JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -1 EXAMINATION- 2024

B.Tech-III Semester (ECE)

COURSE CODE(CREDITS): 18B11EC311(3)   MAX. MARKS: 15

COURSE NAME: Automatic Control Systems

COURSE INSTRUCTORS: Dr Rajiv Kumar   MAX. TIME: 1 Hour

Note: (a)All questions are compulsory.

(b)Marks are indicated against each question in square brackets.

(c) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems

Q-1:a) Explain open-loop and closed loop control systems with one example of each.

[2, CO-1]

b) What are major advantages and disadvantages of open-loop control systems.

[1, CO-1]

c) What is significance of mathematical modeling, simulation and testing in the design process of product?   [2, CO-1]

Q-2: a) Define a transfer function? Describe the condition when it is proper or improper.

[2, CO-1]

b) Determine, Poles, zeros and order of the system of following transfer function:

$G(s) = \dfrac{(s+3)^2}{s(s^2+10)}$ also; check, whether the transfer function is proper or improper
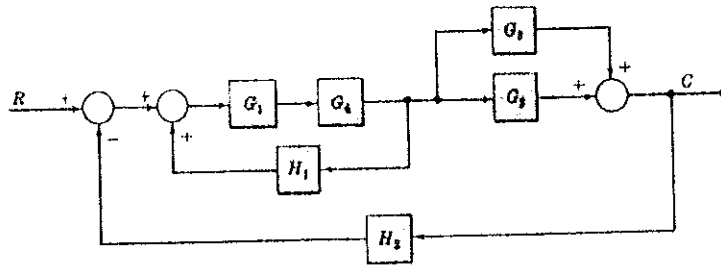
[2, CO-1]

c) Find from the following block diagram:

i) Equivalent signal flow graph (SFG),

ii) Overall transfer function by block diagram reduction technique

[1+2=3, CO-1]

Q-3: Explain the Routh-Hurwitz criterion of stability. Using this criterion, check the stability of system having following characteristic equation:

$$q(s) = s^5 + 2s^4 + 3s^3 + 2s^2 + 3s + 2 = 0$$

[3, CO-2]