CODE: 2202PC03 | R22 | SET - 2

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
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B.TECH II YEAR I SEMESTER REGULAR EXAMINATIONS, JANUARY-2024
ANALOG ELECTRONICS
(EEE)

[Time: 3 Hours] **[Max. Marks: 60]**

PART – A
(10x 1 = 10M)

Note: 1. This Part consists of 10 QUESTIONS
2. Answer **All Questions**. Each question carries 1 Mark

1.	A	Define Clipper?	1M	BTL1
	B	List out various types of Biasing?	1M	BTL2
	C	Define Transconductance?	1M	BTL1
	D	Recall the small signal equivalent circuit MOSFET.	1M	BTL2
	E	List out various types of multi stage amplifiers.	1M	BTL1
	F	Define Cross over distortion.	1M	BTL2
	G	What is the concept of Feedback?	1M	BTL1
	H	List out Various types oscillators?	1M	BTL2
	I	Recall various Op-Amp Characteristics.	1M	BTL1
	J	Define Slew rate?	1M	BTL2

PART – B
(5 x 10 = 50M)

Note: 1. This Part consists of 10 QUESTIONS
2. Answer any 1 question from each Section. Each question carries 10 Marks.
3. Illustrate your answers with NEAT sketches wherever necessary.

SECTION - I

2.A	Explain about the working of PN diode?	5M	BTL2
2.B	Summarize the working of Clippers.	5M	BTL2

(OR)

3.	Analyze the Input and Output characteristics of CE Configuration.	10M	BTL4

SECTION - II

4.	Explain about Common Drain amplifier with neat sketches.	10M	BTL2

(OR)

5.A	Analyze the structure of MOSFET with neat sketches.	5M	BTL4
5.B	Summarize about the Switching action MOSFET.	5M	BTL2

SECTION - III

6.	Analyze the working of Two stage RC coupled amplifier with relevant expressions	10M	BTL4

(OR)

7.	Outline the working principle of Class-B Push pull Amplifier.	10M	BTL2

SECTION – IV

8.A	Summarize about voltage-series feedback amplifier.	5M	BTL2
8.B	Determine the gain, input and output impedances of a voltage series feedback amplifier having A=-300, R_i =1.5 KΩ, Ro= 50 KΩand β=0.04.	5M	BTL5

(OR)

9.	Explain about RC Phase shift Oscillator and derive the expression for frequency of oscillations.	10M	BTL2

SECTION – V

10.	Summarize about DC characteristics of Op-Amp with necessary expressions.	10M	BTL2

(OR)

11.	Explain about Inverting and Non-Inverting amplifiers using Op-Amp with their gain expressions.	10M	BTL2

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CODE:2202PC01	R22	SET - 3

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B.TECH II YEAR I SEMESTER REGULAR EXAMINATIONS, JAN/FEB -2024
ELECTRICAL CIRCUIT ANALYSIS
(ELECTRICAL AND ELECTRONICS ENGINEERING)

[Time: 3 Hours] **[Max. Marks: 60]**

PART – A

(10x 1 = 10M)

Note: 1. This Part consists of 10 QUESTIONS
2. Answer **All Questions**. Each question carries 1 Mark.

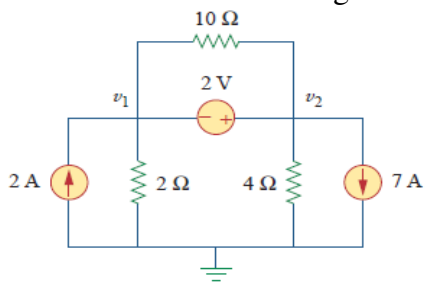
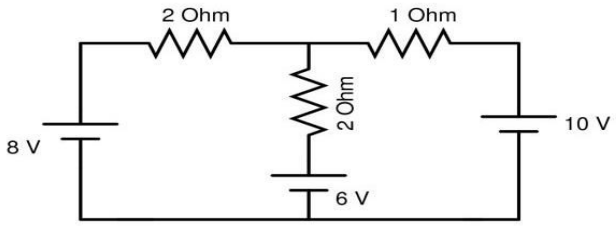
1	A	Restate Norton theorem	1M	BTL2
	B	Illustrate super mesh and give an example	1M	BTL3
	C	Outline the term 'time constant' of the RC transient circuit and its expression	1M	BTL2
	D	Differentiate forced response and free response	1M	BTL2
	E	Show the illustration of RLC series circuit and impedance expression of it	1M	BTL2
	F	Interpret the understanding on RMS value of a sine wave	1M	BTL3
	G	Review the term poles and state its use in electrical network	1M	BTL2
	H	List the difference between time response and frequency response of an electrical circuit	1M	BTL2
	I	Interpret the various types of two port network parameters	1M	BTL2
	J	Draw the impedance triangle and mention all its parameters	1M	BTL2

