	Hall	Ticket Number :	
		e: 7GC43	
Ĺ	2006	II B.Tech. II Semester Supplementary Examinations February 2022 Complex Variables & Special Functions	
		( Common to EEE & ECE ) Time: 3 Hour ver any five full questions by choosing one question from each unit (5x14 = 70 Marks *********	
1.	a)	UNIT–I Symmetry of Beta function B(m, n)=B(n, m)	7M
	b)	Evaluate $\int_{0}^{1} \frac{x^2}{\sqrt{1-x^5}} dx$ in terms of B function	7M
		$\mathbf{OR}$	
2.		Show that $\Gamma(n) = \int_{0}^{1} \left( \log \frac{1}{x} \right)^{n-1} dx$ , $n > 0$	7M
	b)	Evaluate $\int_{0}^{1} \sqrt{\cot \pi} d_{\pi}$	7M
3.	a)	<b>UNIT–II</b> Show that $f(z) = z + 2\overline{z}$ is not analytic anywhere in the complex plane.	7M
	b)	Determine whether the function $2xy + i(x^2 - y^2)$ is analytic. OR	7M
4.		Prove that $\left(\frac{\partial^2}{\partial x^2} + \frac{\partial^2}{\partial y^2}\right)  \operatorname{Re} al f(z) ^2 = 2  f'(z) ^2$ where $w = f(z)$ is analytic.	14M
		UNIT–III	
5.		Evaluate $\int_{c} \frac{\log z}{(z-1)^3} dz$ where $c:  z-1  = \frac{1}{2}$ using Cauchy's integral formula <b>OR</b>	14M
6.		Expand $Log z$ by Taylor's series about z=1.	14M
7.		Find the poles of the function $\frac{z+1}{z^2(z-2)}$ and Residues at the poles	14M
	,	<b>OR</b> 7 <i>e</i> <sup>2</sup>	
8.	a)	Find the poles and Residues at each pole $\frac{ze^{z}}{(z-1)^{3}}$	7M
	b)	Use Residue theorem to find the number of zeros of the polynomial $z^{10} - 6z^7 + 3z^3 + 1$ if $ z  < 1$	7M
9.		UNIT-V 1	
0.		Show that the image of the hyperbola $x^2 - y^2 = 1$ under the Transformation $w = \frac{1}{z}$	14M
		is the Lemniscate $^2 = \cos 2w$	
10.		Show that the function $w = \frac{4}{-}$ transforms the straight line x=c in the z-plane into a	A AN A
		z circle in the w-plane	14M

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circle in the w-plane.

<u> </u>	ode: 7G244	R-17
	II B.Tech. II Semester Supplementary Examinations Februa Electrical Circuits-II	ry 2022
	( Electrical and Electronics Engineering )	
	Nax. Marks: 70 nswer any five full questions by choosing one question from each unit (5x ********	Time: 3 Hours 14 = 70 Marks )
		Marks CO
	UNIT–I	
a)	A three phase balanced delta connected load of (4+j8) ohm	
	is connected across a 400 V three phase balanced supply.	
	Determine the phase currents and line currents.	7M
b)	Show that $V_L = 3 V_{ph}$ for 3-, balanced, Y- connected	
	system.	7M
	OR	
a)	A symmetrical 400V, 3 phase supplies a star connected	
	load with $Z_R = 20$ , $Z_Y = j50$ , $\&Z_B = -j5$ . Determine the line currents phase sequence is RYB.	7M
b)	A symmetrical 3- , 3-wire 400V supply is connected to a	
0)	delta connected load. The impedance in each branch	
	$Z_{RY}= 20 \ 30^{\circ}$ , $Z_{YB}=40 \ 60^{\circ}$ $Z_{BR}=10 \ -90^{\circ}$ . Calculate	
	phase currents, line currents and power consumed by the	;
	load. Assume phase sequence RYB.	7M
	UNIT–II	
a)	Illustrate initial and final value of given transfer function	
	$S + \frac{5}{S(S-2)(S^2+2S+3)}$	7M
b)	Explain the step response of series RC Circuit using	ļ
	Laplace Transform.	7M
	OR	
a)	Determine the inverse Laplace transform of the following functions.	
	$(S+1)$ (S) $S^2$	
	(i) $A(S) = \frac{(S+1)}{S(S+2)}$ (ii) $B(S) = \frac{S^2}{(S^2+1)^2}$	7M
b)	Determine the Laplace transform of the periodic saw tooth	
	wave of amplitude 20V and time period of 2sec.	7M
	UNIT–III	
a)	Derive the expression for current response of RC series	5
	circuit with a DC excitation.	7M
		Page <b>1</b> of <b>2</b>

Hall Ticket Number :

1.

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R-17

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 b) A series RL circuit with R=20 and L=10H has a constant voltage V=50v applied at t=0. Determine the current and voltage across resistor and inductor.

#### OR

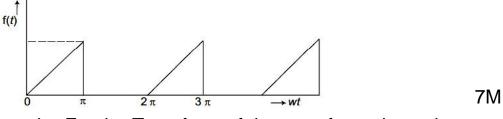
 In a series RLC circuits consist of R=20 , L=0.05H and C=20µF is connected to a constant source 100 V applied at t=0. Calculate transient current
 14M

## UNIT–IV

- 7. a) Explain the evaluation of trigonometric Fourier coefficients7Mb) Determine the Fourier transform of the following functions
  - i)  $f(t) = e^{-a|t|}$  ii) f(t) = 1 7M

### OR

8. a) Determine the trigonometric Fourier series of the waveform show in fig.



►t (sec)

b) Calculate the Fourier Transform of the waveform shown in fig f(t)

-X

0

-1

9. a) Discuss the necessary conditions for a driving point function 8M

b) Test the function  $H(s) = 4s^6 + 2s^5 + 17s^4 + 8s^3 + 16s^2 + 6s + 3$ is Hurwitz or not 6M

