CSC END SEMESTER MAKE-UP EXAMINATION (FEBRUARY 2022)

(Copy)

COURSE CODE : CONTROL SYSTEM COMPONENTS
COURSE NAME : ICE 3151
SEMESTER : V
DATE OF EXAM : 22/02/22
DURATION : 45 + 3 minutes

Instructions for Students:
(1) ANSWER ALL THE QUESTIONS.
(2) EACH QUESTION CARRIES 1 MARK.
(3) YOU ARE INSTRUCTED TO INFORM THE INVIGILATOR AFTER SUBMISSION OF THIS FORM IN THE CHAT SECTION.

* Required

* This form will record your name, please fill your name.

1. STUDENT NAME: *

2. REGISTRATION NUMBER: *

The value must be a number

3. A 12 pole 3 phase 50 Hz induction motor is running at 532 RPM in the same direction as the applied field. The motor is
(1 Point)

- ◯ Generating
- ◯ At Standstill
- ◯ Motoring
- ◯ Braking

4. Which of these elements are not present in Variable Voltage, Variable Frequency drives
(1 Point)

- ◯ Chopper
- ◯ Delay Circuit
- ◯ Rectifier
- ◯ None of the above
- ◯ Power electronic switches

5. _____ actuator produces the moderate thrust
(1 Point)

- ◯ none of the above
- ◯ electro pneumatic
- ◯ motor actuator
- ◯ hydraulic actuator

6. **In the second and fourth quadrant operation of a d.c. motor, power is negative which means**
(1 Point)

- ◯ The motor needs more mower to run
- ◯ The motor has just enough power to run
- ◯ The motor has come to a standstill despite an active supply
- ◯ The motor is generating power

7. A variable reluctance stepper has
(1 Point)

- ◯ High holding torque
- ◯ Continuous power consumption
- ◯ Zero holding torque
- ◯ None of the above

8. another name for Pop off valve is _____
(1 Point)

- ◯ ball
- ◯ pinch valve
- ◯ safety valve
- ◯ gate valve

9. The use of a 6 bit absolute rotary encoder in a servo motor can provide a maximum resolution of
(1 Point)

- ◯ 5.625 degrees
- ◯ 56.25 degrees
- ◯ 5.79 degrees
- ◯ 57.9 degrees

10. In a synchronous motor
(1 Point)

- ◯ 0 < slip < 1
- ◯ Slip is always negative
- ◯ Slip is always positive
- ◯ Slip is always zero

11. **A control system component cannot be**
(1 Point)

- ◯ A sensor
- ◯ A final control element
- ◯ An actuator
- ◯ Controller
- ◯ Communication system

12. two pressure valve also called as
(1 Point)

- ◯ none of the above
- ◯ gate valve
- ◯ solenoid valve
- ◯ AND valve

13. **Which of the following statements is incorrect**
(1 Point)

- ◯ The back emf depends on the type of rotor windings.
- ◯ The back emf can be used for measurement of rotor speed with suitable mechanical linkages.
- ◯ The back-emf in a DC motor is directly proportional to the angular velocity of the rotor
- ◯ None of the above
- ◯ The back emf generated in a motor is a function of time

14. **A d.c. servo motor is**
(1 Point)

- ◯ None of the above
- ◯ A discrete power consumption device
- ◯ A constant torque machine
- ◯ A constant speed machine

15. **The H-bridge discussed in class can be used for:**
(1 Point)

- ◯ Only first two quadrants of motor control
- ◯ Only second and fourth quadrants of motor control
- ◯ Only first and third quadrants of motor control
- ◯ Internet of things require very low power
- ◯ All four quadrants of motor control

16. ____ valve is continue to open when system force is greater than the spring force
(1 Point)

- ◯ ball valve
- ◯ gate valve
- ◯ safety valve
- ◯ relief valve

17. **In a typical microcontroller driven application, position of a DC servo motor is regulated by modulation of**
(1 Point)

- ◯ Frequency of the input voltage
- ◯ Amplitude of input voltage
- ◯ The duty cycle of input voltage
- ◯ Phase of the input voltage

18. Which of the following is not true for a synchro?
(1 Point)

- The electrical zero of the synchro is when rotor aligns with a stator coil and bisects the other stator coils.
- The supply to the rotor of a synchro is pulsed d.c.
- The output of a synchro receiver is an amplitude modulated signal with carrier frequency equal to rotor supply frequency and envelope of difference in angular positions of the transmitter and control transformer.
- The synchro suffers from large residual voltages.

19. _____ type of valve is used to control the flow in steady state sytems
(1 Point)

- linear
- quick opening
- equal percentage
- full port valve

20. The maximum resolution achievable with a stepper motor with 18 stator pole teeth and 12 rotor pole teeth where reversible excitation is available to all stator teeth is
(1 Point)

- 20 degrees
- 5 degrees
- 25 degrees
- 10 degrees

21. **As per the current and voltage conventions of H-bridge motor control circuit discussed in class, negative load voltage and positive load current imply**
(1 Point)

- ◯ Reverse motoring
- ◯ Forward motoring
- ◯ Forward braking
- ◯ Reverse braking

22. _____ actuator require 80 to 100 percent of supply pressure
(1 Point)

- ◯ none of the above
- ◯ spring diaphragm actuator
- ◯ double piston actuator
- ◯ motor actuator

23. ____ valve is used for highly viscus fluids
(1 Point)

- ◯ butterfly
- ◯ pressure relief valve
- ◯ full port valve
- ◯ linear

24. _____is the need of the positioner in control valve
(1 Point)

- changing the pressure signal to control valve
- measuring the stem position
- adjusting the controller output
- regulating stem position

25. **Precise position control in a DC servo motor can not be achieved using**
(1 Point)

- An encoder
- An accelerometer
- A hall encoder
- A potentiometer

26. **The input frequency of supply to a 12 V d.c. motor whose speed is to be controlled by a simple potentiometer in India is.**
(1 Point)

- 0 Hz
- 60 Hz
- 50 Hz
- 110 Hz

27. **An inverter circuit is used to convert**
(1 Point)

- ◯ d.c. voltage to a.c. voltage
- ◯ a.c. voltage to d.c. voltage
- ◯ high frequency to low frequency
- ◯ low frequency to high frequency

28. **A 240 V DC shunt motor has an armature resistance of 0.25 Ω and runs at 1000 rpm taking an armature current of 40 A. It is desired to reduce the speed to to 800. The percentage increase in armature resistance by which this may be achieved is**
(1 Point)

- ◯ 66%
- ◯ 660%
- ◯ 460%
- ◯ 46%

29. The quick exhaust valve is used to exhaust the cylinder air quickly to_____
(1 Point)

- ◯ atmosphere
- ◯ boiler
- ◯ process tank
- ◯ none of the above

30. In a flapper nozzle electronic circuit, the fixed resistance represents_____
(1 Point)

- back pressure resistance
- orifice resistance
- all of the above
- nozzle resistance

31. _____ parameter is going to create the dead band in the control valve
(1 Point)

- actuator undersized
- friction
- defective positioner
- all of the above

32. **Read the statements carefully and select the correct option:**
(1 Point)

- In a shunt DC motor, speed can be controlled independent of torque by changing the motor input voltage.
- In a shunt DC motor, speed can be controlled independent of torque by changing the armature current.
- none of the above
- In a shunt DC motor, speed can be controlled independent of torque by changing the stator field current.