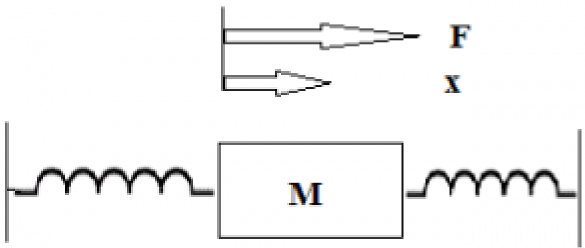
Course/Branch : BE /ECE	**Year / Semester** : II/III	Format No.	NAC/TLP-07a.13
Subject Code :EC8391	**Subject Name** : CONTROL SYSTEMS ENGINEERING	Rev. No.	02
Unit No : 1	**Unit Name : MATHEMATICAL MODELLING**	Date	30.09.2020

OBJECTIVE TYPE QUESTION BANK

S. No.	Objective Questions (MCQ /True or False / Fill up with Choices)	BTL
1	Consider a simple mass spring friction system as given in the figure K1, K2 are spring constants f-friction, M-Mass, F-Force, x-Displacement. The transfer function X(s)/F(s) of the given system  will be a) $1/(Ms^2+fs+K1.K2)$ b) **$1/(Ms^2+fs+K1+K2)$** c) $1/(Ms^2+fs+K1.K2/K1+K2)$ d) $K2/(Ms^2+fs+K1)$	L3
2	The output of an first order hold between two consecutive sampling instants is: a) Constant b) Quadratic Function **c) Ramp Function** d) Exponential Function	L1
3	Which of the following is an example of an open loop system? a) Household Refrigerator b) Respiratory system of an animal c) Stabilization of air pressure entering into the mask **d) Execution of program by computer**	L2
4	A tachometer is added to servomechanism because: a) It is easily adjustable b) **It can adjust damping** c) It reduces steady state error d) It converts velocity of the shaft to a proportional Dc voltage	L1
5	A synchro Transmitter is used with control transformer for: a) Feedback b) Amplification **c) Error detection** d) Remote sensing	L1
6	Backlash in a stable control system may cause: a) Under damping b) Over damping c) High level oscillations d) **Low level oscillations**	L1
7	Tachometer feedback in a D.C. position control system enhances stability? **a) True** b) False	L2

8	Assertion (A): Servomotors have heavier rotors and lower R/X ratio as compared to ordinary motors of similar ratings. Reason (R): Servomotor should have smaller electrical and mechanical time constants for faster response. a) Both A and R are true and R is the correct explanation of A b) Both A and R are true but R is not correct explanation of A c) A is true but R is false **d) A is false but R is true**	L2
9	Assertion (A): DC servomotors are more commonly used in armature controlled mode than field controlled mode. Reason (R): Armature controlled Dc motors have higher starting torque than field controlled motors. **a) Both A and R are true and R is the correct explanation of A** b) Both A and R are true but R is not correct explanation of A c) A is true but R is false d) A is false but R is true	L2
10	In case of DC servomotor, the back emf is equivalent to an “electric friction” which tends to: a) Slowly decrease the stability of the system b) **Improve stability of the system** c) Very rapidly decrease the stability of the system d) Have no effect of stability	L2
11	Which of the following is not the feature of modern control system? a) Quick response b) Accuracy c) Correct power level d**) No oscillation**	L1
12	The output of the feedback control system must be a function of: a) Reference input b) Reference output c) Output and feedback signal **d) Input and feedback signal**	L1
13	The principle of homogeneity and superposition are applied to: a) Linear time invariant systems b) Nonlinear time invariant systems **c) Linear time variant systems** d) Nonlinear time invariant systems	L1
14	In continuous data systems: a) Data may be continuous function of time at all points in the system b) **Data is necessarily a continuous function of time at all points in the system** c) Data is continuous at the inputs and output parts of the system but not necessarily during intermediate processing of the data d) Only the reference signal is continuous function of time	L2
15	A linear system at rest is subject to an input signal $r(t)=1-e^{-t}$. The response of the system for t>0 is given by $c(t)=1-e^{-2t}$. The transfer function of the system is: a) (s+2)/(s+1)	L3