**UNIT-V** 

#### OR

10. The driving point impedance of a one port reactive network is given by

$$Z(S) = 5 \frac{(S^2 + 4) (S^2 + 25)}{S(S^2 + 16)}$$

Determine the first and second foster network. 14M

7M

Code: 7G244

Warks       CO       Leve         UNIT-I       1. a) State and explain Coulomb's law in vector form?       7M       Co1       L         b) Calculate EFI at a point P (3, -4, 2) in free space for Q1 =2µc at (0, 0, 0) and Q2=3µc at (-1, 2, 3).       7M       Co1       L         c) a) Derive the expression for Electric Field Intensity due to Infinite sheet of charge using Gauss' law?       7M       Co1       L         c) a) Derive the expression for Electric Field Intensity due to an electric dipole?       7M       Co1       L         3. a) Derive the expression for electric potential and EFI due to an electric dipole?       7M       Co2       L         b) Write short notes on conduction and convection current density?       7M       Co2       L         b) Write short notes on conduction and convection current density?       7M       Co2       L         c) Derive the conditions at the boundary between two dielectrics?       7M       Co2       L         c) Derive the Laplace's and Poisson's equations in an electric field?       7M       Co3       L         b) State and explain Ampere's Circuital Law?       7M       Co3       L         c) Derive the expression for vector magnetic potential from Biot-Savart's law.       7M       Co3       L         b) State and Explain Maxwell's Fourth equation?       7M       Co3       L		Ha	all Ticket Number :			7
II B.Tech. II Semester Supplementary Examinations February 2022 Electrical and Electronics Engineering ) Max. Marks: 70 Answer any five full questions by choosing one question from each unit (5x14 = 70 Marks) Marks co Marks co				R-17	,	
Electromagnetic Fields (Electrical and Electronics Engineering)         Max. Marks: 70 Answer any five full questions by choosing one question from each unit ( $5x14 = 70$ Marks) 		Coc		<u></u>		1
(Electrical and Electronics Engineering)       Time: 3 Hours         Answer any five full questions by choosing one question from each unit (5x14 = 70 Marks)         Marks co       Biorn         Marks co       Co         UNIT-I       1. a)       State and explain Coulomb's law in vector form?       7M       Co1       Li         b)       Calculate EFI at a point P (3, -4, 2) in free space for Q1 = 2µc at (0, 0, 0) and Q2=3µc at (-1, 2, 3).       7M       Co1       Li         c)       OR       7M       Co1       Li         b)       State and explain Maxwell's Second equation?       7M       Co1       Li         c)       UNIT-II       7M       Co1       Li         c)       UNIT-II       7M       Co2       Li         d)       Wirtle short notes on conduction and convection current density?       7M       Co2       Li         d)       Wirtle short notes on conduction sin an electric field?       7M       Co2       Li         b)       Derive the caplace's and Poisson's equations in an electric field?       7M       Co3       Li         d)       Using Biot-Savart's Law find Mir H due to a straight current carrying filament?       7M       Co3       Li         d)       Using Biot-Savart's Law find Mir H due to a straight current carry				<u>1</u> 022		
Max. Marks: 70 Answer any five full questions by choosing one question from each unit ( $5x14 = 70$ Marks) Marks co <sup>Bloom</sup> Leve UNIT-I 1. a) State and explain Coulomb's law in vector form? Marks co <sup>Cloom</sup> Derive the expression for Electric Field Intensity due to Infinite sheet of charge using Gauss' law? Mit coi Li Derive the expression for Electric Field Intensity due to Infinite sheet of charge using Gauss' law? Mit coi Li Derive the expression for Electric Field Intensity due to Infinite sheet of charge using Gauss' law? Mit coi Li UNIT-II 3. a) Derive the expression for electric potential and EFI due to an electric dipole? Mit short notes on conduction and convection current density? Mit coi Li Derive the expression for electric potential and EFI due to an electric field? Mit short notes on conduction and convection current density? Mit coi Li Derive the conditions at the boundary between two dielectrics? Mit coi Li Derive the cuplace's and Poisson's equations in an electric field? Mit coi Li Derive the explain Ampere's Circuital Law? Mit coi Li Di State and explain Ampere's Circuital Law? Mit coi Li Di State and explain Ampere's Circuital Law? Mit coi Li Di State and Explain Maxwell's Fourth equation? Mit coi Li Di State and Explain Maxwell's Fourth equation? Mit coi Li Di State and Explain Maxwell's Fourth equation? Mit coi Li Di Derive the expression for force on a current length of the conductor? Mit coi Li Di Derive the expression for force on a current loop placed in a magnetic field? Mit coi Li Di Derive the expression for encetry density in the magnetic field? Mit coi Li Di Derive the expression for encetry stored and energy density in the magnetic field? Mit coi Li Di Derive the expression for modified Maxwell's equation for time varying fields. Mit coi Li Di Derive the expression for modified Maxwell's equation for time varying fields. Mit coi Li Di Derive the expression for modified Maxwell's equation for time varying fields. Mit coi Li Di De			C C			
Answer any five full questions by choosing one question from each unit ( 5x14 = 70 Marks ) ********  Marks co Bloom Leve UNIT-I  1. a) State and explain Coulomb's law in vector form? TM co1 Leve D Calculate EFI at a point P (3, -4, 2) in free space for Q <sub>1</sub> =2µc at (0, 0, 0) and Q <sub>2</sub> =3µc at (-1, 2, 3). OR  2. a) Derive the expression for Electric Field Intensity due to Infinite sheet of charge using Gauss' law? OR  3. a) Derive the explain Maxwell's Second equation? TM co1 Leve UNIT-II  3. a) Derive the explain Maxwell's Second equation? TM co2 L UNIT-II  3. a) Derive the expression for electric potential and EFI due to an electric dipole? TM co2 L UNIT-II  5. a) Derive the conditions at the boundary between two dielectrics? TM co2 L b) Derive the claplace's and Poisson's equations in an electric field? TM co3 L UNIT-II  5. a) Using Biot-Savart's Law find MFI due to a straight current carrying filament? TM co3 L UNIT-IV  7. a) Derive the expression for force on a current lement in a magnetic field? TM co4 L UNIT-IV  7. a) Derive the expression for force on a current lement in a magnetic field? TM co4 L UNIT-V  9. a) State and explain Faraday's laws of electromagnetic induction in point form and Integral form? TM co5 L UNIT-V  9. a) State and explain Faraday's laws of electromagnetic induction in point form and Integral form? TM co5 L Derive the expression for meeting the aparetic induction in point form and Integral form? TM co5 L Derive the expression for current within a parallel plate capacitor where =100 o, A=0.1m², d=0.05mm and the capacitor voltage is 100 sin2000 tvolts. TM co5 L D Co L D State and explain Poynting theorem? L D State and explain Faraday's laws of electromagnetic induction in point form and Integral form? L D D State and explain Poynting theorem? L D D Evice the expression for meeting the singuificance of Poynting Vector? TM co5 L D D Evice the expression for meeting the the singuificance of Poynting Vector? TM co5 L D D Evice the expression for meeting the singuificance of Poynting Vector		Мс		າe:3⊦	lours	
WarksCoLeveUNIT-II. a)State and explain Coulomb's law in vector form?7MCo1Lb)Calculate EFI at a point P (3, -4, 2) in free space for $Q_1 = 2\mu c$ at (0, 0, 0) and $Q_2 = 3\mu c$ at (-1, 2, 3).7MCo1L2. a)Derive the expression for Electric Field Intensity due to Infinite sheet of charge using Gauss' law?7MCo1Lb)State and Explain Maxwell's Second equation?7MCo1Lc)UNIT-II7MCo1L3. a)Derive the expression for electric potential and EFI due to an electric dipole?7MCo2Lb)Write short notes on conduction and convection current density?7MCo2Lb)Write short notes on conduction and convection current density?7MCo2Lc)OR000004. a)Derive the conditions at the boundary between two dielectrics?7MCo2Lb)Derive the aplace's and Poisson's equations in an electric field?7MCo3Lc)UNIT-II0000006a)Derive the expression for vector magnetic potential from Biot-Savart's law.7MCo3Lb)State and explain Maxwell's Fourth equation?7MCo3LLc)UNIT-IV0000007. a)Derive the expression for force on a current element in a magnetic field?7MCo4Lb)Two lon		-	wer any five full questions by choosing one question from each unit ( 5x14			