PART – B

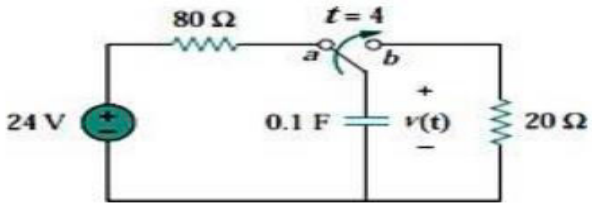
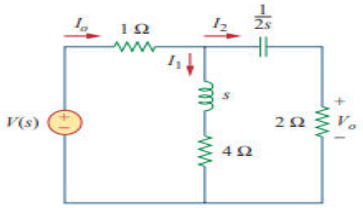
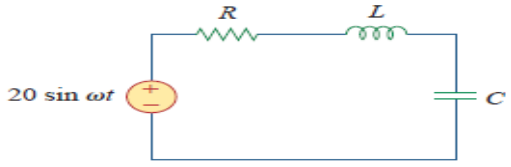
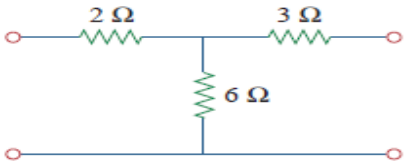
(5 x 10 = 50M)

Note: 1. This Part consists of 5 QUESTIONS
2. Answer any 1 question from each Section. Each question carries 10 Marks.
3. Illustrate your answers with NEAT sketches wherever necessary.

SECTION - I

2.	Find the node voltages in the circuit shown in Fig. 	10M	BTL3
	(OR)		
3.	Find $i_{2\Omega}$ in the circuit of Fig. using superposition theorem. 	10M	BTL4

SECTION - II

4.	A step DC voltage is applied to a series RL Circuit at t = 0. Develop the expression for current through inductor for t=0 and sketch the responses. Assume zero initial conditions.	10M	BTL4
	(OR)		
5.	The switch in the below figure has been in position a for a long time, At t = 4 s the switch is moved to position b and left there. Determine v(t) at t = 10 s. 	10M	BTL4
	SECTION - III		
6.	A balanced delta-connected load has a phase current $I_{AC}= 10\angle -30°A$: i. Determine the three-line currents assuming that the circuit operates in the positive phase sequence. ii. Calculate the load impedance if the line voltage is $V_{AB}= 110\angle 0°V$	10M	BTL3
	(OR)		
7.	A balanced star-connected load absorbs a total power of 5 KW at a leading power factor of 0.6 when connected to a line voltage of 240 V. Find the total complex power of load.	10M	BTL4
	SECTION – IV		
8.	Define Transfer function and write its significance. Determine the transfer function $H(s) = V_0(s) / I_0(s)$ of the circuit shown in Fig. 	10M	BTL4
	(OR)		
9.	In the circuit of Fig. R = 2Ω, L = 1mH and C = 0.4 μF. (i) Find the resonant frequency and the half-power frequencies. (ii) Calculate the quality factor and bandwidth. (iii) Determine the amplitude of the current at ω_0, ω_1 and ω_2. 	10M	BTL4
	SECTION – V		
10.	Define transmission parameters and write its significance. Explain the procedure and obtain thetransmission parameters of a two port network.	10M	BTL4
	(OR)		
11.	Find the hybrid parameters for the two-port network of Fig. 	10M	BTL4

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CODE: 2202PC02 | R22 | SET - 3

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B.TECH II YEAR I SEMESTER REGULAR EXAMINATIONS, JAN/FEB-2024
ELECTRO MAGNETIC FIELDS
(EEE)

[Time: 3 Hours] **[Max. Marks: 60]**

PART – A

(10x 1 = 10M)

Note: 1. This Part consists of 10 QUESTIONS
2. Answer **All Questions**. Each question carries 1Mark.

