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 : 2	**Unit Name : TIME RESPONSE ANALYSIS**	Date	30.09.2020

OBJECTIVE TYPE QUESTION BANK

S. No.	Objective Questions (MCQ /True or False / Fill up with Choices)	BTL
1	A feedback control systems has the inherent capability that its parameter can be adjusted to alter both its transient and steady state responses. a) **True** b) False	L2
2	Transient response analysis is done for_____ systems. a) Unstable **b) Stable** c) Conditionally stable d) Marginally stable	L1
3	The input signals to control systems are not known fully ahead of time, the characteristics of control system which suddenly strain a control system are: a) Sudden shock b) Sudden change c) Constant velocity and acceleration d**) All of the mentioned**	L1
4	Standard test signals in control system are: a) Impulse signal b) Ramp signal c) Unit step signal d) **All of the mentioned**	L1
5	The nature of transient response is revealed by _____ a) Sine wave b) Cos wave c) Tan wave d**) Test signals**	L1
6	t is generally used to analyze the transient response to one of the standard test signals. a) **True** b) False	L2
7	Step signal is the signal whose values is : a) 1 for all values greater than zero b) Indeterminate at zero c) It is zero for time less than zero **d) All of the mentioned**	L1
8	Ramp input : a) Denotes constant velocity b) Value increases linearly with time c**) It denotes constant velocity and varies linearly with time** d) It varies exponentially with time	L1
9	A perfect impulse has one value at zero time instant but otherwise zero elsewhere. a) True b) **False**	L2
10	To find system's response by means of convolution integral _____ of the system is used.	L1

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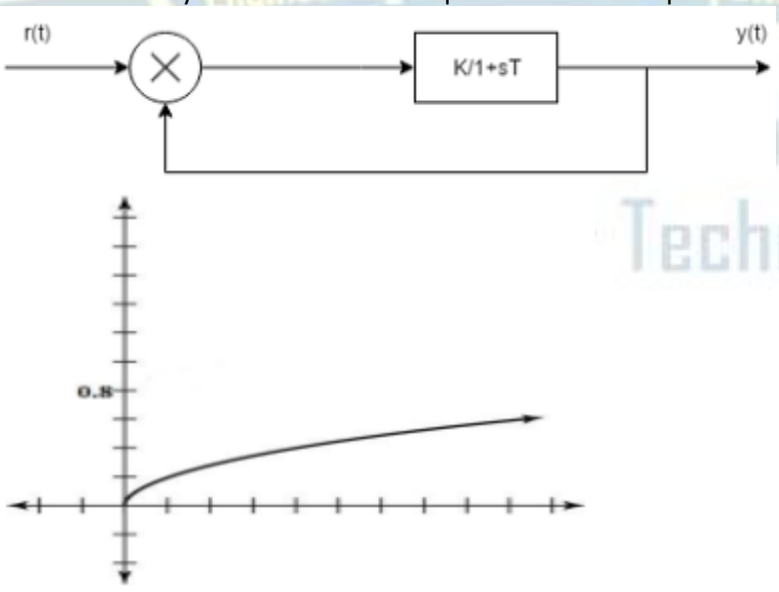
	a) Sum b) Difference c) Exponential d) **Weighing**	
11	First order system is defined as : a) Number of poles at origin b) Order of the differential equation c) Total number of poles of equation d) **Total number of poles and order of equation**	L1
12	A unit step is applied at t=0 to a first order system without time delay. The response has the value of 1.264 units at t=10 mins, and 2 units at steady state. The transfer function of the system is_____ a) 3/(1+600s) b) 2/(1+500s) c) 5/(1+220s) **d) 2/(1+600s)**	L4
13	The transfer function of the system is G(s) =100/(s+1) (s+100). For a unit step input to the system the approximate settling time for 2% criterion is: a) 100 sec b**) 4 sec** c) 1 sec d) 0.01 sec	L4
14	If a first order system and its time response to a unit step are as shown below, the gain K is :  a) 0.25 b) 0.8 c) 1 d**) 4**	L4
15	The unit impulse response of a system having transfer function K/(s+a) is shown below. The value	L4