UNIT-I1. a)State and explain Coulomb's law in vector form?7MCo1Lib)Calculate EFI at a point P (3, -4, 2) in free space for $Q_1 = 2\mu c$ at (0, 0, 0) and $Q_2=3\mu c$ at (-1, 2, 3).7MCo1LiOR2. a)Derive the expression for Electric Field Intensity due to Infinite sheet of charge using Gauss' law?7MCo1Li0.00UNIT-II3. a)Derive the expression for electric potential and EFI due to an electric dipole?7MCo2Li0.00ORa)UNIT-II3. a)Derive the conditions at the boundary between two dielectrics?7MCo2LiUNIT-III5. a)Using Biot-Savart's Law find MFI due to a straight current carrying filament?7MCo3LiDerive the explexion for vector magnetic potential from Biot-Savart's law.7MCo3LiDerive the explexion for vector magnetic potential from Biot-Savart's law.7MCo3LiDerive the expression for vector magnetic potential from Biot-Savart's law.7MCo4LiDerive the expression for con a current element in a magnetic field?7MCo4LiDerive the expression for torque on a current lement in a magnetic field?7MCo4LiDerive the expression for torque on a current lement in a magnetic field?7MCo4Li <td></td> <td></td> <td></td> <td>Marks</td> <td>со</td> <td>Blooms Level</td>				Marks	со	Blooms Level
b) Calculate EFI at a point P (3, -4, 2) in free space for Q <sub>1</sub> =2µc at (0, 0, 0) and $Q_2=3µc$ at (-1, 2, 3). OR 2. a) Derive the expression for Electric Field Intensity due to Infinite sheet of charge using Gauss' law? b) State and Explain Maxwell's Second equation? <u>UNIT-II</u> 3. a) Derive the expression for electric potential and EFI due to an electric dipole? M Co1 Li <u>UNIT-II</u> 3. a) Derive the expression for electric potential and EFI due to an electric dipole? M Co2 Li b) Write short notes on conduction and convection current density? OR 4. a) Derive the conditions at the boundary between two dielectrics? M Co2 Li <u>Derive the Laplace's and Poisson's equations in an electric field?</u> M Co2 Li <u>Derive the Laplace's and Poisson's equations in an electric field?</u> M Co2 Li b) State and explain Ampere's Circuital Law? OR 6. a) Derive the expression for vector magnetic potential from Biot-Savart's law. Derive the expression for force on a current element in a magnetic field? T M Co3 Li Di State and Explain Maxwell's Fourth equation? M Co3 Li D) State and Explain Maxwell's Fourth element in a magnetic field? T M Co4 Li D) Two long parallel conductors are separated by 2 cm in air carrying current of 100A flowing in opposite directions. Find the force per meter length of the conducto? M Co4 Li D Derive the expression for torque on a current loop placed in a magnetic field? M Co4 Li D Derive the expression for one encry stored and energy density in the magnetic field? M Co4 Li D Derive the expression for modified Maxwell's equation for time varying fields. M Co5 Li D Derive the expression for modified Maxwell's equation for time varying fields. M Co5 Li D Derive the expression for modified Maxwell's equation for time varying fields. M Co5 Li D Derive the expression for modified Maxwell's equation for time varying fields. M Co5 Li D Derive the expression for modified Maxwell's equation for time varying fields. M Co5 Li D Derive the explain Faraday's laws of electromagnetic i			UNIT–I			2010.
Q2=3µc at (-1, 2, 3).       OR       Image: Construct of the expression for Electric Field Intensity due to Infinite sheet of charge using Gauss' law?       7M co1       Image: Construct of the expression for Electric Field Intensity due to Infinite sheet of charge using Gauss' law?         b)       State and Explain Maxwell's Second equation?       7M co1       Image: Construct of the expression for electric potential and EFI due to an electric dipole?       7M co2       L         3. a)       Derive the expression for electric potential and EFI due to an electric dipole?       7M co2       L         b)       Write short notes on conduction and convection current density?       7M co2       L         b)       Write short notes on conduction and convection current density?       7M co2       L         b)       Derive the conditions at the boundary between two dielectrics?       7M co3       L         b)       Derive the Laplace's and Poisson's equations in an electric field?       7M co3       L         c)       Imit=1II       The co3       L       Imit=1II         5. a)       Using Biot-Savart's Law find MFI due to a straight current carrying filament?       7M co3       L         b)       State and explain Ampere's Circuital Law?       7M co3       L         for       OR       Imit=1V       Co3       L         for       Outret he expression for vector mag	1.	a)	State and explain Coulomb's law in vector form?	7M	CO1	L3
OR         2. a) Derive the expression for Electric Field Intensity due to Infinite sheet of charge using Gauss' law?       7M       Co1       Li         b) State and Explain Maxwell's Second equation?       7M       Co1       Li         1. UNIT-II       0       0       1       Co1       Li         3. a) Derive the expression for electric potential and EFI due to an electric dipole?       7M       Co2       L         b) Write short notes on conduction and convection current density?       7M       Co2       L         b) Derive the conditions at the boundary between two dielectrics?       7M       Co2       L         b) Derive the Laplace's and Poisson's equations in an electric field?       7M       Co2       L         c) Derive the Laplace's and Poisson's equations in an electric field?       7M       Co3       Li         c) Derive the Laplace's and Poisson's equations in an electric field?       7M       Co3       Li         c) State and explain Ampere's Circuital Law?       7M       Co3       Li         b) State and Explain Maxwell's Fourth equation?       7M       Co3       Li         c) Two long parallel conductors are separated by 2 cm in air carrying current of 100A flowing in opposite directions. Find the force per meter length of the conductor?       7M       Co4       L         b) Derive the		b)	Calculate EFI at a point P (3, -4, 2) in free space for $Q_1 = 2\mu c$ at (0, 0, 0) and			
<ul> <li>2. a) Derive the expression for Electric Field Intensity due to Infinite sheet of charge using Gauss' law?</li> <li>M C01 Ling Gauss' law?</li> <li>M C02 Ling Gauss' law?</li> <li>M C03 Ling Gauss' law?</li> <li>M C03 Ling Gauss' law find MFI due to a straight current carrying filament?</li> <li>M C03 Ling Gauss' law?</li> <li>M C03 Ling Gauss' law find MFI due to a straight current carrying filament?</li> <li>M C03 Ling Gauss' law for or vector magnetic potential from Biot-Savart's law.</li> <li>M C03 Ling Gauss' law for or vector magnetic potential from Biot-Savart's law.</li> <li>M C03 Ling Gauss' law for or vector magnetic potential from Biot-Savart's law.</li> <li>M C04 Ling UNIT-IV</li> <li>A) Derive the expression for torque on a current element in a magnetic field?</li> <li>M C04 Ling Gauss' law for energy dang and energy density in the magnetic field?</li> <li>M C04 Ling Gauss' law for expression for energy stored and energy density in the magnetic field?</li> <li>M C04 Ling Gauss' law for electromagnetic induction in point form and Integral form?</li> <li>M C05 Ling Causs' law for electromagnetic induction in point form and Integral form?</li> <li>M C05 Ling Causs' law for electromagnetic voltage is 100 sin2000 t volts.</li> <li>M C05 Ling Causs' law for electromagnetic voltage is 100 sin2000 t volts.&lt;</li></ul>			Q <sub>2</sub> =3µc at (-1, 2, 3).	7M	CO1	L3
<ul> <li>using Gauss' law?</li> <li>TM c01</li> <li>Li</li> <li>b) State and Explain Maxwell's Second equation?</li> <li>TM c01</li> <li>Li</li> <li>UNIT-II</li> <li>a) Derive the expression for electric potential and EFI due to an electric dipole?</li> <li>TM c02</li> <li>L</li> <li>Write short notes on conduction and convection current density?</li> <li>TM c02</li> <li>L</li> <li>OR</li> <li>a) Derive the conditions at the boundary between two dielectrics?</li> <li>TM c02</li> <li>L</li> <li>UNIT-III</li> <li>5. a) Using Biot-Savart's Law find MFI due to a straight current carrying filament?</li> <li>TM c03</li> <li>Li</li> <li>UNIT-III</li> <li>5. a) Using Biot-Savart's Law find MFI due to a straight current carrying filament?</li> <li>TM c03</li> <li>Li</li> <li>Derive the expression for vector magnetic potential from Biot-Savart's law.</li> <li>TM c03</li> <li>Li</li> <li>UNIT-IV</li> <li>7. a) Derive the expression for force on a current element in a magnetic field?</li> <li>TM c04</li> <li>L</li> <li>Diving in opposite directions. Find the force per meter length of the conductor?</li> <li>TM c04</li> <li>L</li> <li>UNIT-V</li> <li>9. a) State and explain Faraday's laws of electromagnetic induction in point form and Integral form?</li> <li>OR</li> <li>10. a) Find the displacement current within a parallel plate capacitor where =100 or A=0.1m<sup>2</sup>, d=0.05mm and the capacitor voltage is 100 sin2000 t volts.</li> <li>TM c05</li> <li>Li</li> <li>Divite the expression for modified Maxwell's equation for time varying fields.</li> <li>TM c05</li> <li>Li</li> <li>Dirive the explain Poynting theorem? What is the significance of Poynting Vector?</li> <li>TM c05</li> <li>Li</li> </ul>			OR			
