KOLEJ YAYASAN PELAJARAN JOHOR
FINAL EXAMINATION

COURSE NAME	:	**INDUSTRIAL AUTOMATION**
COURSE CODE	:	**DKE 3053**
EXAMINATION	:	**JANUARY 2024**
DURATION	:	**2 HOURS 30 MINUTES**

INSTRUCTION TO CANDIDATES

1.   This question paper consist of **ONE (1)** part: (100 Marks)

2.   Candidates are not allowed to bring any material to examination room except with the permission from the invigilator.

3.   Please check to make sure that this examination pack consist of:
     i. The Question Paper
     ii. An Answering Booklet

DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO

*This examination paper consists of **6** printed pages including front page*
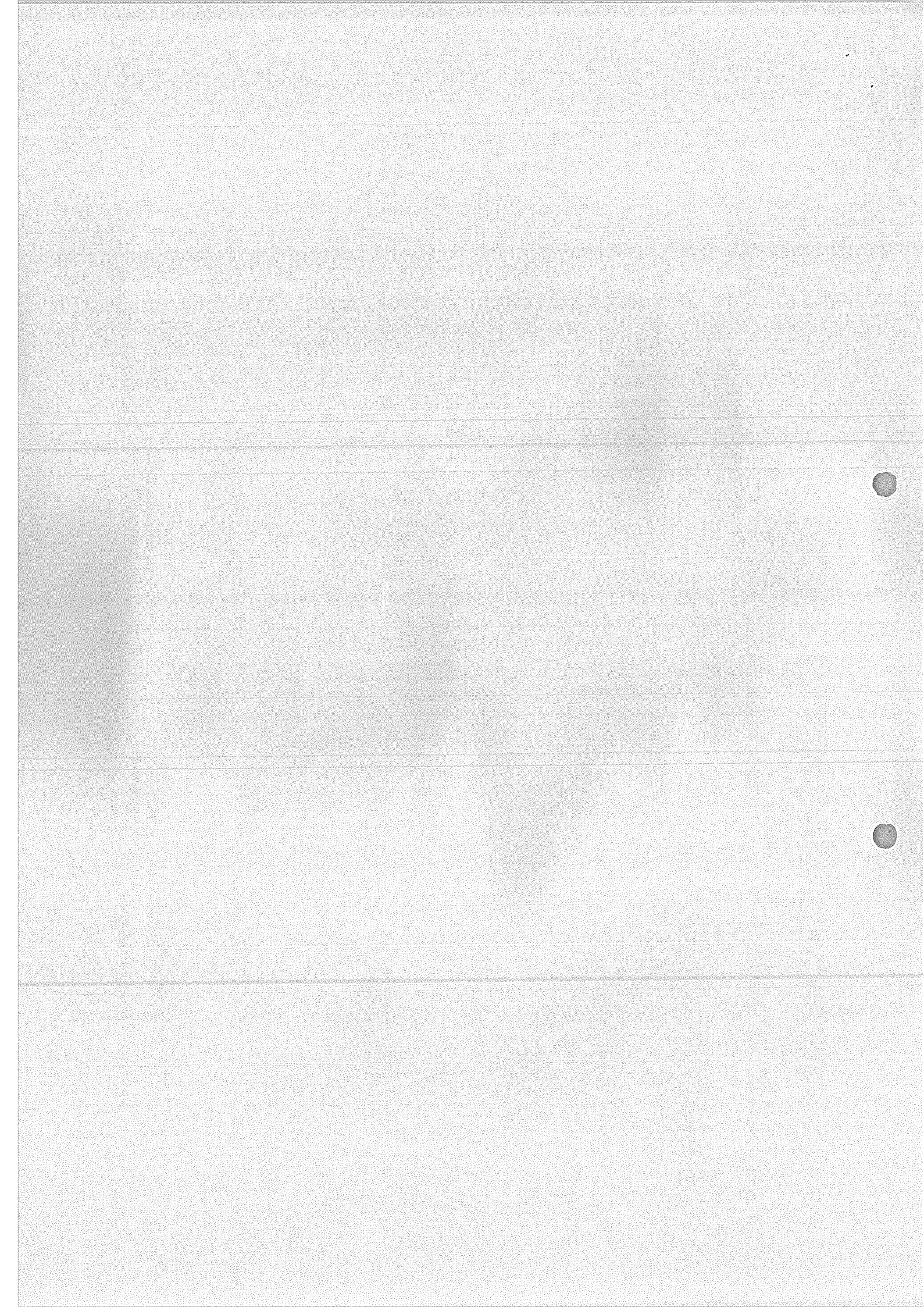
This part consist of **FOUR (4)** questions.

Answer ALL questions in Answering Booklet.

QUESTION 1

a. Define the following terms.

   i.   Automation

   ii. Industrial Robot

   iii. Manufacturing Support Systems

   iv. Computer Aided Manufacturing

   v.   Local Area Network

(5 marks)

b. State **five(5)** situations in which manual labor is preferred over automation.

(5 marks)

c. Explain USA Principle for automation principles and strategies.

(5 marks)

d. Explain briefly about Automated Guided Vehicle(AGV) system using an appropriate diagram.

(10 marks)

QUESTION 2

a. Identify **five(5)** goals and reasons for automating storage operations.

(5 marks)

b. Explain briefly the applications of carousels in storage systems.

(8 marks)

c. Define **four(4)** specifications and the sensor selection.

(4 marks)

d. State **four(4)** comparison of actuating systems.

(8 marks)

QUESTION 3

a. Sketch the symbol of the following directional control valves:

i. Solenoid actuating 5/3 way.

ii. Push button actuating 3/2 way.

