Roll No. ☐☐☐☐☐☐☐☐☐☐☐   Total No. of Pages : 02

Total No. of Questions : 18

B.Tech. (Electronics & Communication Engineering) (2018 Batch) (Sem.–4)

SIGNALS AND SYSTEMS
Subject Code : BTEC-403-18
M.Code : 77568

Time : 3 Hrs.   Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :
1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

SECTION-A

Write briefly :

Q1   What is time inversion property of signal?

Q2   What is Central Limit Theorem?

Q3   What is Ergodic Process?

Q4   Define Power Signal.

Q5   Write down Dirichlet's condition of Fourier series.

Q6   What do you mean by Stable System?

Q7   Differentiate between auto correlation and cross correlation function.

Q8   State the significance of difference equations.

Q9   What is the difference between recursive and non-recursive systems?

Q10 What do you mean by Forced Response?

SECTION-B

Q11 State and prove sampling theorem for low pass signals.

Q12 Decompose the signal into even and odd parts:

a) $3t^2 + 2t + 1$

b) $\{1,1,1\}$
    $\uparrow$

Q13 Define Z-transform. State and prove any three properties of Z-transform.

Q14 Prove that for BIBO stable discrete time LTI system, the ROC of the system function includes unit circle.

Q15 State and prove Parseval's Theorem.

SECTION-C

Q16 An LTI system is described by following input-output relation :

$$y(n) - 9/4\, y(n-1) + 1/2\, y(n-2) = x(n) - 3\, x(n-1)$$

Determine the impulse response of the system with specified ROC's of H(Z) for the conditions :

a) System is Stable.

b) System is Causal.

Q17 Find the CTFT of the signal $x(t) = t\, e^{-at}\, u(t)$ using appropriate property. State and prove the properties used.

Q18 Show that spectrum of the sampled signal is the infinite sum of shifted replicas of the spectrum of original signal.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.