<ul> <li>b) State and Explain Maxwell's Second equation?</li> <li>UNIT-II</li> <li>3. a) Derive the expression for electric potential and EFI due to an electric dipole?</li> <li>7M co2</li> <li>L</li> <li>b) Write short notes on conduction and convection current density?</li> <li>7M co2</li> <li>L</li> <li>b) Write short notes on conduction and convection current density?</li> <li>7M co2</li> <li>L</li> <li>b) Derive the conditions at the boundary between two dielectrics?</li> <li>7M co2</li> <li>L</li> <li>b) Derive the Laplace's and Poisson's equations in an electric field?</li> <li>7M co2</li> <li>L</li> <li>UNIT-III</li> <li>5. a) Using Biot-Savart's Law find MFI due to a straight current carrying filament?</li> <li>7M co3</li> <li>L:</li> <li>b) State and explain Ampere's Circuital Law?</li> <li>OR</li> <li>6. a) Derive the expression for vector magnetic potential from Biot-Savart's law.</li> <li>7M co3</li> <li>L:</li> <li>UNIT-IV</li> <li>7. a) Derive the expression for force on a current element in a magnetic field?</li> <li>7M co4</li> <li>L</li> <li>Write ong parallel conductors are separated by 2 cm in air carrying current of 100A flowing in opposite directions. Find the force per meter length of the conducto?</li> <li>7M co4</li> <li>L</li> <li>UNIT-V</li> <li>9. a) State and explain Faraday's laws of electromagnetic induction in point form and Integral form?</li> <li>7M co5</li> <li>L:</li> <li>OR</li> <li>a) Derive the expression for modified Maxwell's equation for time varying fields.</li> <li>7M co5</li> <li>C</li> <li>C</li> <li>D) Derive the expression for modified Maxwell's equation for time varying fields.</li> <li>7M co5</li> <li>C</li> <li>D) Derive the expression for modified Maxwell's equation for time varying fields.</li> <li>7M co5</li> <li>C</li> <li>D) Derive the expression for modified Maxwell's equation for time varying fields.</li> <li>TM co5</li> <li>C</li> <li>D) State and explain Poynting theorem? What is the significance of Poynting Vector?</li> <li>7M co5</li> <li>C</li> <td>2.</td><td>a)</td><td></td><td></td><td></td><td></td></ul>	2.	a)				
UNIT-II         3. a) Derive the expression for electric potential and EFI due to an electric dipole?       7M       co2       L         b) Write short notes on conduction and convection current density?       7M       co2       L         0R       0R       0       Co2       L         4. a) Derive the conditions at the boundary between two dielectrics?       7M       co2       L         b) Derive the Laplace's and Poisson's equations in an electric field?       7M       co2       L         5. a) Using Biot-Savart's Law find MFI due to a straight current carrying filament?       7M       co3       Li         b) State and explain Ampere's Circuital Law?       7M       co3       Li         core       0R       0       Co3       Li         b) State and Explain Maxwell's Fourth equation?       7M       co3       Li         core       0R       0       Co4       L         b) State and Explain Maxwell's Fourth equation?       7M       co3       Li         core       0R       7M       co3       Li         b) Two long parallel conductors are separated by 2 cm in air carrying current of 100A       flowing in opposite directions. Find the force per meter length of the conductor?       7M       co4       L         0       0       De			using Gauss' law?	7M	CO1	L3
<ul> <li>3. a) Derive the expression for electric potential and EFI due to an electric dipole? 7M co2 L</li> <li>b) Write short notes on conduction and convection current density? 7M co2 L</li> <li>OR 7M co2 L</li> <li>b) Derive the conditions at the boundary between two dielectrics? 7M co2 L</li> <li>b) Derive the Laplace's and Poisson's equations in an electric field? 7M co3 L</li> <li>c) UNIT-III</li> <li>5. a) Using Biot-Savart's Law find MFI due to a straight current carrying filament? 7M co3 L</li> <li>b) State and explain Ampere's Circuital Law? 7M co3 L</li> <li>c) OR 7M co3 L</li> <li>c) OR 7M co3 L</li> <li>d) State and Explain Maxwell's Fourth equation? 7M co3 L</li> <li>c) UNIT-IV</li> <li>7. a) Derive the expression for vector magnetic potential from Biot-Savart's law. 7M co3 L</li> <li>c) UNIT-IV</li> <li>7. a) Derive the expression for force on a current element in a magnetic field? 7M co4 L</li> <li>b) Two long parallel conductors are separated by 2 cm in air carrying current of 100A flowing in opposite directions. Find the force per meter length of the conductor? 7M co4 L</li> <li>c) OR</li> <li>8. a) Derive the expression for torque on a current loop placed in a magnetic field? 7M co4 L</li> <li>c) OR</li> <li>a) State and explain Faraday's laws of electromagnetic induction in point form and Integral form? 7M co5 L</li> <li>c) OR</li> <li>a) State and explain Faraday's laws of electromagnetic induction in point form and Integral form? 7M co5 L</li> <li>c) OR</li> <li>a) Find the displacement current within a parallel plate capacitor where =100 o, A=0.1m^2, d=0.05mm and the capacitor voltage is 100 sin2000 t volts. 7M co5 L</li> <li>b) State and explain Poynting theorem? What is the significance of Poynting Vector? 7M co5 L</li> </ul>		b)	State and Explain Maxwell's Second equation?	7M	CO1	L3
<ul> <li>b) Write short notes on conduction and convection current density?</li> <li>7M co2</li> <li>CO2</li> <li>CO3</li> <li>CO3</li></ul>			UNIT–II			
OR         4. a) Derive the conditions at the boundary between two dielectrics?       7M       CO2       L         b) Derive the Laplace's and Poisson's equations in an electric field?       7M       CO2       L         UNIT-III         5. a) Using Biot-Savart's Law find MFI due to a straight current carrying filament?       7M       CO3       L:         b) State and explain Ampere's Circuital Law?       7M       CO3       L:         OR         6. a) Derive the expression for vector magnetic potential from Biot-Savart's law.       7M       CO3       L:         D         OR         OR         6. a) Derive the expression for vector magnetic potential from Biot-Savart's law.       7M       CO3       L:         D         UNIT-IV         7. a) Derive the expression for force on a current element in a magnetic field?       7M       CO4       L         D         No long parallel conductors are separated by 2 cm in air carrying current of 100A         flowing in opposite directions. Find the force per meter length of the conductor?       7M       CO4       L         D         UNIT-V         9. a) State	3.	a)	Derive the expression for electric potential and EFI due to an electric dipole?	7M	CO2	L1
<ul> <li>4. a) Derive the conditions at the boundary between two dielectrics? 7M co2 L</li> <li>b) Derive the Laplace's and Poisson's equations in an electric field? 7M co2 L</li> <li>UNIT-III</li> <li>5. a) Using Biot-Savart's Law find MFI due to a straight current carrying filament? 7M co3 L:</li> <li>b) State and explain Ampere's Circuital Law? 7M co3 L:</li> <li>OR</li> <li>6. a) Derive the expression for vector magnetic potential from Biot-Savart's law. 7M co3 L:</li> <li>b) State and Explain Maxwell's Fourth equation? 7M co3 L:</li> <li>Derive the expression for force on a current element in a magnetic field? 7M co4 L</li> <li>b) Two long parallel conductors are separated by 2 cm in air carrying current of 100A flowing in opposite directions. Find the force per meter length of the conductor? 7M co4 L</li> <li>Derive the expression for torque on a current loop placed in a magnetic field? 7M co4 L</li> <li>Derive the expression for energy stored and energy density in the magnetic field? 7M co4 L</li> <li>UNIT-V</li> <li>9. a) State and explain Faraday's laws of electromagnetic induction in point form and Integral form? 7M co5 L:</li> <li>OR</li> <li>10. a) Find the displacement current within a parallel plate capacitor where =100 o, A=0.1m<sup>2</sup>, d=0.05mm and the capacitor voltage is 100 sin2000 t volts. 7M co5 L:</li> <li>b) State and explain Poynting theorem? What is the significance of Poynting Vector? 7M co5 L:</li> </ul>		b)	Write short notes on conduction and convection current density?	7M	CO2	L1
b)       Derive the Laplace's and Poisson's equations in an electric field?       7M       CO2       L         5.       a)       Using Biot-Savart's Law find MFI due to a straight current carrying filament?       7M       CO3       Li         b)       State and explain Ampere's Circuital Law?       7M       CO3       Li         oR       0R       0R       03       Li         6.       a)       Derive the expression for vector magnetic potential from Biot-Savart's law.       7M       CO3       Li         b)       State and Explain Maxwell's Fourth equation?       7M       CO3       Li         7.       a)       Derive the expression for force on a current element in a magnetic field?       7M       CO4       Li         b)       Two long parallel conductors are separated by 2 cm in air carrying current of 100A flowing in opposite directions. Find the force per meter length of the conductor?       7M       CO4       Li         b)       Derive the expression for torque on a current loop placed in a magnetic field?       7M       CO4       Li         b)       Derive the expression for torque on a current loop placed in a magnetic field?       7M       CO4       Li         c)       UNIT-/V       9.       a)       State and explain Faraday's laws of electromagnetic induction in point form and Integral form?			OR			
