Reg. No. | | | | | | | | | | | | |

Question Paper Code : 57316

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2016

Fourth Semester

Electrical and Electronics Engineering

EE6401 – ELECTRICAL MACHINES – I

(Regulations 2013)

Time : Three Hours **Maximum : 100 Marks**

Answer ALL questions.

PART – A (10 × 2 = 20 Marks)

1. State Ampere's Law.
2. Define Leakage Flux.
3. Define all day efficiency of a transformer.
4. What is Inrush current in a transformer ?
5. Define Co-energy.
6. What is meant by winding inductance ?
7. Compare Lap and Wave windings.
8. Draw various characteristics of D.C. shunt generator.
9. Draw speed-torque characteristics of DC series motor.
10. What is meant by Plugging ?

PART – B (5 × 16 = 80 Marks)

11. (a) Summarize the properties of magnetic materials. (16)

OR

(b) Explain the Hysteresis and eddy current losses and obtain its expression. (16)

12. (a) With a circuit explain how to obtain equivalent circuit by conducting O.C & S.C test in a single phase transformer. (16)

OR

(b) Explain the various three phase transformer connection and parallel operation of three phase transformer. (16)

13. (a) Obtain the expression for energy in a attracted armature relay magnetic system. (16)

OR

(b) With an example explain the Multiple-excited magnetic field system. (16)

14. (a) Explain the Armature Reaction in D.C machine. (16)

OR

(b) (i) Obtain EMF equation of D.C. generator. (8)

(ii) A 4-pole dc motor is lap-wound with 400 conductors. The pole-shoe is 20cm long and the average flux density over one-pole-pitch is 0.4T, the armature diameter being 30 cm. find the torque and gross-mechanical power developed when the motor is Drawing 25A and running at 1500 rpm. (8)

15. (a) The no-load test of a 44.76 kW, 220-V, D.C. shunt motor gave the following figures :

Input current = 13.25 A; Field current = 2.55 A; Resistance of the armature at 75°C = 0.032Ω and Brush drop = 2V. Estimate the full-load current and efficiency. (16)

OR

(b) Explain the method to obtain efficiency at full load by conducting Hopkinson's test. (16)

Question Paper Code : 57317

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2016

Fourth Semester

Electrical and Electronics Engineering

EE 6402 – TRANSMISSION AND DISTRIBUTION

(Regulations 2013)

Time : Three Hours **Maximum : 100 Marks**

Answer ALL questions.

PART – A (10 × 2 = 20 Marks)

1. What are the advantages of high voltage power transmission ?
2. What are the objectives of FACTS ?
3. Define transposition of lines.
4. What is corona ?
5. Define Ferranti effect.
6. Mention the significance of surge impedance loading.
7. What are the tests performed on the insulators ?
8. Classify the cables used for three phase service.
9. Define sag.
10. What is meant by stringing chart ?

PART – B (5 × 16 = 80 Marks)

11. (a) (i) Explain the structure of electric power system. **(8)**

(ii) A two wire dc ring main distributor ABCDEA is fed at point A with 230V supply. The resistances of go and return conductors of each section AB, BC, CD, DE, AE are 0.1 ohm. The main supplies the loads of 10A at B, 20A at C, 10A at D, 30A at E. Find the voltage at each load point. **(8)**

OR

(b) (i) Explain the different types of FACTS controllers. **(8)**

(ii) Explain the different HVDC links. **(8)**

12. (a) Derive the expression for the capacitance of a three phase transmission line with unsymmetrical spacing. **(16)**

OR

(b) Determine the inductance per km of a double circuit 3Φ line as shown in Fig. Q. 12 (b). The transmission line is transposed within each circuit and each circuit remains on its own side. The diameter of each conductor is 15mm. **(16)**

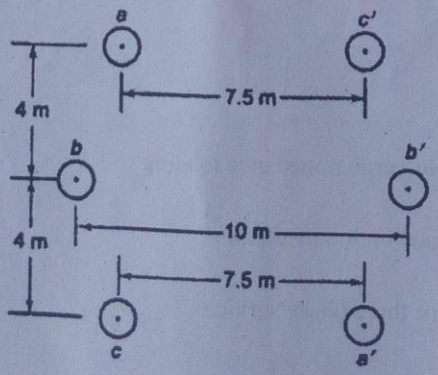

Fig. Q. 12 (b)

