# DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE – RAIGAD -402 103

## Winter Semester Examination – December - 2019

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**Branch: Electrical Engg.** **Sem.:-III**

**Subject with Subject Code: -SIGNALS & SYSTEMS (BTEEE305C)** **Marks: 60**

**Date: -19/12/2019** **Time: -3 Hr.**

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**Instructions to the Students**

1. Each question carries 12 marks.
2. Attempt **any five** questions of the following.
3. Illustrate your answers with neat sketches, diagram etc., wherever necessary.
4. If some part or parameter is noticed to be missing, you may appropriately assume it and should mention it clearly

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**Q.1. Attempt the following** **(12)**

**a)** What is signal? Define,Sketch and explain the Continuous Time and discrete time signals.

**b)** I) Check whether the following signal is periodic or not. If signal is periodic find its fundamental period.

$x(t)=\sin(\pi/4)t+\cos(\pi/3)t$

II) Check the following systems for causality.

i) y(n)= 7*x(n)

ii) y(n)= x(5-n)

**Q.2. Attempt the following** **(12)**

**a)** what is system? Check the following system with respect to properties.

i).Time Invariance

ii). Linearity

iii). Causality

$$y(n)=\sum_{k=-\infty}^{n} x(k)$$

**b)** State and explain the properties of Discrete Time System.

**OR**

**b)** I) Check the following system for stability

$h(n) = (0.5)^n u(n)$

II) Check the following system for Linearity

y(n) = n*x(n)

**Q.3. Attempt the following** **(12)**

**a)** Find Fourier series representation of the waveform shown in fig.3.a

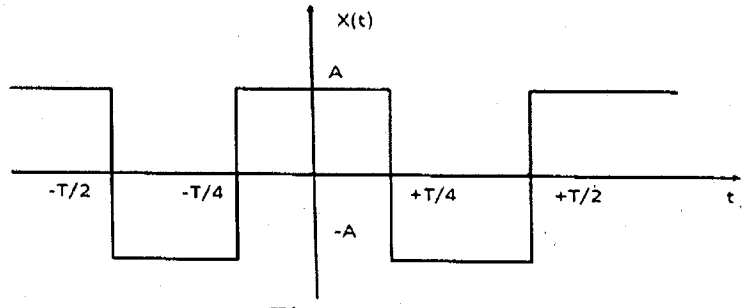


**Fig. 3.a**

**b)** Find the Laplace Transform of the following signals

i) $x(t) = \sin wt\, u(t)$

ii) $y(t) = t^3 + 3t^2 - 6t + 4$

**OR**

**b)** Find the Fourier Transform of $x(t) = e^{-at}\cos(bt)\, u(t)$ , $t > 0$

**Q.4. Attempt the following** **(12)**

**a)** The LTI system having unit impulse response $h(t) = e^{-2t}u(t)$
Determine the output of the system to the input $x(t) = e^{-t}u(t)$.

**b)** Find the inverse Laplace transform of the following

$$X(s) = \frac{(s+7)}{(s^2 - 3s - 10)}$$

**Q.5. Attempt the following** **(12)**

**a)** i) State and explain the sampling theorem? What is the effect of under sampling? Explain.
ii) Compute the Nyquist sampling rate for the following signal ?
$x(t) = 5*\cos(50\pi t) + 8*\sin(300\pi t)$

**b)** Find z-transform of $x(n) = a^n u[n] + a^{-n}u[-n-1]$. Sketch the ROC

**Q.6. Attempt the following** **(12)**

**a)** Find the convolution sum of the two DT sequences
$x(n) = (0.5)^n u(n)$
$h(n) = u(n)$
Sketch the output sequence.

**b)** Find the inverse z- transform of the following.

$$X(z) = \frac{2z^2}{(z+1)(z+2)^2}$$

********** **PAPER END** **********