UNIT-II         5. a)       Using Biot-Savart's Law find MFI due to a straight current carrying filament?       7M       Co3       Li         b)       State and explain Ampere's Circuital Law?       7M       Co3       Li         OR       0R       0       1       1         6. a)       Derive the expression for vector magnetic potential from Biot-Savart's law.       7M       Co3       Li         b)       State and Explain Maxwell's Fourth equation?       7M       Co3       Li         7. a)       Derive the expression for force on a current element in a magnetic field?       7M       Co4       L         b)       Two long parallel conductors are separated by 2 cm in air carrying current of 100A flowing in opposite directions. Find the force per meter length of the conductor?       7M       Co4       L         b)       Derive the expression for torque on a current loop placed in a magnetic field?       7M       Co4       L         UNIT-V       9. a)       State and explain Faraday's laws of electromagnetic induction in point form and Integral form?       7M       Co5       Li         b)       Derive the expression for modified Maxwell's equation for time varying fields.       7M       Co5       Li         core       0R       7M       Co5       Li         b)       Derive the	4.	a)	Derive the conditions at the boundary between two dielectrics?	7M	CO2	L1
<ul> <li>5. a) Using Biot-Savart's Law find MFI due to a straight current carrying filament? 7M CO3 Libble State and explain Ampere's Circuital Law? 7M CO3 Libble State and explain Ampere's Circuital Law? 7M CO3 Libble State and Explain Maxwell's Fourth equation? 7M CO3 Libble State and Explain Maxwell's Fourth equation? 7M CO3 Libble State and Explain Maxwell's Fourth equation? 7M CO3 Libble State and Explain Maxwell's Fourth equation? 7M CO3 Libble State and Explain Maxwell's Fourth equation? 7M CO4 Libble State and Explain Maxwell's Fourth equation? 7M CO4 Libble Two long parallel conductors are separated by 2 cm in air carrying current of 100A flowing in opposite directions. Find the force per meter length of the conductor? 7M CO4 Libble Derive the expression for torque on a current loop placed in a magnetic field? 7M CO4 Libble Derive the expression for energy stored and energy density in the magnetic field 7M CO4 Libble Derive the expression for modified Maxwell's equation for time varying fields. 7M CO5 Libble Derive the expression for modified Maxwell's equation for time varying fields. 7M CO5 Libble Derive the expression for modified Maxwell's equation for time varying fields. 7M CO5 Libble Derive the expression for modified Maxwell's equation for time varying fields. 7M CO5 Libble Derive the expression for modified Maxwell's equation for time varying fields. 7M CO5 Libble Derive the expression for modified Maxwell's equation for time varying fields. 7M CO5 Libble Derive the expression for modified Maxwell's equation for time varying fields. 7M CO5 Libble Derive the expression for modified Maxwell's equation for time varying fields. 7M CO5 Libble Derive the expression for modified Maxwell's equation for time varying fields. 7M CO5 Libble Derive the expression for modified Maxwell's equation for time varying fields. 7M CO5 Libble Derive the expression for modified Maxwell's equation for time varying fields. 7M CO5 Libble Derive the expression for modified Maxwell's equation for time varying fields. 7M C</li></ul>		b)	Derive the Laplace's and Poisson's equations in an electric field?	7M	CO2	L1
<ul> <li>b) State and explain Ampere's Circuital Law?</li> <li>OR</li> <li>6. a) Derive the expression for vector magnetic potential from Biot-Savart's law.</li> <li>M CO3</li> <li>D State and Explain Maxwell's Fourth equation?</li> <li>UNIT-IV</li> <li>7. a) Derive the expression for force on a current element in a magnetic field?</li> <li>TW CO4</li> <li>Two long parallel conductors are separated by 2 cm in air carrying current of 100A flowing in opposite directions. Find the force per meter length of the conductor?</li> <li>8. a) Derive the expression for torque on a current loop placed in a magnetic field?</li> <li>TM CO4</li> <li>Derive the expression for energy stored and energy density in the magnetic field?</li> <li>M CO4</li> <li>UNIT-V</li> <li>9. a) State and explain Faraday's laws of electromagnetic induction in point form and Integral form?</li> <li>Derive the expression for modified Maxwell's equation for time varying fields.</li> <li>TM CO5</li> <li>D</li> <li>Derive the displacement current within a parallel plate capacitor where =100 o, A=0.1m<sup>2</sup>, d=0.05mm and the capacitor voltage is 100 sin2000 t volts.</li> <li>M CO5</li> <li>D true and explain Poynting theorem? What is the significance of Poynting Vector?</li> <li>TM CO5</li> </ul>			UNIT–III			
OR         6. a) Derive the expression for vector magnetic potential from Biot-Savart's law.       7M       CO3       Li         b) State and Explain Maxwell's Fourth equation?       7M       CO3       Li         UNIT-IV       7M       CO4       Li         7. a) Derive the expression for force on a current element in a magnetic field?       7M       CO4       Li         b) Two long parallel conductors are separated by 2 cm in air carrying current of 100A flowing in opposite directions. Find the force per meter length of the conductor?       7M       CO4       Li         B. a) Derive the expression for torque on a current loop placed in a magnetic field?       7M       CO4       Li         0R       0R       0R       004       Li       Li         9. a) State and explain Faraday's laws of electromagnetic induction in point form and Integral form?       7M       CO5       Li         0D       0R       7M       CO5       Li         0D       0D <td>5.</td> <td>a)</td> <td>Using Biot-Savart's Law find MFI due to a straight current carrying filament?</td> <td>7M</td> <td>CO3</td> <td>L3</td>	5.	a)	Using Biot-Savart's Law find MFI due to a straight current carrying filament?	7M	CO3	L3
<ul> <li>6. a) Derive the expression for vector magnetic potential from Biot-Savart's law.</li> <li>b) State and Explain Maxwell's Fourth equation?</li> <li>7. a) Derive the expression for force on a current element in a magnetic field?</li> <li>7. a) Derive the expression for force on a current element in a magnetic field?</li> <li>7. a) Derive the expression for torque on a current element in a magnetic field?</li> <li>7. m CO4</li> <li>8. m Derive the expression for torque on a current loop placed in a magnetic field?</li> <li>7. m CO4</li> <li>9. m State and explain Faraday's laws of electromagnetic induction in point form and Integral form?</li> <li>7. m CO5</li> </ul>		b)	State and explain Ampere's Circuital Law?	7M	CO3	L3
<ul> <li>b) State and Explain Maxwell's Fourth equation?</li> <li>7M CO3 Li</li> <li>7M CO3 Li</li> <li>10 Derive the expression for force on a current element in a magnetic field?</li> <li>7M CO4 Li</li> <li>7M CO5 Li</li> </ul>						
UNIT-IV         7. a) Derive the expression for force on a current element in a magnetic field?       7M co4       L         b) Two long parallel conductors are separated by 2 cm in air carrying current of 100A flowing in opposite directions. Find the force per meter length of the conductor?       7M co4       L         0R       0R       0R       000 </td <td>6.</td> <td>a)</td> <td>Derive the expression for vector magnetic potential from Biot-Savart's law.</td> <td>7M</td> <td>CO3</td> <td>L3</td>	6.	a)	Derive the expression for vector magnetic potential from Biot-Savart's law.	7M	CO3	L3
<ul> <li>7. a) Derive the expression for force on a current element in a magnetic field?</li> <li>7M CO4 L</li> <li>b) Two long parallel conductors are separated by 2 cm in air carrying current of 100A flowing in opposite directions. Find the force per meter length of the conductor?</li> <li>7M CO4 L</li> <li>0R</li> <li>8. a) Derive the expression for torque on a current loop placed in a magnetic field?</li> <li>7M CO4 L</li> <li>b) Derive the expression for energy stored and energy density in the magnetic field</li> <li>7M CO4 L</li> <li>UNIT-V</li> <li>9. a) State and explain Faraday's laws of electromagnetic induction in point form and Integral form?</li> <li>7M CO5 Li</li> <li>0R</li> <li>10. a) Find the displacement current within a parallel plate capacitor where =100 o, A=0.1m<sup>2</sup>, d=0.05mm and the capacitor voltage is 100 sin2000 t volts.</li> <li>7M CO5 Li</li> <li>b) State and explain Poynting theorem? What is the significance of Poynting Vector?</li> <li>7M CO5 Li</li> </ul>		b)	State and Explain Maxwell's Fourth equation?	7M	CO3	L3
