and racing industry(6 marks)
 - (c) Explain **FOUR (4)** factors that have to be considered when selecting a rivet. (4 marks)
 - (d) List **TWO (2)** types of the steel work connections and discuss the relative advantages and limitations of each of the system. (8 marks)
- Q5**
- (a) Describe the braze welding with the aid of sketches, outline the different types of joint by braze welding. (4 marks)
 - (b) Describe basic principle of brazing. (2 marks)
 - (c) Analyze **TWO (2)** applications of brazing. (4 marks)
 - (d) Welding is the most economical and efficient way to join metals permanently.
 - (i) A common fault when welding is lack of penetration. Explain **FOUR (4)** main causes of this fault (4 marks)
 - (ii) Explain the meaning of lack of fusion and state **TWO (2)** possible causes of this fault (6 marks)

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-END OF QUESTIONS -

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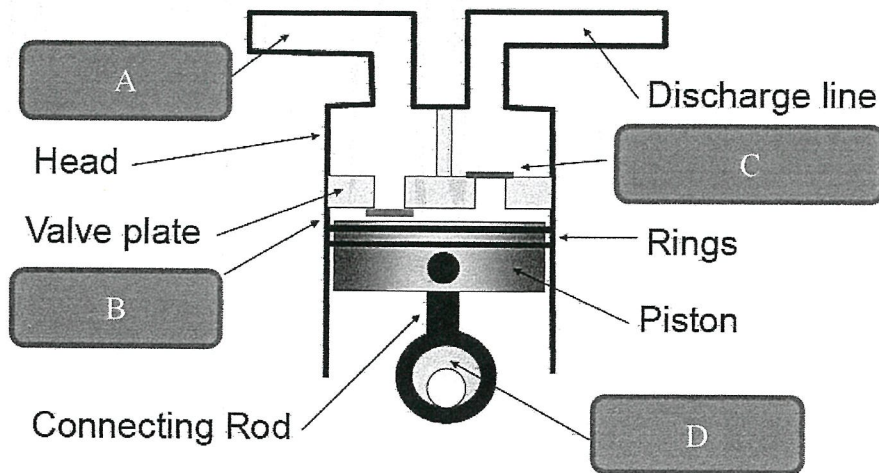


Figure Q1 (c)

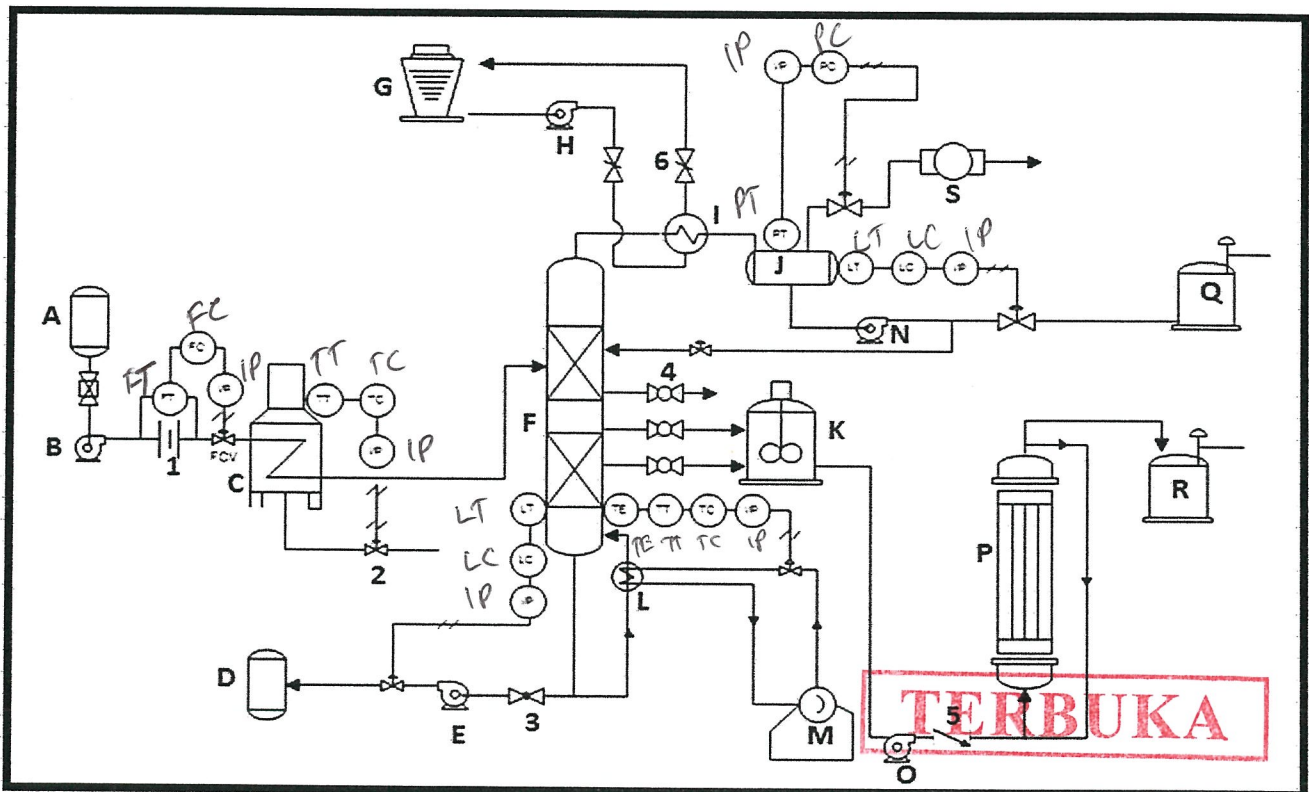


Figure Q3 (a)