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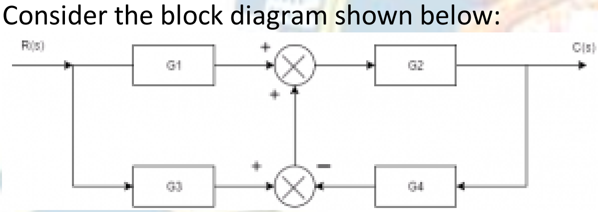
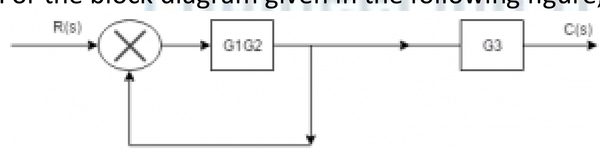
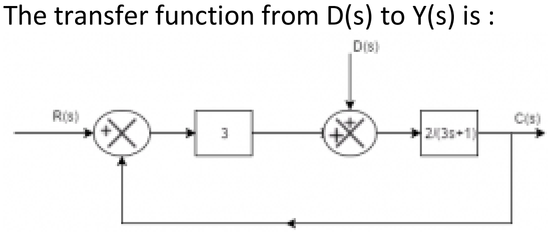
	b) (s+1)/(s+2) c**) 2(s+1)/(s+2)** d) (s+1)/2(s+2)	
16	In regenerating the feedback, the transfer function is given by a) C(s)/R(s)=G(s)/1+G(s)H(s) b) C(s)/R(s)=G(s)H(s)/1-G(s)H(s) c) C(s)/R(s)=G(s)/1+G(s)H(s) d**) C(s)/R(s)=G(s)/1-G(s)H(s)**	L3
17	When deriving the transfer function of a linear element a) Both initial conditions and loading are taken into account b) Initial conditions are taken into account but the element is assumed to be not loaded c) **Initial conditions are assumed to be zero but loading is taken into account** d) Initial conditions are assumed to be zero and the element is assumed to be not loaded	L2
18	If the initial conditions for a system are inherently zero, what does it physically mean? a) The system is at rest but stores energy b) The system is working but does not store energy c) **The system is at rest or no energy is stored in any of its part** d) The system is working with zero reference input	L2
19	Consider the block diagram shown below:  If the transfer function of the system is given by T(s)=G1G2+G2G3/1+X. Then X is: a) G2G3G4 b**) G2G4** c) G1G2G4 d) G3G4	L3
20	For the block diagram given in the following figure, the expression of C/R is:  a**) G1G2G3/1-G2G1** b) G1G2/1-G1G2G3 c) G1G2G3/1-G1G2G3 d) G1G2/G3(1-G1G2)	L3
21	The transfer function from D(s) to Y(s) is : 	L3

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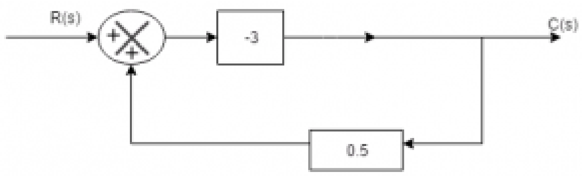
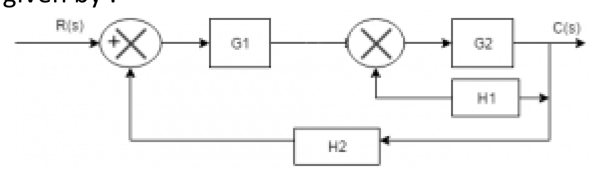
	a) **2/3s+7** b) 2/3s+1 c) 6/3s+7 d) 2/3s+6	
22	The closed loop gain of the system shown in the given figure is :  a) -9/5 b**) -6/5** c) 6/5 d) 9/5	L3
23	The advantage of block diagram representation is that it is possible to evaluate the contribution of each component to the overall performance of the system. **a) True** b) False	L2
24	The overall transfer function from block diagram reduction for cascaded blocks is : a) Sum of individual gain **b) Product of individual gain** c) Difference of individual gain d) Division of individual gain	L1
25	The overall transfer function of two blocks in parallel are : a) **Sum of individual gain** b) Product of individual gain c) Difference of individual gain d) Division of individual gain	L1
26	Transfer function of the system is defined as the ratio of Laplace output to Laplace input considering initial conditions________ a) 1 b) 2 c) **0** d) infinite	L1
27	In the following block diagram, G1=10/s G2=10/s+1 H1=s+3, H2=1. The overall transfer function is given by :  a) $10/11s^2+31s+10$ b) **$100/11s^2+31s+100$** c) $100/11s^2+31s+10$ d) $100/11s^2+31s$	L3