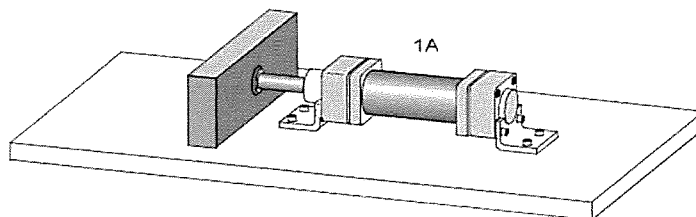iii. 5/2 way directional control valve.

(6 marks)

Figure Q3(b) (source: Pneumatics Basic Level, Festo)

b. By referring to Figure Q3(b), design a pneumatic circuit.
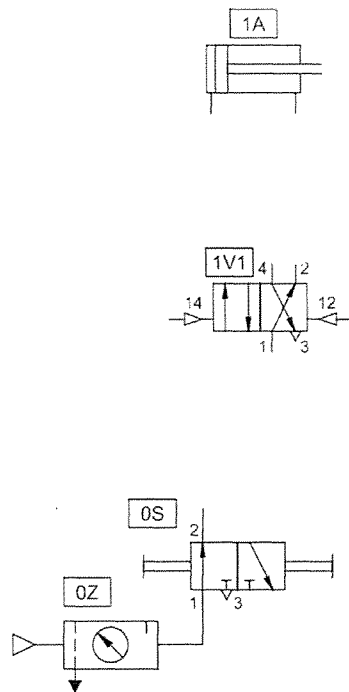
(6 marks)

Figure Q3(c) (source: Pneumatics Basic Level, Festo)

c. Figure Q3(c) above is a memory circuit and cylinder speed control. In the answer booklet, copy and complete the diagram.
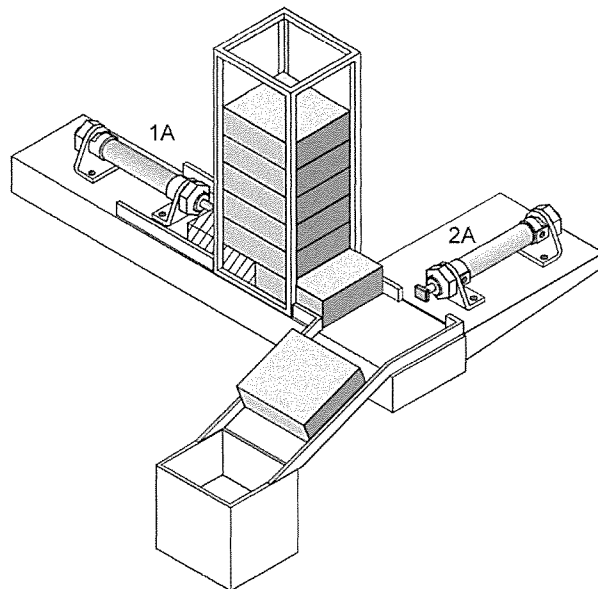
(8 marks)

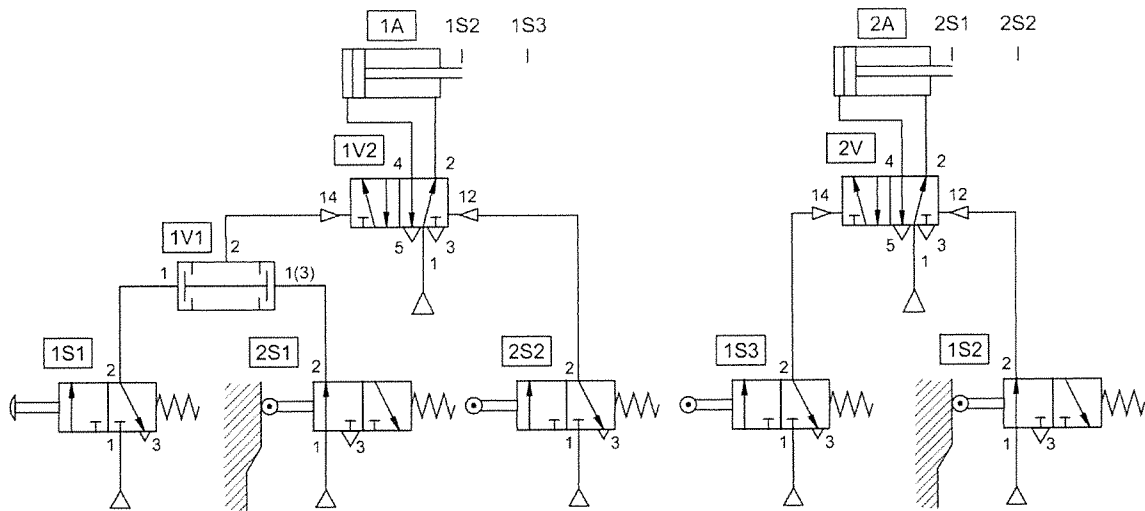Figure Q3(d)(i) (source: Pneumatics Basic Level, Festo)

Figure Q3(d)(ii) (source: Pneumatics Basic Level, Festo)

d. Figure Q3(d)(i) and Q3(d)(ii) above is application of two cylinders are used to transfer parts from a magazine onto a chute. Give a step-by-step explanation of how this application works.

(5 marks)

QUESTION 4

a. Define **five(5)** features of CNC.

(5 marks)

b. Identify **five(5)** advantages of using FMS.

(5 marks)

c. Define CAM Applications in Manufacturing Control.

(5 marks)

d. Calculate the OEE for the production setup as follows:

Item	Data
Shift length	8 hrs = 480 min.
Short Breaks	2@ 30 min. = 60 min
Meal Break	2 @ 20 min = 40 min
Down Time	95 min
Ideal Run Time	60 pieces per min
Total Pieces	53456 pieces
Reject Pieces	879 pieces

(10 marks)

END OF QUESTION PAPER