TEST 2

Actuation

For the following questions, you have four answer options A, B, C and D. Choose the correct answer from the answer options.

Questions 1, 2 and 3 concern the following symbol, which describes a directional control valve.

1. Decide whether each of these statements is TRUE (T) or FALSE (F).
   
   With the push-button not pressed:
   (i) Pressure is applied to port 4.
   (ii) Port 2 is vented.
   
   Which option BEST describes the two statements?
   A (i) T (ii) T
   B (i) T (ii) F
   C (i) F (ii) T
   D (i) F (ii) F

2. Decide whether each of these statements is TRUE (T) or FALSE (F).
   
   When the push-button is pressed:
   (i) Pressure is applied to port 4.
   (ii) Port 2 is vented.
   
   Which option BEST describes the two statements?
   A (i) T (ii) T
B  (i) T (ii) F
C  (i) F (ii) T
D  (i) F (ii) F

3. Decide whether each of these statements is TRUE (T) or FALSE (F).
   After pressing the push-button it is released, then:
   (i) Pressure is applied to port 2.
   (ii) Port 4 is vented.
Which option BEST describes the two statements?

A  (i) T (ii) T  

B  (i) T (ii) F  

C  (i) F (ii) T  

D  (i) F (ii) F  

Questions 4 and 5 refer to the following figure, which shows a cylinder controlled by two pneumatic valves.

4. Decide whether each of these statements is TRUE (T) or FALSE (F).
   (i) When push-button A is pressed, the load is lifted.
   (ii) When push-button A is released, the load descends.
   Which option BEST describes the two statements?

A  (i) T (ii) T  

B  (i) T (ii) F  

C  (i) F (ii) T  

D  (i) F (ii) F  

5. Decide whether each of these statements is TRUE (T) or FALSE (F).
   (i) When push-button B is pressed, the load is lifted.
   (ii) When push-button B is released, the load remains either lifted or descended.
   Which option BEST describes the two statements?

A  (i) T (ii) T  

B  (i) T (ii) F  

C  (i) F (ii) T  

D  (i) F (ii) F
6. Decide whether each of these statements is TRUE (T) or FALSE (F).

A process control valve with a quick-opening plug gives:

(i) A change in flow rate that is proportional to the change in displacement of the valve stem.

(ii) A large change in the flow rate for a small initial movement of the valve stem.

Which option BEST describes the two statements?

A  (i) T (ii) T  
B  (i) T (ii) F  
C  (i) F (ii) T  
D  (i) F (ii) F  

7. For the pneumatic circuit given below, following the pressing of the start push-button the sequence is:

A  A+, B+, B−, A−  
B  A+, A−, B+, B−  
C  A+, B+, A−, B−  
D  A+, A−, B−, B+  

8. Decide whether each of these statements is TRUE (T) or FALSE (F).

Four links are connected as indicated in the following figure:
With the relative link lengths shown:

(i) When link 4 rotates in a circular path, link 1 rotates in a circular path.

(ii) If link 4 is made the same length as link 1 then when link 4 rotates, link 1 can only oscillate back-and-forth and not completely rotate.

Which option BEST describes the two statements?

A (i) T (ii) T  
B (i) T (ii) F  
C (i) F (ii) T  
D (i) F (ii) F

9. The cam shown in the following figure rotates with a constant angular velocity.

![Cam Diagram]

The displacement of the follower is best described by:

![Displacement Graphs]

A  
B  
C  
D

10. A ball bearing is required to withstand radial loads and axial loads. The optimum bearing from the following is:

A Deep groove.  
B Filling-slot.  
C Angular contact.  
D Self-aligning.
11. Decide whether each of these statements is TRUE (T) or FALSE (F).

For a thyristor:

(i) When it is switched on and forward breakdown occurs, the thyristor resistance drops to a low value.

(ii) The voltage at which a thyristor is switched on is determined by the current entering the gate.

Which option BEST describes the two statements?

A  (i) T (ii) T  
B  (i) T (ii) F  
C  (i) F (ii) T  
D  (i) F (ii) F

12. Decide whether each of these statements is TRUE (T) or FALSE (F).

For a series wound DC motor:

(i) The direction of rotation of its shaft can be reversed by reversing the direction of the current supplied to the motor.

(ii) The speed of rotation of the motor shaft can be controlled by varying the size of the current supplied to the motor.

Which option BEST describes the two statements?

A  (i) T (ii) T  
B  (i) T (ii) F  
C  (i) F (ii) T  
D  (i) F (ii) F

13. Decide whether each of these statements is TRUE (T) or FALSE (F).

For a shunt wound DC motor:

(i) The direction of rotation of its shaft can be reversed by reversing the direction of the armature current.

(ii) The speed of rotation of the motor shaft can be controlled by varying the size of the armature current.

Which option BEST describes the two statements?

A  (i) T (ii) T  
B  (i) T (ii) F  
C  (i) F (ii) T  
D  (i) F (ii) F
14. Decide whether each of these statements is TRUE (T) or FALSE (F).

The H-circuit shown below is used to control the current supplied to a DC motor.

(i) For the motor to rotate, we must have both X and Y high.
(ii) To reverse the motor, we must have both X and Y low.

Which option BEST describes the two statements?
A (i) T (ii) T
B (i) T (ii) F
C (i) F (ii) T
D (i) F (ii) F

15. Decide whether each of these statements is TRUE (T) or FALSE (F).

A stepper motor is specified as having a step angle of 6°. This means that:
(i) Each pulse input to the motor rotates the motor shaft by 6°.
(ii) An input of 300 pulses per second will cause it to rotate at 5 rev/s.

Which option BEST describes the two statements?
A (i) T (ii) T
B (i) T (ii) F
C (i) F (ii) T
D (i) F (ii) F
16. Decide whether each of these statements is TRUE (T) or FALSE (F).

The figure below shows the unipolar connection for a stepper motor.

The motor will:

(i) Rotate through one step when each transistor, 1, 2, 3 and 4, is switched on in turn, otherwise being off.

(ii) Reverse its direction of rotation when the transistors are switched in the sequence 4, 3, 2 and 1, otherwise being off.

Which option BEST describes the two statements?

A  (i) T (ii) T  
B  (i) T (ii) F  
C  (i) F (ii) T  
D  (i) F (ii) F


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16. Decide whether each of these statements is TRUE (T) or FALSE (F).