

Bachelor of Engineering
Third Semester Main Examination, Dec-2020
Electrical Measurements and Instrumentation [EX-221]
Branch: EX

Time: 3:00 Hrs

Max Marks 70

Note : 1. Attempt any five questions out of eight.
2. All questions carry equal marks.

- Q.1 (a) Define the terms:
(i) Accuracy (ii) Precision
(iii) Static sensitivity (iv) Reliability
(b) What do you mean by calibration curve? Explain loading effects due to shunt connected and series connected instruments.
- Q.2 (a) Explain the construction and working of D'arsonal Galvanometer.
(b) Explain why PMMC instruments are the most widely used instruments. Discuss their advantages and disadvantages.
- Q.3 (a) Explain with the help of block diagram the working of Digital voltmeter.
(b) Write down the difference between current transformer and potential transformer. Also explain their working.
- Q.4 (a) Describe the constructional details and working of an electro-dynamometer type of wattmeter. Discuss the main sources of errors in electro-dynamometer type instruments
(b) Explain the measurement of power using:
(i) Three wattmeter method
(ii) CTs and PTs
- Q.5 (a) Explain the construction and operation of single phase and three phase electronic energy meter.
(b) What is Phantom loading? Explain with example. Also describe the testing by phantom loading for energy meters
- Q.6 (a) Describe the circuit diagram of a series type ohm meter. Explain how is it designed. Why are series type ohm meter preferred over shunt type ohm meters?
(b) What is a B-H curve in terms of magnetic material? Write down its characteristics?
- Q.7 Write short notes on (any two):
(a) Lloyd fisher square method
(b) Economics of measurement system
(c) Kelvin's double bridge
(d) Maximum demand meter

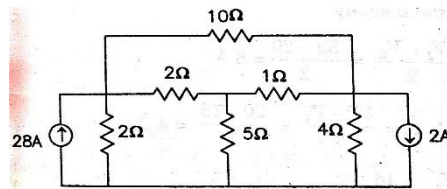
Branch - EX

Time: 3:00 Hrs

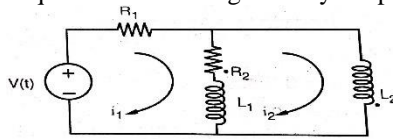
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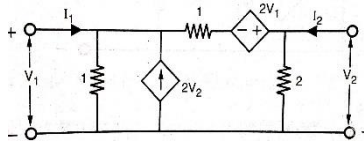
- Q.1 (a) Explain Dependent and Independent sources and it's type?
(b) State and Explain KCL and KVL.
- Q.2 (a) Discuss the properties and characteristics of a ideal voltage and current sources?
(b) What are Series & parallel resonance? Explain and derive expression for resonance frequencies?
- Q.3 (a) Explain Transients in RLC Circuits, initial conditions, time constants. Steady state analysis.
(b) Use Nodal analysis method to find currents in various resistors of the given Network.



- Q.4 (a) Explain the terms tie-set matrix and cut-set matrix of a network with illustrative example?
(b) State and explain Thevenins & Norton's theorem with its limitation?
- Q.5 (a) What is coupling coefficient?
(b) Write the KVL equation for the magnetically coupled circuit for shown in figure.



- Q.6 (a) Explain Initial and Final value theorem?
(b) Define Unit Impulse Function and derive its Laplace transform.
- Q.7 (a) Find laplace transform of $\sin(\omega t)$?
(b) Explain Exponential form of Fourier series
- Q.8 (a) Explain conversion of Z parameter to ABCD parameter.
(b) Find Y and Z parameter for the network shown below.



Enrollment No.....

**Bachelor of Engineering
Third Semester Main Examination, Dec-2020
Analog Electronics [EX-223]**

Branch: EX

Time: 3:00 Hrs

Max Marks 70

Note : 1. Attempt any five questions out of eight.

2. All questions carry equal marks.

- Q.1 (a) What is P-N junction? Explain its characteristics?
(b) What is Schottky diode? Explain its characteristics?
- Q.2 (a) Explain Zener diode and Varactor diode with symbols, Tunnel diode, PIN diode?
(b) What is half-wave rectifier & full-wave rectifier? Draw and explain its expression waveform.
- Q.3 (a) Explain gain-bandwidth constant relationship and Define Thermal runaway Condition in BJT.
(b) Explain (a) voltage multiplier circuit. (b) Clipper and clamper circuit
- Q.4 (a) Explain biasing methods of transistor and Explain transistor as an amplifier
(b) What is FET, explain.
- Q.5. (a) What is MOSFET ? what are its Types & configuration, working principle, characteristics, and region of operation
(b) What is feedback? Explain its type and derive its transfer function?
- Q.6 (a) Explain:
(i) Wein Bridge Oscillator
(ii) Hartley Oscillator
(iii) Crystal Oscillator.
(b) Explain any two:
(i) Power amplifiers
(ii) Class B
(iii) Class A B
- Q.7 (a) Explain reverse recovery time and Switching Characteristics for Diode.
(b) Explain Darlington Pair?
- Q.8 (a) Explain Transients in RLC Circuits, initial conditions, time constants. Steady state analysis.
(b) Explain Nodal analysis method to find currents in various resistors in a Network.

Enrollment No.....

Bachelor of Engineering
Third Semester Main Examination, Dec-2020
Signals and Systems [EX-224]
Branch-EX

Time: 3:00 Hrs

Max Marks 70

Note : Attempt any five questions. All questions carry equal marks.