1	A	State Gauss Law	1M	BTL1
	B	Write Laplace equation in both Cartesian and cylindrical coordinates.	1M	BTL1
	C	What is meant by boundary conditions? How they are useful?	1M	BTL1
	D	Write the equation of continuity	1M	BTL1
	E	State Ampere's circuit law.	1M	BTL1
	F	Define coefficient of coupling	1M	BTL1
	G	Write Maxwell's equations in point form.	1M	BTL1
	H	Define internal inductance and external inductance	1M	BTL1
	I	Write Maxwell‟s equation in Phasor form	1M	BTL1
	J	What is poynting vector?	1M	BTL1

PART – B

(5 x 10 = 50M)

Note: 1. This Part consists of 10 QUESTIONS
2. Answer any 1 question from each Section. Each question carries 10 Marks.
3. Illustrate your answers with NEAT sketches wherever necessary.

SECTION - I

2.A	Derive the expression for electric field intensity due to sheet of charge	5M	BTL4
2.B	Find the electric field intensity at P(1,1,1) caused by four identical 3 nC charges located at P1(1,1,0), P2(-1,1,0), P3(-1,-1,0) and P4(1, -1, 0).	5M	BTL3

(OR)

3.A	State and explain coulomb's law with necessary equations	5M	BTL2
3.B	A charge of -0.3 μC is located at A(25, -30, 15) (in cm) and a second charge of 0.5 μC is at B(-10, 8, 12) cm . Find E at (a) the origin (b) P(15,20, 50) cm	5M	BTL3

SECTION - II

4.A	Explain about Poisson's equation and Laplace equation.	5M	BTL2
4.B	Derive the expression for capacitance of parallel-plate capacitor	5M	BTL4

(OR)

5.A	Derive the expression for capacitance of a spherical capacitor	5M	BTL4
5.B	An electric dipole of $100a_z$ pC.m is located at the origin. Find V and E at points (i) (0, 0, 10) and (ii) (1, $\pi/3$, $\pi/2$)	5M	BTL3

SECTION - III

6.A	Derive the expression for magnetic field intensity due to infinitely long straight filament carrying a direct current I.	5M	BTL2
6.B	Discuss about force between differential current elements.	5M	BTL2

(OR)

7.A	Explain about magnetic flux and magnetic flux density.	5M	BTL2
7.B	Obtain an expression for the self-inductance of a toroid of circular cross section with 'N' closely spaced turns.	5M	BTL3

SECTION – IV

8.A	A parallel plate capacitor with plate area of $5cm^2$ and separation of 3 mm has a voltage 50sin103t,V applied to its plates. Calculate the displacement current assuming $\varepsilon = 2\varepsilon_0$.	5M	BTL3
8.B	Explain about Faraday's laws of electromagnetic induction	5M	BTL2

(OR)

9.A	Explain about Dynamically induced EMFs.	5M	BTL2
9.B	Write the Maxwell's equations both in point and integral forms for time varying fields.	5M	BTL2

SECTION – V

10.A	State and explain poynting theorem.	5M	BTL2
10.B	Derive the necessary plane equation in free space and in a homogeneous material.	5M	BTL2

(OR)

11.A	In free space E = 20 cos ($\omega t - 50x$) ay V/m. calculate (i) J_d (ii) H (iii) ω	5M	BTL3
11.B	Derive the necessary plane equation in conducting medium and in loosy dielectrics.	5M	BTL2

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CODE: 2202ES03 | R22 | SET - 3

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B.TECH II YEAR I SEMESTER REGULAR EXAMINATIONS, JANUARY-2024
ENGINEERING MECHANICS
(EEE)

[Time: 3 Hours] **[Max. Marks: 60]**

PART – A **(10x 1 = 10M)**

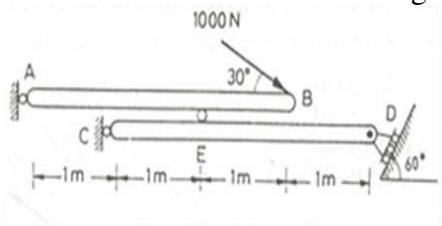
Note: 1. This Part consists of 10 QUESTIONS
2. Answer **All Questions**. Each question carries 1 Mark.