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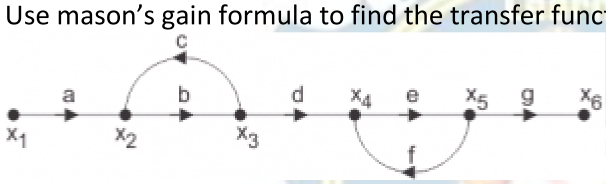
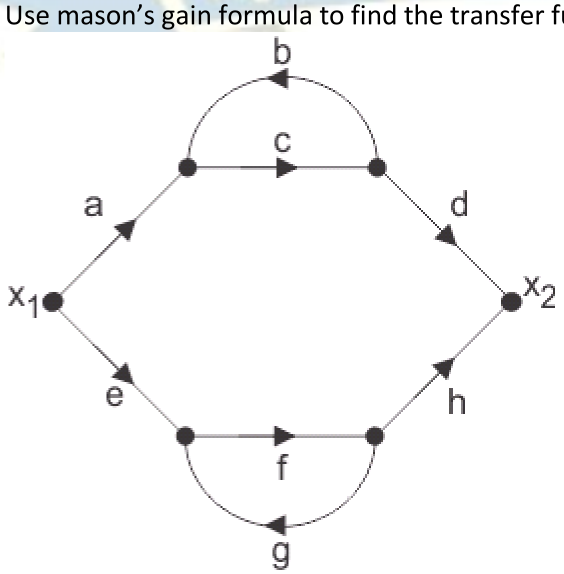
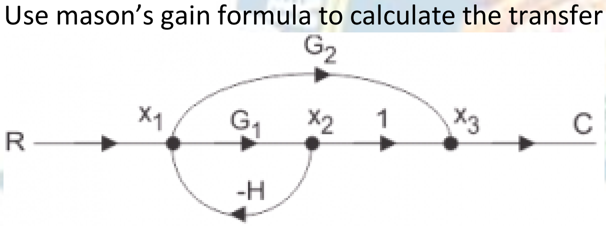
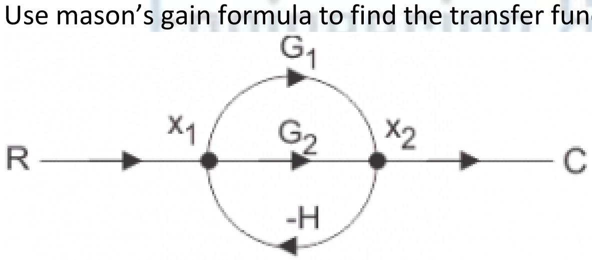
28	Oscillations in output response is due to : **a) Positive feedback** b) Negative feedback c) No feedback d) None of the mentioned	
29	A signal flow graph is the graphical representation of the relationships between the variables of set linear algebraic equations. a**) True** b) False	L2
30	A node having only outgoing branches. a**) Input node** b) Output node c) Incoming node d) Outgoing node	L2
31	Use mason's gain formula to find the transfer function of the given signal flow graph:  a) abd/1-(ac) **b) abdeg/1-(bc+ef)+bcef** c) abd/1-(bc+ef)+bcef d) adcdef/1-(bc+ef)+bcef	L3
32	Use mason's gain formula to find the transfer function of the following signal flow graph:  a) abcd+efg/1-cd-fg-cdfg b) **acdfg+bcefg/1-cd-fg-cdfg** c) abef+bcd/1-cd-fg-cdfg d) adcdefg/1-cd-fg-cdfg	L3
33	Loop which do not possess any common node are said to be ____________ loops.	L1

	a) Forward gain b) Touching loops c**) Non touching loops** d) Feedback gain	
34	Signal flow graphs: a) **They apply to linear systems** b) The equation obtained may or may not be in the form of cause or effect c) Arrows are not important in the graph d) They cannot be converted back to block diagram	L1
35	Signal flow graphs are reliable to find transfer function than block diagram reduction technique. **a) True** b) False	L2
36	The relationship between an input and output variable of a signal flow graph is given by the net gain between the input and output node is known as the overall_______________ a) **Overall gain of the system** b) Stability c) Bandwidth d) Speed	L1
37	Use mason's gain formula to calculate the transfer function of given figure:  a) G1/1+G2H **b) G1+G2/1+G1H** c) G2/1+G1H d) None of the mentioned	L3
38	Use mason's gain formula to find the transfer function of the given figure:  a) G1+G2 b) G1+G1/1-G1H+G2H **c) G1+G2/1+G1H+G2H** d) G1-G2	L3