- Q.1 (a) What do you understand by Signal and System Explain its classification?
(b) Find z-transform of signal: (i) $a^n u(n)$ (ii) $\cos(\omega_0 n) u(n)$

- Q.2 (a) Define and classify systems. Write its Classification and explain (in detail) Step, ramp, pulse and impulse signals.
 (b) Define and Explain-
 (a) Periodic and Non Periodic signal.
 (b) Energy and Power signal.
- Q.3 (a) Discuss the impulse response of LTI system. How to describe the stability and causality of LTI system.
 (b) Write the advantages of digital signal processing over analog signal processing.
- Q.4 (a) Consider the difference equation $y(n) - \frac{5}{6}y(n-1) + \frac{1}{6}y(n-2) = \frac{1}{3}x(n-1)$. What are the impulse response, frequency response and step response for the casual LTI system satisfying the difference
 (b) State and prove time shifting and frequency shifting properties of DTFT.
- Q.5 (a) Define inverse discrete Fourier transform (IDFT).
 (b) Define z-transform and region of convergence (ROC) of z-transform.
- Q.6 (a) Determine $x(n)$ by using convolution for-

$$X(z) = \frac{1}{\left(1 - \frac{1}{2}z^{-1}\right)\left(1 + \frac{1}{4}z^{-1}\right)}$$

- (b) Prove the circular time shifting property of a DFT sequence.
- Q.7 (a) Write the short note on one-sided Z-transform
 (b) Solve the Difference equation of a Casual Discreet-time LTI system which is expressed as under:
 $y(n) + 3y(n-1) = x(n)$.
- Q.8 (a) What is SFG? What are its advantages?
 (b) What is the difference between laplace Transform and z- Transform

Enrollment No.....

Bachelor of Engineering
Third Semester Main Examination, Dec-2020
Communication Skills [HU220]
Branch-CE/EX/EC/CSE/IT/ME

Time: 3:00 Hrs

Max Marks 70

Note : Attempt any five questions. All questions carry equal marks.

- Q.1 What do you mean by Communication? Describe it.
- Q.2 Explain process of communication with diagram.
- Q.3 What are upward and downward communication?
- Q.4 Differentiate one way and two way communication.
- Q.5 List out challenges in communication.
- Q.6 Explain barriers to communication.
- Q.7 Write a short note on Articles.
- Q.8 What are parts of speech? Explain with suitable examples.

Enrollment No.....

Bachelor of Engineering
Third Semester Main Examination, Dec-2020
Mathematics-III [MA-220]
Branch-EE/EC/CS/IT

Time: 3:00 Hrs

Max Marks 70

Note : Attempt any five questions.
All question carry equal marks.

- Q.1 (a) State and prove Cauchy's theorem.
(b) Show that the function $e^x(\cos y + i \sin y)$ is analytic and find its derivative.
- Q.2 (a) Using Cauchy's integral formula prove that : $\int_C \frac{e^{2z}}{(z+1)^4} dz = \frac{8\pi e^{-2}}{3} i$, where C is the circle $|z| = 3$.
(b) Find the imaginary part of the analytic function whose real part is $x^3 - 3xy^2 + 3x^2 - 3y^2$.

Q.3 (a) Find the real root of the equations $x^3 - 9x + 1 = 0$ by the method of false position.

(b) Apply Newton Raphson method to solve $3x = \cos x + 1$.

Q.4 (a) Using Newton's forward Interpolation formula, find the value of $f(1.6)$, if

$$x: \quad 1 \quad 1.4 \quad 1.8 \quad 2.2$$

$$y: \quad 3.49 \quad 4.82 \quad 5.96 \quad 6.5$$

(b) Solve the following system by Gauss elimination method

$$6x_1 + 3x_2 + 2x_3 = 6$$

$$6x_1 + 4x_2 + 3x_3 = 0$$

$$20x_1 + 15x_2 + 12x_3 = 0$$

Q.5 (a) Apply Lagrange's formula to find the value of x when $f(x) = 0$ given that

$$x: \quad 30 \quad 34 \quad 38 \quad 42$$

$$f(x): \quad -30 \quad -13 \quad 3 \quad 18$$

(b) Solve initial value problem $\frac{dy}{dx} = 1 + xy^2$, $y(0)=1$ for $x = 0.4, 0.5$ by using Milne's method when it is given that

$$x: \quad 0.1 \quad 0.2 \quad 0.3$$

$$y: \quad 1.105 \quad 1.223 \quad 1.355$$

Q.6 (a) Solve the equation $\frac{dy}{dx} = x + y$ with initial condition $y(0) = 1$ by Runge kutta rule from $x = 0$ to $x = 0.4$ with $h = 0.1$

(b) Evaluate $\int_{0.5}^{0.7} x^{1/2} e^{-x} dx$ approximately by using a suitable formula.

Q.7 (a) Solve the following by Euler's modified method, the equation $\frac{dy}{dx} + \log(x + y)$, $y(0) = 2$ at $x = 1.2$ and 1.4 with $h = 0.2$

(b) Use picard's method to approximate y when $x = 0.2$ given that $y = 1$ when $x = 0$ and $\frac{dy}{dx} = x - y$

Q.8 (a) Find the z Transform of $\sin x$, $k=7, 0$

(b) Solve the following by Gauss Seidel iteration Method

$$10x + y + z = 12$$

$$2x + 10y + z = 13$$

$$2x + 2y + 10z = 14$$