1	A	What is coplanar and non coplanar forces	1M	BTL1
	B	Define a free body diagram.	1M	BTL2
	C	State the laws of friction.	1M	BTL1
	D	How does friction influence the motion of bodies on surfaces?	1M	BTL2
	E	Differentiate between centroid and center of gravity.	1M	BTL1
	F	Define the radius of gyration.	1M	BTL1
	G	What is mass moment of inertia?	1M	BTL2
	H	What is the parallel rule of moment of inertia?	1M	BTL2
	I	State D'Alemberts principle for a particle.	1M	BTL1
	J	What is the principle of the conservation of energy?	1M	BTL2

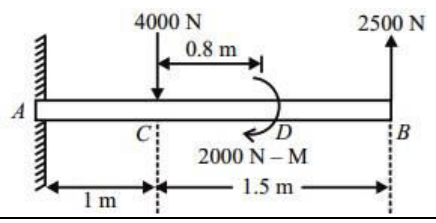
PART – B **(5 x 10 = 50M)**

Note: 1. This Part consists of 10 QUESTIONS
2. Answer any 1 question from each Section. Each question carries 10 Marks.
3. Illustrate your answers with NEAT sketches wherever necessary.

SECTION – I

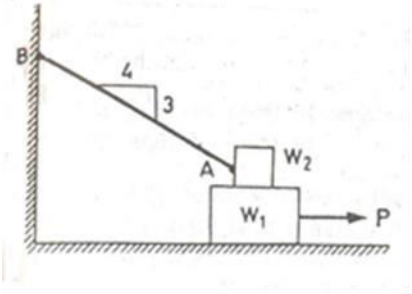
2.A	State and prove Varignon's theorem of moments.	5M	BTL2
2.B	Two beams AB and CD are arranged and supported as shown in fig. Find the reaction at D due to a force of 1000 N acting at B. 	5M	BTL4

(OR)

3.A	Define couple and explain its characteristics. With the help of a sketch, explain how a force can be resolved into a force and a couple.	5M	BTL2
3.B	Figure shows two vertical forces and a couple of moment 2000 N-m acting on a horizontal rod which is fixed at end A.Determine the resultant of the system. 	5M	BTL5

CODE: 2202ES03	R22	SET - 3

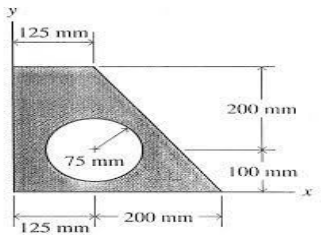
SECTION - II

4	A block of weight W_1=1000N rests on a horizontal surface and supports on its top another block of weight W_2=250N as shown in Fig. The weight W_2 is attached by an inclined string AB to the vertical Wall. Find the magnitude of the horizontal force P applied to the lower block to cause slipping to impend. The coefficient of friction for all contacting surfaces may be assumed to μ=0.3. 	10M	BTL5

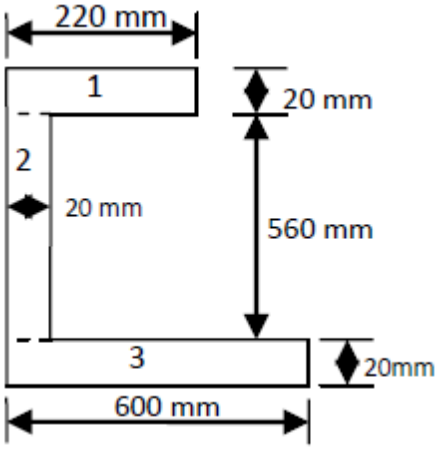
(OR)

5	The following particulars refer to a screw jack: Diameter of screw rod = 62.5 mm. Length of the handle = 250 mm. Pitch of the square thread = 12.5 mm. Coefficient of friction = 0.05. (i) Find the effort required to lift up a load of 5000 N. (ii) Find the effort required to lift down a load of 5000 N.	10M	BTL4