13. (a) A 3Φ, 50Hz, 100 km line has the following constants. Resistance/phase/km = 0.153 ohm, inductance/phase /km = 1.21mH, capacitance/phase / km = 0.00958 μF. If the line supplies a load of 20MW at 0.9 pf lagging at 110 kV at the receiving end calculate sending end current, sending end power factor, regulation and transmission efficiency using nominal T method. (16)

OR

(b) The constants of a three phase line are A = 0.9∟2° and B = 140∟70° ohms per phase. The line delivers 60 MVA at 132 kV and 0.8 pf lagging. Draw power circle diagrams and find (a) sending end voltage and power angle (b) the maximum power which the line can deliver with the above values of sending and receiving end voltages (c) the sending end power and power factor (d) line losses. (16)

14. (a) (i) Briefly explain the different methods to improve string efficiency of suspension type insulators. (8)

(ii) A three unit insulator string is fitted with a guard ring. The capacitances of the link pins to metal work and guard ring can be assumed to be a 15% and 5% of the capacitance of each unit. Determine voltage distribution and string efficiency. (8)

OR

(b) Explain the methods of grading of cables with neat diagrams and equations. (16)

15. (a) A transmission line has a span of 275 m betweeen level supports. The conductor has an effective diameter of 1.96 cm and weighs 0.865 kg/m. If the conductor has ice coating of radial thickness 1.27 cm and is subjected to a wind pressure of 3.9 gm/sq.cm of projected area. The ultimate strength of the conductor is 8060 kg.Calculate the sag if the factor of safety is 2 and weight of 1 c.c of ice is 0.91 gm. (16)

OR

(b) Explain the methods of neutral grounding. (16)

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Question Paper Code : 57318

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2016

Fourth Semester

Electrical and Electronics Engineering

EE 6403 – DISCRETE TIME SYSTEMS AND SIGNAL PROCESSING

(Common to Instrumentation and Control Engineering, Electronics and Instrumentation Engineering)

(Regulations 2013)

Time : Three Hours **Maximum : 100 Marks**

Answer ALL questions.

PART – A (10 × 2 = 20 Marks)

1. Determine if the system described by the equation $y(n) = x(n) + \frac{1}{x(n-1)}$ is causal or non-causal.

2. What is an Anti-Aliasing filter ?

3. Determine the Z-transform and ROC of the following finite duration signals

   (i) $x(n) = \{3, 2, 2, 3, 5, 0, 1\}$

   (ii) $x(n) = \delta(n - k)$

4. Compute the convolution of the two sequences

   $x(n) = \{2, 1, 0, 0.5\}$ and $n(n) = \{2, 2, 1, 1\}$

5. Draw the flow graph of a 4 point radix-2 DIT-FFT butterfly structure for DFT.

6. What are the applications of FFT algorithm ?

ıe cascade realization for the system function,

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

the advantages of FIR filters over IIR filters.

: the merits and demerits of VLIW architecture ?

: the factors that influence the selection of DSP processor for an application ?

PART – B (5 × 16 = 80 Marks)

Determine if the signals, $x_1(n)$ and $x_2(n)$ are power, energy or neither energy nor power signals.

$x_1(n) = \left(\frac{1}{3}\right)^n u(n)$ and $x_2(n) = e^{2n} u(n)$. **(8)**

) What is the input signal $x(n)$ that will generate the output sequence

$y(n) = \{1, 5, 10, 11, 8, 4, 1\}$ for a system with impulse response $h(n) = \{1, 2, 1\}$. **(8)**

OR

A signal $x(t) = \sin c(50 \pi t)$ is sampled at a rate of (1) 20 Hz (2) 50 Hz and (3) 75 Hz. For each of these cases, explain if you can recover the signal $x(t)$ from the samples signal. **(6)**

) Determine whether or not each of the following signals is periodic. If the signal is periodic, specify its fundamental period.