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	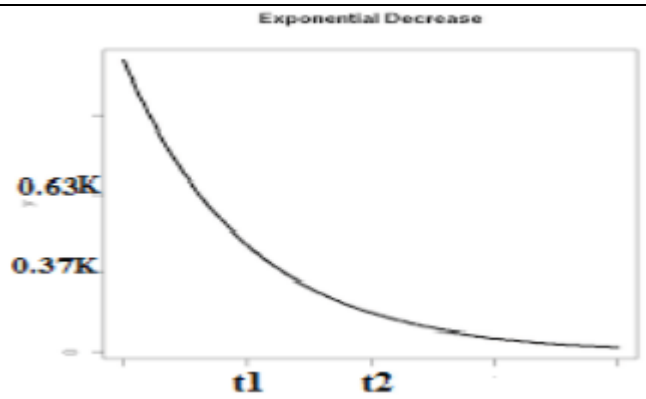 of a is a) t1 b) t2 c) 1/t1 **d) 1/t2**	
16	A system with transfer function 1/Ts+1, subjected to a step input takes to seconds to reach 50% of step height. The value of t is : a) 6.9s b) 10s **c) 14.4s** d) 20s	L4
17	Assertion (A): It is observed that step function is first derivative of a ramp function and impulse function is first derivative of a step function. Reason (R): From the derived time response expression it is concluded that the output time response also follows the same sequence as that of input functions. 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) Both A is True but R is false d) Both A is False but R is true	L4
18	Laplace transform of unit impulse signal is : a) A/s b) A **c) 1** d) 1/s	L1
19	Time response during steady state the output velocity matches with the input velocity but lags behind the input by T. a**) True** b) False	L1
20	Which of the following transfer function will have the greatest maximum overshoot? a) $9/(s^2+2s+9)$ b) $16/(s^2+2s+16)$ c) $25/(s^2+2s+25)$ d**) $36/(s^2+2s+36)$**	L4

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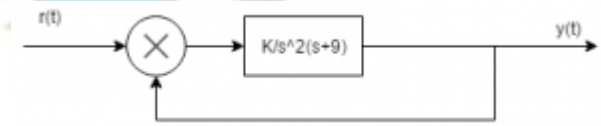
21	A system generated by $\frac{dy}{dx} + 2y = 4tu(t)$. The ramp component in the forced response will be: a) t u(t) **b) 2t u(t)** c) 3t u(t) d) 4t u(t)	L4
22	The system in originally critically damped if the gain is doubled the system will be : a) Remains same b) Overdamped c) **Under damped** d) Undamped	L1
23	Let c(t) be the unit step response of a system with transfer function K(s+a)/(s+K). If c(0+) = 2 and c(∞) = 10, then the values of a and K are respectively. a) 2 and 10 b) -2 and 10 c) **10 and 2** d) 2 and -10	L4
24	The damping ratio and peak overshoot are measures of: a) Relative stability b**) Speed of response** c) Steady state error d) Absolute stability	L1
25	Find the type and order of the system given below  a) 2,3 b**) 2,2** c) 3,3 d) None of the mentioned	L4
26	A system has a complex conjugate root pair of multiplicity two or more in its characteristic equation. The impulse response of the system will be: a) A sinusoidal oscillation which decays exponentially; the system is therefore stable b) A sinusoidal oscillation with a time multiplier ; the system is therefore unstable c) **A sinusoidal oscillation which rises exponentially ; the system is therefore unstable** d) A dc term harmonic oscillation the system therefore becomes limiting stable	L1
27	The forward path transfer function is given by G(s) = 2/s(s+3). Obtain an expression for unit step response of the system. a) $1+2e^{-t}+e^{-2t}$ b) $1+e^{-t}-2e^{-2t}$ c) $1-e^{-t}+2e^{-2t}$ d**) $1-2e^{-t}+e^{+2t}$**	L4
28	Find the initial and final values of the following function:	L4