SECTION - III

6.A	State and prove Pappus theorem.	5M	BTL2
6.B	With respect to coordinate axes x and y, locate the centroid of the shaded area shown in Fig. 	5M	BTL4

(OR)

7	Find out moment of inertia at horizontal and vertical centroid axes of the given lamina. 	10M	BTL5

CODE: 2202ES03 | **R22** | **SET - 3**

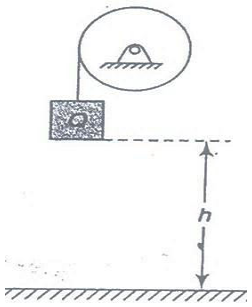
SECTION – IV

8	Determine the Mass moment of inertia a solid sphere of Radius R about its diametrical axis.	10M	BTL3

(OR)

9.A	State and prove transfer formula for product of inertia.	5M	BTL2
9.B	Determine the mass moment of inertia of a cylinder shaft of 100mm diameters and 2.5m height about the centre of gravity axes.(density, ρ=8000 kg/m^3).	5M	BTL3

SECTION – V

10	A solid right circular drum of radius r=0.3m and weight w=143.3 N is free to rotate about its geometric axis as shown in Fig.8,wound around a circumference of the drum is flexible cord carrying at its free end a weight Q =44.5 N .if the weight Q is released from rest. (a) find the time t required for it to fall through the height h=3m (b) with what velocity "v" will it strike the floor. 	10M	BTL5

(OR)

11.A	Derive the expression of work done and kinetic energy for a rigid body.	4M	BTL1
11.B	A pile driver weighing 200 kg strikes a pile of 100 kg from a height of 7 m. If the resistance of penetration is constant and amounts to 6000 kg, how many blows will be required to drive it by 1 m? Consider the coefficient of restitution is 0.27.	6M	BTL5

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CODE: 2000BS03 | **R20** | **SET - 1**

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B.TECH II YEAR I SEMESTER REGULAR EXAMINATIONS, JAN/FEB -2024
MATHEMATICS - III
(COMMON TO ECE & EEE)

[Time: 3 Hours] **[Max. Marks: 70]**

PART – A

(5 x 2 = 10M)

Note: 1. This Part consists of 8 QUESTIONS
2. Answer any 5 questions. Each question carries 2 Marks.

1	A	State Cauchy-Riemann equations in a Cartesian coordinates.	2M	BTL2
	B	Show that z^2 is an analytic for all z.	2M	BT L3
	C	Evaluate $\int_0^{2+i} (\bar{z})^2 dz$ along the line $y=\frac{x}{2}$.	2M	BT L3
	D	Evaluate $\int_C \frac{z^2+4}{z-3}dz$, where C is $\lvert z\rvert=5$.	2M	BT L3
	E	Calculate the residue of $\frac{3z+1}{(z+1)(2z-1)}$ at $z=\frac{1}{2}$.	2M	BT L2
	F	Find the Fourier coefficient a_0 for the given function $f(x)=e^x$ in the interval $0<x<2\pi$	2M	BT L1
	G	Find the Z-transform of $\sin(3n+5)$.	2M	BT L1
	H	Find the Z-transform of $e^t \sin 2t$.	2M	BT L1

PART – B

(5 x 12 = 60M)

Note: 1. This Part consists of 10 QUESTIONS
2. Answer any 1 question from each Section. Each question carries 12Marks.
3. Illustrate your answers with NEAT sketches wherever necessary.

SECTION - I

2.A	If f(z) is an analytic function with constant modulus, show that f(z) is constant.	6 M	BTL2
2.B	Show that the polar form of Cauchy-Riemann equations are $\frac{\partial u}{\partial r}=\frac{1}{r}\frac{\partial v}{\partial \theta}, \frac{\partial v}{\partial r}=-\frac{1}{r}\frac{\partial u}{\partial \theta}$.	6 M	BTL3

(OR)

3.A	If f(z) is a holomorphic function of z, show that $\left\{\frac{\partial}{\partial x}\lvert f(z)\rvert\right\}^2+\left\{\frac{\partial}{\partial y}\lvert f(z)\rvert\right\}^2=\lvert f'(z)\rvert$.	6 M	BTL3
3.B	Construct the analytic function, whose real part is $\frac{\sin 2x}{(\cosh 2y-\cos 2x)}$.	6 M	BTL3

