Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER I
SESSION 2016/2017

COURSE NAME	:	PROCESS MODELLING ANALYSIS AND SIMULATION
COURSE CODE	:	DAK 21303
PROGRAMME	:	2 DAK
EXAMINATION DATE	:	DECEMBER 2016/ JANUARY 2017
DURATION	:	2 HOURS 30 MINUTES
INSTRUCTION	:	SECTION A) ANSWER **ALL** QUESTIONS
		SECTION B) ANSWER **TWO (2)** QUESTIONS ONLY

THIS QUESTION PAPER CONSISTS OF **FOUR (4)** PAGES

SECTION A

Q1 (a) Describe the following measurement instrument.

(i) Venturi Meter.

(5 marks)

(ii) Electromagnetic Flowmeter.

(5 marks)

(iii) Bourdon Tube Sensor.

(5 marks)

(iv) Thermocouple.

(5 marks)

(v) Resistance Temperature Detector.

(5 marks)

Q2 (a) (i) Define plant commissioning.

(1 marks)

(ii) Describe **FOUR (4)** importance of plant pre-commissioning.

(4 marks)

(iii) List **FIVE (5)** examples of process machinery and **FIVE (5)** examples of instrument to be check and test during pre-commissioning of plant.

(5 marks

(b) Describe in details **FIVE (5)** elements of plant inspection.

(15 marks)

SECTION B

Q3 (a) Write **FIVE (5)** major factors that need to be consider during choosing right flow meter.

(2 marks)

(b) Compare **FOUR (4)** transmission media for data communication

(12 marks)

(c) Describe Conductivity Meter operation.

(4 marks)

(d) Control valve regulates the flow rate of fluids through pipes in the process system by adjusting an opening through which the material flows.

(i) Under normal conditions, fluid passing through a valve will undergo a pressure drop across the valve orifice which is at its lowest pressure. Describe the meaning of flashing and cavitation condition.

(7 marks)

Q4 (a) Sketch Piping and Instrumentation Design (P & ID) for the following situation given.

(i) When fluid is added into tank A, temperature of medium will be altered. Temperature sensing element will detect this changes and send signal to temperature transmitter. Temperature transmitter will send electric signal to temperature indicator controller. Temperature indicator controller will send pneumatic pressure to control valve to open steam valve.

(6 marks)

(ii) On the same sketch diagram, there is a flow rate sensing element which measures the flow rate. Flow rate sensing element will send data to flow rate transmitter. Flow rate transmitter will send electric signal to flow rate indicator controller. Flow rate indicator controller will send pneumatic pressure to control valve to control opening of pipeline.

(6 marks)

(iii) A simple tank containing pH controller to maintain pH of medium at 6-8 (hint: 2 control systems for acid and base).

(13 marks)

Q5 (a) (i) Describe basic operation of boiler.

(3 marks)

(ii) Sketch component of water and fire tube boiler.

(4 marks)

(iii) Describe in detail the method to improve overall boiler performance.

(18 marks)

Q6 (a) State **FOUR (4)** advantages of using steam as heating media compared to using hot water or oil.

(4 marks)

(b) Sketch the right and wrong way of steam distribution system installation for the following.

(i) Drain point.

(3 marks)

(ii) Branch line.

(3 marks)

(iii) Pipeline.

(3 marks)

(iv) Strainer.

(3 marks)

(v) Separator (baffle type).

(3 marks)

(vi) Filter.

(3 marks)

(vii) Air vent.

(3 marks)

- END OF QUESTION –