<ul> <li>b) Two long parallel conductors are separated by 2 cm in air carrying current of 100A flowing in opposite directions. Find the force per meter length of the conductor? 7M CO4 L</li> <li>OR</li> <li>8. a) Derive the expression for torque on a current loop placed in a magnetic field? 7M CO4 L</li> <li>b) Derive the expression for energy stored and energy density in the magnetic field 7M CO4 L</li> <li>UNIT-V</li> <li>9. a) State and explain Faraday's laws of electromagnetic induction in point form and Integral form? 7M CO5 Li</li> <li>b) Derive the expression for modified Maxwell's equation for time varying fields. 7M CO5 Li</li> <li>OR</li> <li>10. a) Find the displacement current within a parallel plate capacitor where =100 o, A=0.1m<sup>2</sup>, d=0.05mm and the capacitor voltage is 100 sin2000 t volts. 7M CO5 Li</li> <li>b) State and explain Poynting theorem? What is the significance of Poynting Vector? 7M CO5 Li</li> </ul>						
<ul> <li>flowing in opposite directions. Find the force per meter length of the conductor? 7M CO4 L</li> <li>OR</li> <li>8. a) Derive the expression for torque on a current loop placed in a magnetic field? 7M CO4 L</li> <li>b) Derive the expression for energy stored and energy density in the magnetic field 7M CO4 L</li> <li>UNIT-V</li> <li>9. a) State and explain Faraday's laws of electromagnetic induction in point form and Integral form? 7M CO5 L</li> <li>b) Derive the expression for modified Maxwell's equation for time varying fields. 7M CO5 L</li> <li>OR</li> <li>10. a) Find the displacement current within a parallel plate capacitor where =100 o, A=0.1m<sup>2</sup>, d=0.05mm and the capacitor voltage is 100 sin2000 t volts. 7M CO5 L</li> <li>b) State and explain Poynting theorem? What is the significance of Poynting Vector? 7M CO5 L</li> </ul>	7.	a)	Derive the expression for force on a current element in a magnetic field?	7M	CO4	L1
OR         8. a) Derive the expression for torque on a current loop placed in a magnetic field?       7M cO4       L         b) Derive the expression for energy stored and energy density in the magnetic field       7M cO4       L         UNIT-V       9. a) State and explain Faraday's laws of electromagnetic induction in point form and Integral form?       7M cO5       L         b) Derive the expression for modified Maxwell's equation for time varying fields.       7M cO5       L         COR       0R       0R       10. a) Find the displacement current within a parallel plate capacitor where =100 o, A=0.1m², d=0.05mm and the capacitor voltage is 100 sin2000 t volts.       7M cO5       L         b) State and explain Poynting theorem? What is the significance of Poynting Vector?       7M cO5       L		b)				
<ul> <li>8. a) Derive the expression for torque on a current loop placed in a magnetic field? 7M CO4 L</li> <li>b) Derive the expression for energy stored and energy density in the magnetic field 7M CO4 L</li> <li>UNIT-V</li> <li>9. a) State and explain Faraday's laws of electromagnetic induction in point form and Integral form? 7M CO5 L</li> <li>b) Derive the expression for modified Maxwell's equation for time varying fields. 7M CO5 L</li> <li>OR</li> <li>10. a) Find the displacement current within a parallel plate capacitor where =100 o, A=0.1m<sup>2</sup>, d=0.05mm and the capacitor voltage is 100 sin2000 t volts. 7M CO5 L</li> <li>b) State and explain Poynting theorem? What is the significance of Poynting Vector? 7M CO5 L</li> </ul>				7M	CO4	L1
<ul> <li>b) Derive the expression for energy stored and energy density in the magnetic field 7M CO4 L</li> <li>UNIT-V</li> <li>9. a) State and explain Faraday's laws of electromagnetic induction in point form and Integral form? 7M CO5 L</li> <li>b) Derive the expression for modified Maxwell's equation for time varying fields. 7M CO5 L</li> <li>OR</li> <li>10. a) Find the displacement current within a parallel plate capacitor where =100 o, A=0.1m<sup>2</sup>, d=0.05mm and the capacitor voltage is 100 sin2000 t volts. 7M CO5 L</li> <li>b) State and explain Poynting theorem? What is the significance of Poynting Vector? 7M CO5 L</li> </ul>	Q	2)		71/	004	11
UNIT-V         9. a) State and explain Faraday's laws of electromagnetic induction in point form and Integral form?       7M CO5         b) Derive the expression for modified Maxwell's equation for time varying fields.       7M CO5         b) Derive the expression for modified Maxwell's equation for time varying fields.       7M CO5         10. a) Find the displacement current within a parallel plate capacitor where =100 o, A=0.1m <sup>2</sup> , d=0.05mm and the capacitor voltage is 100 sin2000       7M CO5         b) State and explain Poynting theorem? What is the significance of Poynting Vector?       7M CO5	0.					
<ul> <li>9. a) State and explain Faraday's laws of electromagnetic induction in point form and Integral form? 7M CO5 Line</li> <li>b) Derive the expression for modified Maxwell's equation for time varying fields. 7M CO5 Line</li> <li>10. a) Find the displacement current within a parallel plate capacitor where =100 o, A=0.1m<sup>2</sup>, d=0.05mm and the capacitor voltage is 100 sin2000 t volts. 7M CO5 Line</li> <li>b) State and explain Poynting theorem? What is the significance of Poynting Vector? 7M CO5 Line</li> </ul>		D)		7 IVI	CO4	LI
<ul> <li>Integral form?</li> <li>b) Derive the expression for modified Maxwell's equation for time varying fields.</li> <li>TM CO5</li> <li>CO5</li> <li>CO5</li></ul>	0	2)				
<ul> <li>b) Derive the expression for modified Maxwell's equation for time varying fields. 7M CO5 Line</li> <li>OR</li> <li>10. a) Find the displacement current within a parallel plate capacitor where =100 o, A=0.1m<sup>2</sup>, d=0.05mm and the capacitor voltage is 100 sin2000 t volts. 7M CO5 Line</li> <li>b) State and explain Poynting theorem? What is the significance of Poynting Vector? 7M CO5 Line</li> </ul>	9.	a)		71/	COF	13
OR10. a) Find the displacement current within a parallel plate capacitor where =100 o, A=0.1m², d=0.05mm and the capacitor voltage is 100 sin2000 t volts.7M CO5 Lineb) State and explain Poynting theorem? What is the significance of Poynting Vector?7M CO5 Line		b)				
<ul> <li>a) Find the displacement current within a parallel plate capacitor where =100 o, A=0.1m<sup>2</sup>, d=0.05mm and the capacitor voltage is 100 sin2000 t volts.</li> <li>b) State and explain Poynting theorem? What is the significance of Poynting Vector?</li> <li>TM CO5 Line</li> </ul>		D)		/ IVI	005	LS
A=0.1m², d=0.05mm and the capacitor voltage is 100 sin2000 t volts.7M cosLb) State and explain Poynting theorem? What is the significance of Poynting Vector?7M cosL	10	a)				
b) State and explain Poynting theorem? What is the significance of Poynting Vector? 7M CO5 Li		a)		7M	CO5	L3
		b)				L3
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	all Ticket Number :	R-17	]
Co	Dde: 7G536 II B.Tech. I Semester Supplementary Examinations February		]
	Fluid Mechanics and Hydraulic Machines	2022	
	(Electrical and Electronics Engineering)		
	T nswer any five full questions by choosing one question from each unit (5x1- *********	ime: 3 Hours 4 = 70 Marks )	
		Marks CO	Blo Le
	UNIT–I		
. a)	Define the following properties of the fluid.		
	<ul> <li>i) Specific Weight ii) Specific Gravity iii) viscosity</li> <li>iv) Surface Tension</li> </ul>	8M	
b)	Calculate the Density, Specific weight and Specific gravity of		
	One liter of liquid, which weighs 7N.	6M	
	OR		
. a)	Explain the property viscosity of a fluid. Also describe its variation with temperature.	7M	
b)	The dynamic viscosity of an oil used for lubrication between a		
0)	shaft and sleeve is 6 poise. The shaft is of diameter 0.4 m		
	and rotates at 190 r.p.m. Calculate the power lost in the		
	bearing for a sleeve length of 90 mm. The thickness of oil film		
	is 1.5 mm.	7M	
、			
. a)	Explain the minor losses in pipes briefly.	7M	
b)	At a sudden enlargement of water main from 240 mm to		
	480mm diameter, the hydraulic gradient rises by 10 mm. Estimate the rate of flow.	7M	
	OR		
	State the Bernoulli's theorem and derive the Bernoulli's		
	equation completely from the fundamental Euler's equation of		
	fluid motion.	14M	
	UNIT–III		
. a)	Derive an expression for force exerted by the jet on the flat		
1- 1	vertical plate moving in the direction of the jet.	8M	
b)	A nozzle of 50 mm diameter delivers a stream of water at 20 m/sec perpendicular to the plate that moves away from the		
	20 m/sec perpendicular to the plate that moves away from the jet at 5m/sec. Find i) the force on the plate ii) the work done		
	ii) the efficiency of the jet.	6M	
	OR		