SECTION - II

4.A	Solve $\int_{1-i}^{2+i}(2x+iy+1)dz$, along the path (i) $x=t+1, y=2t^2-1$	6 M	BTL3

	(ii) the straight line joining $1-i$ *and* $2+i$.		
4.B	Verify Cauchy's theorem for the integral z^3 take over the boundary ofthe rectangle with vertices $-1,1,1+i,-1+i$.	6 M	BTL4

(OR)

5.A	State and prove Cauchy's integral formula.	6 M	BTL3
5.B	Expand the Laurent's expansion of $f(z)=\dfrac{7z-2}{(z+1)z(z-2)}$ in the region $1<z+1<3$.	6 M	BTL4

SECTION - III

6.A	Determine the poles of the function $f(z)=\dfrac{z^2-2z}{(z+1)^2(z^2+1)}$ and also calculate residues at each pole.	6 M	BTL5
6.B	Evaluate $\oint_C \dfrac{e^z}{\cos \pi z}dz$, where C is the unit circle $\lvert z\rvert=1$.	6 M	BTL4

(OR)

7.	Apply calculus of residues, to prove that $\int_0^{2\pi} \dfrac{d\theta}{1-2r\cos\theta+r^2}=\dfrac{\pi}{1-r^2}$.	12 M	BTL5

SECTION – IV

8.A	Express the function $f(x)=\lvert x\rvert$ as a Fourier series in the interval $\pi<x<\pi$.	6 M	BTL4
8.B	Find the half-range cosine series for the function $f(x)=x^2$ in the range $0\le x\le \pi$.	6 M	BTL2

(OR)

9.	Obtain the Fourier series for the function $f(x)=\begin{cases}\pi x, & 0\le x\le 1\\ \pi(2-x), & 1\le x\le 2\end{cases}$. Deduce that $\dfrac{1}{1^2}+\dfrac{1}{3^2}+\dfrac{1}{5^2}+\dfrac{1}{7^2}+\ldots\ldots=\dfrac{\pi^2}{8}$.	12 M	BTL3

SECTION – V

10.A	Express the function $f(x)=\begin{cases}1\ for\ \lvert x\rvert\le 1\\ 0\ for\ \lvert x>1\rvert\end{cases}$ as a Fourier integral. Hence evaluate $\int_0^{\infty}\dfrac{\sin\lambda\cos\lambda x}{\lambda}d\lambda$.	6 M	BTL4
10.B	Find the Fourier sine transform of $e^{-\lvert x\rvert}$. Hence show that $\int_0^{\infty}\dfrac{x\sin mx}{1+x^2}dx=\dfrac{\pi e^{-m}}{2}, m>0$.	6 M	BTL2

(OR)

11.A	If $U(Z)=\dfrac{2z^2+5z+14}{(z-1)^4}$, evaluate u_2 *and* u_3.	6 M	BTL4
11.B	Solve $y_{n+2}+6y_{n+1}+9y_n=2^n$ with $y_0=y_1=0$,using Z-transform.	6 M	BTL3

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CODE: 2000BS03 | R20 | SET-3

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B.TECH II YEAR I SEMESTER SUPPLY EXAMINATIONS, FEBRUARY -2024

MATHEMATICS-III

(COMMON TO ECE,EEE)

[Time: 3 Hours] **[Max. Marks: 70]**

PART – A

(5 x 2 = 10M)

Note: 1. This Part consists of 8 QUESTIONS
2. Answer any 5 questions. Each question carries 2 Marks.

1	A	Check whether $w = \bar{z}$ is analytic everywhere.	2M	BTL2
	B	Show that an analytic function with constant real part is constant.	2M	BTL3
	C	Find the harmonic conjugate of the function $u(x, y) = 2x(1-y)$	2M	BTL2
	D	Find the poles of the function $f(z) = \dfrac{z^2}{(z-1)^2(z+2)}$	2M	BTL2
	E	If $f(x)=x^3, -\pi < x < \pi$, find the constant term a_o of its Fourier series.	2M	BTL3
	F	Prove that $F[f(x-a)] = e^{ias}F(s)$.	2M	BTL3
	G	State Dirichlet's conditions to expand a given function in Fourier series.	2M	BTL2
	H	Prove that $F\{f(ax)\} = \dfrac{1}{a}F\left[\dfrac{s}{a}\right], a > 0.$	2M	BTL3

PART – B

(5 x 12 = 60M)

Note: 1. This Part consists of 10 QUESTIONS
2. Answer any 1 question from each Section.Each question carries 12Marks.
3. Illustrate your answers with NEAT sketches wherever necessary.