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	F(s) = 12(s+1)/s(s+2)^2(s+3) a) 1,∞ b) 0,∞ c) ∞,1 **d) 0,1**	
29	The step response of the system is $c(t) = 10+8e^{-t}-4/8e^{-2t}$. The gain in time constant form of transfer function will be: a) -7 b) 7 c) 7.5 d) **-7.5**	L4
30	What will be the nature of time response if the roots of the characteristic equation are located on the s-plane imaginary axis? a) Oscillations b) Damped oscillations c) **No oscillations** d) Under damped oscilaations	L1
31	Consider a system with transfer function $G(s) = s+6/Ks^2+s+6$. Its damping ratio will be 0.5 when the values of k is: a) 2/6 b) 3 c**) 1/6** d) 6	L1
32	The output in response to a unit step input for a particular continuous control system is $c(t)= 1-e^{-t}$. What is the delay time Td? a) 0.36 b) 0.18 c) **0.693** d) 0.289	L4
33	Which one of the following is the most likely reason for large overshoot in a control system? a) High gain in a system b) Presence of dead time delay in a system c) **High positive correcting torque** d) High retarding torque	L3
34	For the system 2/s+1, the approximate time taken for a step response to reach 98% of its final value is: a) 1s b) 2s **c) 4s** d) 8s	L3
35	The unit step response of a second order system is = $1-e^{-5t}-5te^{-5t}$. Consider the following statements: 1. The under damped natural frequency is 5 rad/s. 2. The damping ratio is 1. 3. The impulse response is $25te^{-5t}$.	L4

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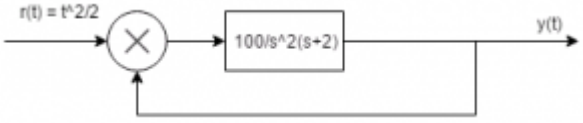
	Which of the statements given above are correct? a) Only 1 and 2 b) Only 2 and 3 c) Only 1 and 3 d) **1,2 and 3**	
36	The loop transfer function of controller Gc(s) is : a**) 1+0.1s/s** b) -1+0.1s/s c) –s/s+1 d) s/s+1	L3
37	The peak percentage overshoot of the closed loop system is : a) 5.0% b) 10.0% c**) 16.3%** d) 1.63%	L3
38	Which of the following quantities give a measure of the transient characteristics of a control system, when subjected to unit step excitation. 1. Maximum overshoot 2. Maximum undershoot 3. Overall gain 4. Delay time 5. Rise time 6. Fall time a) 1,3 and 5 b) 2, 4 and 5 c) 2,4 and 6 **d) 1,4 and 5**	L3
39	The steady state error for a unity feedback system for the input r(t) = Rt^2/2 to the system G(s) = K(s+2)/s(s^3+$7s^2$+12s) is a) 0 b) **6R/K** c) ∞ d) 3R/K	L3
40	A control system is operated with a parabolic input as shown below  If Ka is static error constant of the system, then its dynamic error constant K2 is a) 0.01 b**) 0.02** c) 0.03 d) 0.04	L3
41	Find the velocity error constant of the system given below :	L3

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	 a) 0 b) 2 c) **4** d) ∞	
42	Consider the unity feedback system with open loop transfer function the minimum value of the steady state error to a ramp input r(t) = 6tu(t) is OLTF = K/s(s+1)(s+2) a) 1 b**) 2** c) 3 d) 4	L3
43	A ramp input applied to a unity feedback system results in 5% steady state error. The type number and zero frequency gain of the system are respectively a**) 1 and 20** b) 0 and 20 c) 0 and 1/20 d) 1 and 1/20	L3
44	. A particular control system yielded a steady state error of 0.20 for unit step input. A unit integrator is cascaded to this system and unit ramp input is applied to this modified system. What is the value of steady-state error for this modified system? a) 0.10 b) 0.15 c) 0.20 **d) 0.25**	L3
45	The error constants described are the ability to reduce the steady state errors. a) **True** b) False	L2
46	Steady state refers to a**) Error at the steady state** b) Error at the transient state c) Error at both state d) Precision	L1
47	The disadvantages of the error constants are: a) They do not give the information of the steady state error when the inputs are other than the three basic types b) Error constant fail to indicate the exact manner in which the error function change with time. c) **They do not give information of the steady state error and fail to indicate the exact manner in which the error function change with time** d) They give information of the steady state error	L2