- 6. a) What is pumped storage power plant and explain its concept. 7M
  - b) Describe the various storage requirements of hydroelectric power station.

## UNIT-IV

7. a) Explain the various parts of Pelton turbine and its working with the neat sketch.

b) A Pelton wheel has a mean bucket speed of 10m/sec with a jet water flowing at the rate of 700 liters per second under a head of 30 meters. The bucket deflects the jet at angle of 160<sup>°</sup>. Calculate the power given by the water to the runner and the hydraulic efficiency of the turbine. Assume coefficient of velocity as 0.98.

#### OR

- 8. a) Define the unit quantities and describe them with expressions 8M
  - b) A turbine develops 500 kW power under a head of 100 meters at 200 r.p.m. What would be its normal speed and output under a head of 81 meters 6M

## UNIT-V

- 9. a) Explain the working principle of single acting reciprocating pump with neat sketch.
  - b) Define indicator diagram and also show that area of indicator diagram is proportional to the work done by the reciprocating pump.

#### OR

- 10. a) Define slip, percentage of slip and negative slip of the reciprocating pump 7M
  - b) A single acting reciprocating pump running at 50 r.p.m., delivers 0.01 m<sup>3</sup>/sec of water. The diameter of the piston is 200 mm and stroke length 400 mm. Determine:

i) The theoretical discharge of pump ii) coefficient of discharge iii) slip and percentage of slip of the pump. 7M

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6M

8M

7M

7M

	Ha	all Ticket Number :												-	7
	Co	de: 7G243								<u>]</u>		<u></u>		R-17	
	II B.Tech. II Semester Supplementary Examinations February 2022														
Linear Control Systems															
	(Electrical and Electronics Engineering) Max. Marks: 70 Time: 3 Hours Answer any five full questions by choosing one question from each unit (5x14 = 70 Marks )														
								~~~~							Marks
1.	a)	Explain the effect of	feed	lback	in r		<b>IT–I</b> cing p	aran	neter	varia	ation	s.			7M
	b)	Derive an expression					• •						DC sei	rvo motor.	7M
						C	DR								
2.	,	Explain the properti		0			•								7M
	b)	Derive an expression	on for	the t	rans			on of	an A	AC se	ervo	moto	r		7M
3.	2)	Determine the unde	vrdan	anad	roer		T–II		nd o	dor	ontr	പം	stom s	whitested to unit	
5.	a)	step input function	luan	ipeu	iest	0115		Seco		uert	Jonn	01 59	SIGHT S		8M
	b)	Obtain the rise time	e, pe	eak ti	me,	max	imun	n pea	ak ov	rsh	oot a	and s	ettling	time of the unit	
		step response of a c	close	d loo	р со	ntro	syst	em g	jiven	by G	(s)	$=\frac{1}{2}$	$\frac{36}{2+2.5}$	<u>+ 36</u>	6M
							DR					D	120	1 50	0111
4.	a)	Define Type & Orde	er of a	a Sys	tem	with	exar	nples	S.						4M
	b)	Explain about time	doma	ain sp	ecifi	catio	ons								10M
_			_				T–III								
5.		Explain the construct							•					by Douth's tost	7M
	b)	Test the stability of s <sup>6</sup> +2s <sup>5</sup> +8s <sup>4</sup> +20s <sup>2</sup> +1			m w	itn tr	ie toi	IOWIN	ig cr	arac	terist	ic ec	Juation	by Routh's test	7M
						C	DR								
6.		Sketch the root										•			
		$G(s) = \frac{K}{S(S+2)(S+1)}$	$\frac{1}{4}$ .	Find	the	valu	e of I	< so	that	the c	lamp	ing r	atio of	the closed loop	14M
		system is 0.5	')												
		-				UNI	T–IV								
7.		Explain bode plots of	of ba	sic fa	ctors	s of a	a trar	sfer	func	tion.					14M
•							DR								
8.		Sketch the Bode µ				the	Pha	se m	nargi	n an	d ga	ain m	nargin	for the system	4 4 5 4
		$G(s)H(S) = \frac{10}{S(S+2)}$	$\frac{S(S^{-1})}{S(S^{-1})}$	+S +	2)										14M
		, , , , , , , , , , , , , , , , , , ,				UN	T–V								
9.	a)	What is state transit	ion n	natrix	? St			rove	its p	rope	rties.				7M
	b)	Derive the expression	on fo	r tran	sfer	fund	ction	of Sta	ate N	lode					7M
							DR				_				
10.		Explain design of th	e ba	sic le	ad c	omp		tor u **	sing	Bode	e plot				14M
							-14								