SECTION - I

2.A	Verify if $f(z) = \dfrac{xy^2(x+iy)}{x^2+y^4}$, $z \neq 0$; $f(0) = 0$ is analytic or not.	6M	BTL3
2.B	Evaluate the regular function whose imaginary part is $e^x \sin y$	6M	BTL5

(OR)

3.A	Verify whether $f(z) = \log z$ is analytic	6M	BTL3
3.B	Find the conjugate harmonic function of $u(x, y) = 3x^2y + 2x^2 - y^3 - 2y^2$ and express $u + iv$ as an analytic function of z	6M	BTL5

SECTION - II

4.A	Using Cauchy's integral formula, evaluate $\int_c \dfrac{z}{(z+1)^2(z+3)}dz$, where C is the Circle $\lvert z+1 \rvert = 1$.	6M	BTL3
4.B	Find the Taylor's series to represent $\dfrac{z^2-1}{(z+2)(z+3)}$ in $\lvert z \rvert < 2$.	6M	BTL5

(OR)

5.A	Evaluate f(2) and f(3) where $f(a)=\oint_C \frac{2z^2-z-2}{z-a}dz$ and $C:\lvert z\rvert=2.5$	6M	BTL3
5.B	Expand $f(z)=\frac{z^2-1}{(z+2)(z+3)}$ in Taylor's series if $\lvert z\rvert<2$.	6M	BTL5

SECTION - III

6.A	Evaluate $\int \frac{\sin \pi z^2+\cos \pi z^2}{(z-1)^2(z-2)}dz$ around $\lvert z\rvert=3$	6M	BTL3
6.B	Using the method of contour integration, show that $\int_0^{2\pi}\frac{d\theta}{5+4\sin\theta}=\frac{2\pi}{3}$.	6M	BTL5

(OR)

7.A	Evaluate $\oint_C \frac{1}{\left(z^2+4\right)^2}dz$, $C:\lvert z-i\rvert=2$	6M	BTL3
7.B	By contour integration, evaluate $\int_{-\infty}^{\infty}\frac{dx}{(x^2+1)(x^2+4)}$	6M	BTL5

SECTION – IV

8.	Obtain the Fourier series of $f(x)=\begin{cases}x, & 0<x<\pi\\ 2\pi-x, & \pi<x<2\pi\end{cases}$.	12M	BTL3

(OR)

9.A	Find the Fourier series for $f(x)=x^2$ in $(-\pi,\pi)$.	6M	BTL3
9.B	Find the half-range cosine series for $f(x)=\cos\alpha x$ for α, not an integer in the range $0<x<\pi$	6M	BTL5

SECTION – V

10.A	Find the Fourier transform of $f(x)$ given by $f(x)=\begin{cases}1;\ for\ \lvert x\rvert<2\\ 0;\ for\ \lvert x\rvert>2\end{cases}$ and hence evaluate $\int_0^{\infty}\frac{\sin x}{x}dx$	6M	BTL3
10.B	Find the Z-transform of $\frac{1}{n}$ and $\cos\left(\frac{n\pi}{2}\right)$	6M	BTL5

(OR)

11.A	Applying convolution theorem, find $Z^{-1}\left(\frac{z^2}{(z-4)(z-5)}\right)$	6M	BTL3
11.B	Solve the difference equation $y(k+2)+y(k)=1,\ y(0)=1\ and\ y(1)=0.$	6M	BTL5

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CODE: 2202PC04 | R22 | SET - 1

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(Autonomous Institution – UGC, Govt. of India)

(Affiliated to JNTU, Hyderabad, Approved by AICTE - - ISO 9001:2015 Certified)

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NIRF India Ranking, Accepted by MHRD, Govt. of India

B.TECH II YEAR I SEMESTER REGULAR EXAMINATIONS, JAN/FEB-2024

SIGNALS AND SYSTEMS

(EEE)

[Time: 3 Hours] **[Max. Marks: 60]**

PART – A

(10x 1 = 10M)

Note: 1. This Part consists of 10 QUESTIONS
2. Answer **All Questions**. Each question carries 1 Mark.