(1) $x(n) = e^{j6\pi n}$ **(5)**

(2) $x(n) = \cos\frac{\pi}{3}n + \cos\frac{3\pi}{4}n$. **(5)**

12. (a) (i) Find $x(n)$ if $X(z) = \dfrac{1 + \frac{1}{2}z^{-1}}{1 - \frac{1}{2}z^{-1}}$ (6)

(ii) Find the response of the causal system $y(n) - y(n-1) = x(n) + x(n-1)$ to the input $x(n) = u(n)$. Test its stability. (10)

OR

(b) Find the impulse response, frequency response, magnitude response and phase response of the second order system.

$$y(n) - y(n-1) + \frac{3}{16}y(n-2) = x(n) - \frac{1}{2}x(n-1).$$ (16)

3. (a) (i) Summarize the steps of radix – 2 DIT-FFT algorithm. (8)

(ii) Compute the 4 point DFT of the sequence $x(n) = \{0, 1, 2, 3\}$ using DIT and DIF algorithm. (8)

OR

(b) Find the IDFT of the sequence

$X(K) = \{4, 1 - j\,2.414, 0, 1 - j\,0.414, 0, 1 + j\,0.414, 0, 1 + j\,2.414\}$

Using DIF algorithm. (16)

14. (a) Design an ideal low pass filter with a frequency response

$$H_d(e^{jw}) = 1 \text{ for } \frac{-\pi}{2} \le w \le \frac{\pi}{2}$$

$$= 0 \text{ for } \frac{\pi}{2} \le |w| \le \pi$$

Find the values of h(n) for N = 11. Find H(z) and the filter coefficients. (16)

OR

(b) (i) Given the specifications $\alpha_p = 3$ dB, $\alpha_s = 10$ dB, $f_p = 1$ kHz and $f_s = 2$ kHz. Determine the order of the filter using Chebyshev approximation. Find H(s). (8)

(ii) Apply bilinear transformation to

$H(s) = \dfrac{2}{(s+1)(s+2)}$ with T = 1 sec and find H(z). (8)

a) (i) Discuss on the addressing modes supported by a DSP processor. (8)

(ii) Design a DSP based system for the process of Audio signals in an audio recorder system. (8)

OR

b) (i) Explain the datapath architecture and the bus structure in a DSP processor with suitable diagram. (8)

(ii) Elaborate on Radar signal processing using a DSP processor. (8)

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Question Paper Code : 57319

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2016

Fourth Semester

Electrical and Electronics Engineering

EE 6404 – MEASUREMENTS AND INSTRUMENTATION

(Regulations 2013)

Time : Three Hours **Maximum : 100 Marks**

Answer ALL questions.

PART – A (10 × 2 = 20 Marks)

1. Name the dynamic characteristics of measurement systems.
2. What is meant by calibration of an instrument ?
3. Define creeping in energy meter ?
4. How are basic instruments converted into higher range ammeter ?
5. What is called a volt-ratio box ?
6. What is meant by grounding ?
7. Mention the role of Data loggars in Instrumentation system.
8. Distinguish between LED and LCD.
9. What are the factors to be considered for selection of transducers ?
10. List the types of Analog to Digital Converter ?

PART – B (5 × 16 = 80 Marks)

11. (a) (i) Explain the static characteristics of an instrument. (10)

(ii) Explain in detail the calibration technique. (6)

OR

(b) What are the different types of errors ? Explain how to eliminate errors in instruments. (16)

12. (a) With neat sketch, explain the construction and operation of repulsion type moving iron instrument. Give the advantages and limitations of such instruments. (16)

OR

(b) (i) Obtain B-H curve of ring specimen. (8)

(ii) Describe how to obtain iron loss of a ring specimen (8)

13. (a) Draw the diagram of Co-ordinate type A.C. potentiometer and explain its working principle. (16)

OR

(b) (i) Explain how the inductance is measured in terms of known capacitance using maxwell's bridge. Derive the conditions for balance. (12)

(ii) Why Hay's bridge is suited for measurement of inductance of high Q coils. (4)

14. (a) With neat diagram, explain the basic components and working principle of magnetic tape recorders. (16)

OR

(b) Describe the construction and working of LCDs. Mention the difference between light scattering and field effect types of LCDs, also explain the advantages of LCDs.

15. (a) Explain in detail about construction and working of LVDT. (16)

OR

(b) Explain smart sensors with built in features. Compare with conventional sensors. (16)

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Question Paper Code : 57511

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2016

Fourth Semester

Civil Engineering

MA 6459 – NUMERICAL METHODS

(Common to Aeronautical Engineering, Electrical and Electronics Engineering, Instrumentation and Control Engineering, Electronics and Instrumentation Engineering, Instrumentation and Control Engineering, Geoinformatics Engineering, Petrochemical Engineering, Production Engineering, Chemical and Electrochemical Engineering, Textile Chemistry and Textile Technology Also common to Petrochemical Technology, Polymer Technology, Plastic Technology & Chemical Engineering and Also Sixth Semester Manufacturing Engineerings)

(Regulation 2013)

Time : Three Hours **Maximum : 100 Marks**

Answer ALL questions.

