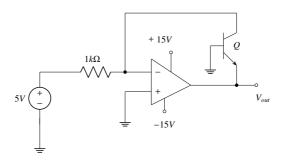
2013-EE-1-13

EE24BTECH11010 - BALAJI B

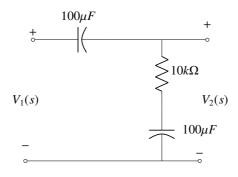
1) In the circuit shown below what is the output voltage (V_{out}) in Volts if a silicon transistor Q and an ideal op-amp are used? (2013-EE)



- a) -15
- b) -0.7

- c) +0.7
- d) + 15
- 2) The transfer function $\frac{V_2(s)}{V_1(s)}$ of the circuit shown below is

(2013-EE)



- a) $\frac{0.5s+1}{s+1}$
- b) $\frac{3s+6}{s+2}$

- c) $\frac{s+2}{s+1}$
- d) $\frac{s+1}{s+2}$
- 3) Assuming zero initial condition, the response y(t) of the system given below to a unit step input u(t) is



1

(2013-EE)

a) $\frac{t^2}{2}u(t)$	b) $\frac{t(t-1)}{2}u(t-1)$	c) $\frac{(t-1)^2}{2}u(t-1)$	d) $\frac{t^2-1}{2}u(t-1)$
 5) Which one of the following statements is NOT TRUE for a continuous time casual and stable LTI system? (2013-EE) a) All the poles of the system must lie on the left side of the <i>jω</i> axis b) Zeros of the system can lie anywhere in the <i>s</i>- plane. c) All the poles must lie within s = 1 d) All the roots of the characteristic equation must be located on the left side of the <i>jω</i> axis. 			
 6) Two systems with impulse response h₁(t) and h₂(t) are connected is cascade. Then the overall impulse response of the cascaded system is given by (2013-EE) a) A product of h₁(t) and h₂(t) b) Sum of h₁(t) and h₂(t) c) Convolution of h₁(t) and h₂(t) d) substraction of h₂(t) from h₁(t) 7) A source v_s(t) = V cos 100πt has an internal impedance of (4 + j3) Ω. If a purely resistive load connected to this source has to extract the maximum power out of the source, its value in Ω should be (2013-EE) 			
a) 3	b) 4	c) 5	d) 7
8) A single-phase load is supplied by a single-phase voltage source. If the current flowing from the load to the source is 10∠−150° A and if the voltage at the load terminals is 100∠60°, then the (2013-EE) a) load absorbs real power real power and delivers reactive power b) load absorbs real power real power and absorbs reactive power c) load delivers real power real power and delivers reactive power d) load delivers real power real power and absorbs reactive power 9) A single-phase transformer has no-load loss of 64W, as obtained from an open-circuit test. When a short-circuit test is performed on it with 90% of the rated currents flowing in its both LV and HV windings, the measured load is 81W. The transformer has maximum efficiency when operated at (2013-EE)			
a) 50.0% of the rb) 64.0% of the r		c) 80.0% of the rad) 88.8% of the ra	
10) The flux density at a point in space is given by $\mathbf{B} = 4x\mathbf{a_x} + 2ky\mathbf{a_y} + 8\mathbf{a_z}Wb/m^2$. The value of constant k must be equal to (2013-EE)			

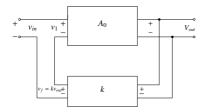
c) $\frac{t^2}{2}u(t)$ d) $e^{-t}u(t)$

4) The impulse response of the system is h(t) = tu(t). For an input u(t-1), the output

a) *u*(*t*)b) *tu*(*t*)

is

- a) -2
- b) -0.5
- c) +0.5
- d) +2
- 11) A continuous random variable X has a probability density function $f(x) = e^{-x}, 0 < 0$ $x < \infty$. Then $P\{X > 1\}$ (2013-EE)
 - a) 0.368
- b) 0.5
- c) 0.632
- d) 1.0
- 12) The curl of the gradient of the scalar field defined by $V = 2x^2y + 3y^2z4z^2x$ is (2013-EE)
 - a) $4xy\mathbf{a_x} + 6yz\mathbf{a_y} + 8zx\mathbf{a_z}$
 - b) $4\mathbf{a_x} + 6\mathbf{a_z} + 8\mathbf{a_z}$
 - c) $(4xy + 6a_z + 6a_z)$ c) $(4xy + 4z^2)a_x + (2x^2 + 6yz)a_y + (3y^2 + 8zx)a_z$
 - d) 0
- 13) In the feedback network shown below, if the feedback factor k is increased, then the (2013-EE)



- a) input impedance increases and output impedance decrease
- b) input impedance increases and output impedance also increase
- c) input impedance decrease and output impedance also decrease
- d) input impedance decreases and output impedance increases