BRAINWARE UNIVERSITY

Term End Examination 2024-2025
Programme – Dip.EE-2022
Course Name – Control of Electrical Machine
Course Code - DEEOE601C
(Semester VI)

Full Marks : 60 **Time : 2:30 Hours**

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group-A
(Multiple Choice Type Question) 1 x 15=15

1. *Choose the correct alternative from the following :*

(i) Compare the reverse recovery time in the case of an SSR with respect to an electromechanical relay.

a) Lesser b) Higher
c) Same d) None of the above

(ii) Identify the primary purpose of a feedback control system is to:

a) Increase the speed of the system b) Reduce the cost of operation
c) Minimize the error between the desired output and actual output d) Increase the system stability

(iii) Identify which of the following is NOT a type of feedback in a control system.

a) Positive feedback b) Negative feedback
c) Open-loop feedback d) None of the above

(iv) Classify a system where the control action is independent of the output is called:

a) Closed-loop system b) Open-loop system
c) Linear system d) Time-invariant system

(v) State why starters are required in a DC motor.

a) Back emf of these motors is zero initially b) These motors are not self-starting
c) These motors have high starting torque d) To restrict armature current as there is no back emf at starting

(vi) Select what will happen if DC motor is used without starter

a) Heavy sparking at brushes b) It'll start smoothly
c) Will not start at all d) Depends on load

(vii) Identify, the speed of a DC shunt motor can be increased by

a) Increasing the resistance in armature circuit b) Increasing the resistance in field circuit
c) Reducing the resistance in the field circuit d) Reducing the resistance in the armature circuit

(viii) To save energy during braking, identify the type of braking used.

a) dynamic
b) plugging
c) regenerative
d) all of the above

(ix) Identify which braking is not possible in series motor

a) dynamic
b) plugging
c) regenerative
d) rheostat

(x) Select the transfer function is applicable to which of the following.

a) Linear and time-in variant systems
b) Linear and time-variant systems
c) Linear systems
d) Non-linear systems

(xi) The armature voltage control of D.C. motor indicates

a) constant voltage drive
b) constant current drive
c) constant torque drive
d) none

(xii) Select for which types of D.C. motor, dynamic braking is generally used

a) shunt motor
b) series motor
c) compound motor
d) all the above

(xiii) Identify the values of duty cycle (α) lies between

a) $0<\alpha<1$
b) $0>\alpha>-1$
c) $0<=\alpha<=1$
d) $1<\alpha<100$

(xiv) Select the option from the following when plugging is applied in a motor, but don't make the switch OFF

a) Motor will come to rest as a result of plugging
b) Motor will come to rest and will start rotating in another direction
c) Motor will burn
d) Nothing will happen

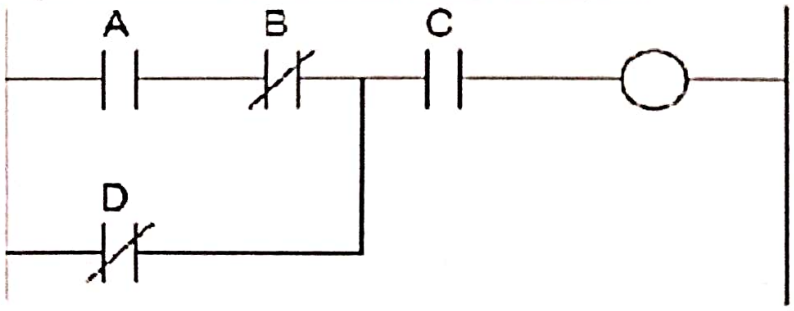
(xv) Dynamic braking is defined as

a) Reversal of field connections
b) Reversal of armature connections
c) Addition of equal and opposite field
d) Removal of armature circuit from current machine circuit

Group-B

(Short Answer Type Questions) 3 x 5=15

2. Explain the concept of feedback in a closed-loop control system and its importance. (3)
3. State the differences between open and proprietary PLC architecture. (3)
4. Explain PWM technique of speed Control of AC motor. (3)
5. Identify the different types of relays that employed for protection of apparatus and transmission lines. (3)
6. Analyze the boolean representation of this PLC program : (3)



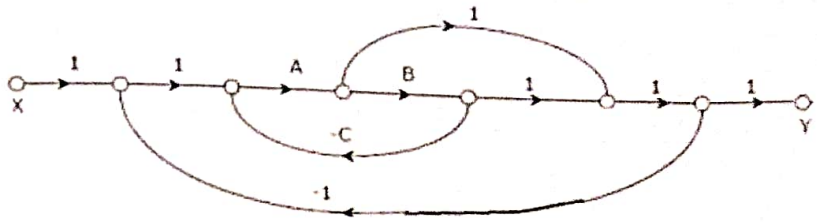
OR

A step-up chopper has input voltage of 220 V and output voltage of 660 V. If the conducting time of the IGBT based chopper is 100 μs, calculate Toff width of the output voltage pulse. (3)

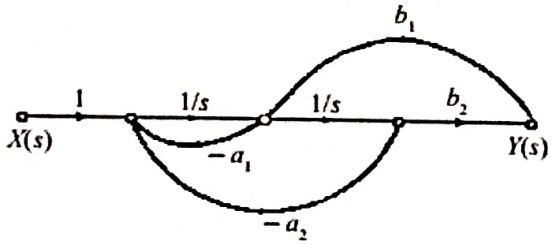
Group-C

(Long Answer Type Questions) 5 x 6=30

7. Write logic of PLC with its ladder diagram. (5)
8. Evaluate the overall gain of the given graph. (5)

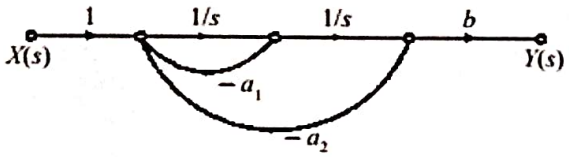


9. Explain the advantage of AC braking. (5)
10. Describe about PLC programming devices. (5)
11. Define automatic star delta starter. (5)
12. Derive the transfer function of the system. (5)



OR

Derive the transfer function of the SFG (5)



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