PART – A (10 × 2 = 20 Marks)

1. What is the condition for convergence in Fixed point Iteration method ?
2. Name the two methods to solve a system of linear simultaneous equations.
3. Construct a table of divided difference for the given data :

x :	654	658	659	661
y :	2.8156	2.8182	2.8189	2.8202

4. Write down the Newton's forward difference interpolation formula for equal intervals.
5. Write down the general quadrature formula for equidistance ordinates.
6. Write down the forward difference formulae to compute the first two derivatives at $x = x_0$.

7. Write down the improve Euler's formula for first order differential equation.

8. How many values are needed to use Milne's predictor-corrector formula prior to the required value ?

9. Write down the diagonal five point formula in the solution of elliptic equations.

10. Classify the partial differential equation :

$$\frac{\partial^2 u}{\partial x^2} - 2\frac{\partial^2 u}{\partial x\,\partial y} + \frac{\partial^2 u}{\partial y^2} = 0$$

PART – B (5 × 16 = 80 Marks)

11. (a) (i) Find the approximate root of $xe^x = 3$ by Newton's method correct to three decimal places. **(8)**

(ii) Using Gauss-Jordan method solve the given system of equations : **(8)**

$10x + y + z = 12,$

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

$x + y + 5z = 7$

OR

(b) (i) Solve the following system of equations using Jacobi's iteration method. **(8)**

$20x + y - 2z = 17,$

$3x + 20y - z = -18,$

$2x - 3y + 20z = 25$

(ii) Using power method find the dominant eigen value and the corresponding eigen vector for the given matrix. **(8)**

$$A = \begin{bmatrix} 15 & -4 & -3 \\ -10 & 12 & -6 \\ -20 & 4 & -2 \end{bmatrix}$$

12. (a) (i) From the given table compute the value of sin 38°. **(8)**

x :	0	10	20	30	40
$\sin x$:	0	0.17365	0.34202	0.5	0.64279

14. (a) (i) Using Taylor series method, compute the value of $y(0.2)$ correct to 3 decimal places from $\frac{dy}{dx} = 1 - 2xy$ given that $y(0) = 0$. **(8)**

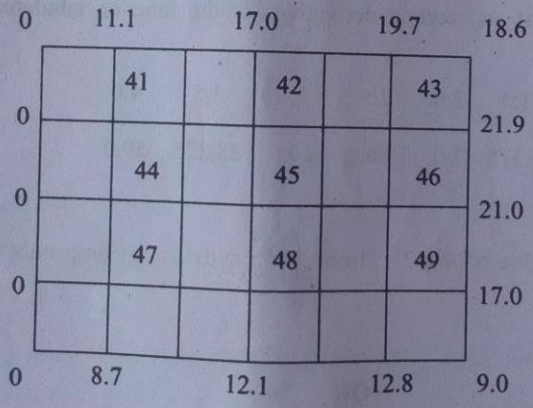
(ii) Using modified Euler's method, find $y(0.1)$ and $y(0.2)$ for the given equation $\frac{dy}{dx} = x^2 + y^2$, given that $y(0) = 1$. **(8)**

OR

(b) (i) Find the value of $y(1.1)$ using Runge-Kutta method of 4^{th} order for the given equation $\frac{dy}{dx} = y^2 + xy$; $y(1) = 1$. **(8)**

(ii) Using Adam's method find $y(0.4)$ given that $\frac{dy}{dx} = \frac{xy}{2}$, $y(0) = 1$, $y(0.1) = 1.01$, $y(0.2) = 1.022$ $y(0.3) = 1.023$. **(8)**

15. (a) Solve the Laplace's equation $\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = 0$ at the interior points of the square region given as below : **(16)**



OR

(b) Given that $\frac{\partial u}{\partial t} = \frac{\partial^2 u}{\partial x^2}$, $u(0, t) = 0$, $u(4, t) = 0$ and $u(x, 0) = \frac{x}{3}(16 - x^3)$.

Find u_{ij} : $i = 1, 2, 3, 4$ and $j = 1, 2$ by using Crank-Nicholson method.