1	A	How signals are classified?	1M	BTL1
	B	How to represent periodic signals by Fourier series?	1M	BTL1
	C	Find the Fourier transform of e^{-at} u (t).	1M	BTL2
	D	What is aliasing?	1M	BTL2
	E	Define transfer function of a system..	1M	BTL3
	F	How filters are classified according to frequency response?	1M	BTL4
	G	What is convolution?	1M	BTL3
	H	Define energy spectral density.	1M	BTL3
	I	Evaluate the Laplace transform of f(t)= e^{-j2t} u(t)	1M	BTL5
	J	Identify the signal which has ROC in entire z-plane and justify the answer.	1M	BTL3

PART – B

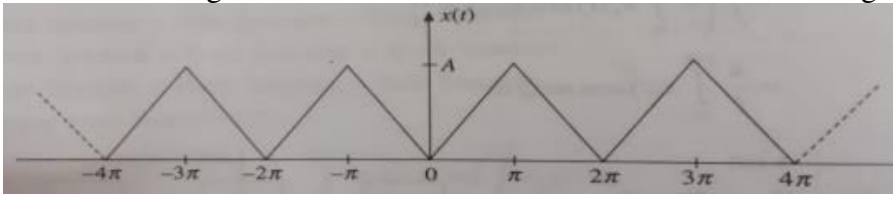
(5 x 10 = 50M)

Note: 1. This Part consists of 10 QUESTIONS
2. Answer any 1 question from each Section. Each question carries 10 Marks.
3. Illustrate your answers with NEAT sketches wherever necessary.

SECTION - I

2.A	Estimate whether the following systems are time invariant or not? i) y(t) = t x(t) ii) y(n) = x (2n)	5M	BTL4
2.B	Discuss about the analogy between vectors and signals.	5M	BTL5

(OR)

	Evaluate the trigonometric series for the waveform shown in the figure. 	10 M	BTL5

SECTION - II

4.A	State and prove any three properties of continuous Fourier transform.	5M	BTL3
4.B	Solve the Fourier transform of the signals	5M	BTL3

	i) $x(t) = t\, e^{-at}\, u(t)$ ii) $x(t) = e^{-t} \cos 5t\, u(t)$		

(OR)

5.A	State and prove sampling theorem for band limited signals using graphica approach.	5M	BTL3
5.B	Discuss about natural and flat top sampling.	5M	BTL3

SECTION - III

6.A	Check whether the following system is (i) Linear or Nonlinear (ii) Time invariant or time variant (iii) Static or dynamic The given system is $y(n) = a^n u(n)$	5M	BTL3
6.B	Obtain the conditions for the distortion less transmission through a system.	5M	BTL3

(OR)

7.A	Explain causality and physical reliability of a system and explain Poly-Wiener criterion.	5M	BTL4
7.B	Derive the relation between band width and rise time of a low pass filter.	5M	BTL4

SECTION – IV

8.A	State and prove the time convolution theorem with Fourier transforms.	5M	BTL1
8.B	Derive the relation between convolution and correlation.	5M	BTL2

(OR)

9.A	State and prove the Parseval's theorem for energy signals.	5M	BTL4
9.B	Explain the detection of periodic signals in the presence of noise by auto correlation.	5M	BTL2

SECTION – V

10.A	Find the Laplace transform of the signal $x(t) = e^{-at}\, u(t) - e^{-bt}\, u(-t)$ and also find its ROC.	5M	BTL5
10.B	Find the inverse transform of the following (i) $X(s) = 1 / [s\,(s+1)\,(s+2)\,(s+3)]$ (ii) $X(s) = s / [(s+3)(s^2 +4s+5)]$	5M	BTL5

(OR)

11.A	State and prove initial and final value theorems of Z-transform.	5M	BTL3
11.B	Find the inverse Z-transform of $X(z) = z^{-1} / (3 - 4z^{-1} + z^{-2})$, ROC: $\|z\| > 1$	5M	BTL2

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