	Ticket Number :									R-17	
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	II D.16CH. II 36	inesiei					nunc				
		(Electr	cal a	nd Elec	tronic	Eng	ineeri	ng)			
	Marks: 70 ver any five full qu	iostions k	wcho	osina o		stion	from		nit (5	Time: 3 Hours	
Alisv			у спо	-	*****	311011	nome		- III (C	14 - 70 Mars j	
				UNIT-	.1						Mark
a)	Explain the dif	ferent t				the t	ransi	forme	r		6
-	4400 V, 50-I										01
	current loss of				-					-	
	ransformer is a					•••					8
-		1- 1		OR	,						
a)	Derive the cor	dition f	or ma	aximur	n effic	iency	y in a	ı singl	e pl	nase	
t	ransformer.										71
b)	A 100 kVA tra	nsforme	er has	s 400 t	turns	on th	e pri	mary	anc	l 80 turns on	
t	he secondary.	The pr	imary	and s	secon	dary	resis	stance	es a	re 0.3 and	
	•	•			•		•	•		actance are	
	1.1 and 0.03				•						
•	i) equivalent i	•			•		•	• • •		•	
τ	erminal voltag	e for fu			<u> </u>	ower	facto	or of C	J.8 I	eading.	7
	• // · · ·	.,		JNIT-							
	With neat circu	•	am e	xplain	the o	t a s	hort	circuit	t tes	st conducted	71
	on a transform	-						40.14	- /		71
	A two winding										
	econnected a Calculate the 1		•	•						•	
	conductively tr	•								•	
	inity pf.				Willio	aon	, crim	9 110	Tat		71
-				OR							
a) N	Vith neat circu	it diagra	am ex	kplain	princi	ole o	f ope	ratior	n of	а	
S	Sumpner's test	on sing	gle pł	nase ti	ransfo	rmer	•				7
b) A	A 100 KVA lig	ghting t	ransf	ormer	has	a ful	l loa	d los	s of	f 3 KW, the	
	osses being e							•••		•	
	he transforme	•									
	nours, and the	-			ligible	tor	the r	emair	ndei	r of the day.	<b>~</b> "
(	Calculate the a	ii dav e	ITICIE	ICV.							71

# UNIT–III

5. a) Compare the Y/Y and  $\Delta/\Delta$  connections of 3-Ph transformer with neat diagrams.

b) A 3-phase, 500 kVA, 6000V/400V, 50Hz, delta-star connected transformer is delivering 300 kW, at 0.8 pf lagging to a balanced 3-phase load connected to the LV side with HV side supplied from 6000 V, 3- phase supply. Calculate the line and winding currents in both the sides. Assume the transformer to be ideal.

OR

- 6. a) Prove that "the load shared by the transformers is inversely proportional to its impedance when they are in parallel".
  - b) Two 1-Ph transformers A and B are connected in parallel to same load. Determine the current delivered by each transformer, given: OC emf 6.6KV for A and 6.4KV for B. Equivalent leakage impedance in terms of the secondary are (0.3+j3) and (0.2+j1) respectively. Total impedance is (8+j6)

## **UNIT-IV**

- 7. a) Explain in detail about torque slip characteristics.
  - b) The power input to the rotor of 440V, 50 Hz, 6 pole, 3-phase, and induction motor is 80 KW. The rotor electromotive force is observed to make 100 complete alterations per minute. Calculate (i) the slip (ii) the rotor speed (iii) rotor copper losses per phase.

#### OR

- 8. a) With neat sketch, explain how rotating magnetic field is produced in a three phase induction motor.
  - b) Explain the phenomenon of crawling and cogging. Also explain it effect. 6M

#### **UNIT-V**

- 9. a) Explain the principle of speed control of a 3-phase induction motor by V/f method and draw the corresponding torque-speed characteristics and discuss the applications and limitations of these methods.
  - b) A cage induction motor when started by means of a star-delta starter takes 190% of full load line current and develops 40% of full load torque at starting. Determine the starting torque and current in terms of full load values, if an auto transformer with 80% tapping were employed.

#### OR

- 10. a) Explain the working principle of Induction generator.
  - b) Explain the conducting procedure of No load and Blocked rotor test on three phase induction motor. 8M

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8M

7M

7M

6M

7M

7M

7M

7M

	Hall Ticket Number :		_
		R-17	
	Code: 7G345 II B.Tech. II Semester Supplementary Examinations February Analog Electronics-II (Electrical and Electronics Engineering) Max. Marks: 70	y 2022 Time: 3 Hours	-
	Answer any five full questions by choosing one question from each unit (5x1 ********	4 = 70 Marks )	
		Marks CO	Blooms Level
	UNIT–I		
1. a	<ul> <li>Describe the internal block diagram of an Op-amp and explain each block in detail</li> </ul>	10M	
ł	b) List the ideal characteristics of an op-amp	4M	
•	OR	TIVI	
2. a		7M	
ł	b) Describe the features of differential amplifier.	7M	
	UNIT–II		
3. a	a) Explain how voltage can be converted into current using Op-Amp.	7M	
ł	<ul> <li>Illustrate the operation of inverting summer circuit using IC 741.</li> </ul>	7M	
	OR		
4.	Discuss the Op-amp ideal differentiator and mention its drawbacks. Also explain how to overcome these drawbacks with practical differentiator.	14M	
5. a	a) What is the basic principle of operation of a comparator? and discuss the operation of inverting Comparator using Op-Amp.	7M	
ł	<ul> <li>Demonstrate the applications of Op-Amp Comparator.</li> </ul>	7M	
	OR		
6. a	necessary equations?	9M	
ł	Design a triangular wave generator using comparator and integrator to oscillate at 4KHz and peak to peak voltage of 7V. Use the Op-Amp with <u>+</u> 15V power supply and make necessary assumptions.		
7	UNIT-IV	014	
7. 8	<ul> <li>a) Explain the basic principle of operation using block schematic of a PLL.</li> <li>b) Discuss how PLL can be used for AM demodulation.</li> </ul>	8M 6M	
L	OR	OIVI	
8.	Illustrate the operation of monostable multivibrator circuit using IC 555 and derive the expression for time period	14M	
0	UNIT-V	71/	
9. a	<ul><li>a) Illustrate the operation of weighted resistor DAC.</li><li>b) Discuss the operation of Servo tracking ADC.</li></ul>	7M 7M	
L	OR	7 111	
10.	Classify the types of ADC and Explain the principle of operation of dual- Slope ADC with necessary diagrams.	14M	