Hall Ticket No: | | | | | | | | | | |

Question Paper Code: 20ENG101

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS INSTITUTION)

B. Tech I Year (R20) Supplementary End Semester Examinations, July – 2025

PROFESSIONAL ENGLISH

(Common to All)

Time: 3Hrs **Max Marks: 60**

Attempt all the questions. All parts of the question must be answered in one place only.
All parts of Q.no 1 are compulsory. In Q.no 2 to 6 answer either A or B only

Q.No		Question	Marks	CO	BL
Q.1	i.	**Fill the blank with correct form of verb.** He met his friend before ---------- (leave) India.	1M	1	3
	ii.	**Write the verb in brackets in the past tense** He (reach) Hyderabad yesterday.	1M	1	3
	iii.	**Fill the blank with appropriate modal verb:** He ---------- dance for two hours. (could/ should/can)	1M	1	3
	iv	Use correct conditional. If he works hard, he _____ (get) a good job.	1M	1	3
	v.	Add a prefix to the verb given to form a meaningful word. ***Kind***	1M	1	3
	vi	Change the following sentence from ***direct speech*** to ***indirect speech.*** "I am writing a poem", she said.	1M	1	3
	vii.	State whether the given statement is True or False "Gesture is a part of verbal communication."	1M	1	2
	viii	Frame question for the reply given: "Yes, I like chocolate."	1M	1	3
	ix.	What is a Memo?	1M	1	2
	x.	What is the importance of suggestions in Report writing?	1M	1	2
Q.2(A)		Read the following sentences carefully. Give the synonyms of the **bold** word from each sentence. i. She felt **happy** after receiving the good news. ii. The elephant was **big** compared to the dog. iii. The cheetah runs **Fast**. iv. He is a very **Smart** student. v. The firefighter was **brave** in saving the child. vi. The flowers looked **pretty** in the garden. vii. His **angry** reaction surprised everyone. viii. After the long hike, she felt **tired**. ix. The businessman was very **rich**. x. The comedian's jokes were **funny**	10M	1	3
		OR			
Q.2(B)		Complete the sentences given below with suitable verb forms for the words given in brackets. i) When I opened my eyes, I _____ (see) a strange sight. ii) She _____ (teach) English for twelve years. iii) During my last summer holidays, my parents _____ (send) me on a language course to London. iv) She _____(drive) to work yesterday. v) After he _____(read) the newspaper, he tidied the room. vi) He _____ (go) to bed at 11 o'clock at night. vii) I _____(study) in the Delhi School of Economics next year. viii) Look! How the bird _____(fly)! ix) She _____(play) the piano when he visited her house. x) He _____ (not, receive) the letter yet.	10M	1	3
Q.3(A)		Write a paragraph on the following topics. i) Health and hygiene.	10M	5	6

	ii) Importance of education.			
	OR			
Q.3(B)	Read the following text carefully and answer the questions given below. The seasonal problem of water taps running dry is plaguing most of our major cities. With the bigger rivers flowing in trickles and ponds and wells reduced to clay-pits, village women in remote areas have to fetch every drop of water for drinking, cooking, washing and so on, across large distances. This has only worsened a perennial problem, that of widespread pollution of water, rendering it unfit for human consumption. The monsoons—and the attendant floods—will not solve this problem. The Delhi Administration is seriously worried about the threat to civic health posed by the polluted waters of the Jamuna. Two new tanks are to be set up to treat sewage. At present only 60 per cent of the 200 million gallons of the city's sewage receives any kind of treatment before it is dumped into the river which supplies water not only to this city but to innumerable towns and villages downstream. The Ganga, the Jamuna, the Cauvery, in fact all our important rivers, serving many urban conglomerations are fast becoming a major source of disease. A comprehensive bill, introduced in Parliament recently, envisages the setting up of Central and State boards for the prevention and control of water pollution. But it will obviously take some time before legislation is passed and effectively implemented. Meanwhile the problem continues to swell. r According to a survey of eight developing countries conducted a couple of years ago, 90 per cent of all child deaths were due to water-borne diseases. It is the same unchanged story today. In a country like India, a burgeoning population continuing to use the open countryside as a lavatory means that, with every dust storm and rain, human excreta laden with germs and parasite spores find their way to ponds, shallow wells and even the streams and rivers. Only 18 per cent of the rural folk have access to potable water. Reading Comprehension Questions: i. Which seasonal problem plagues our major cities? ii. How do the women fulfil need of water? iii. How has water pollution become a health hazard? ' iv. What does the bill introduced in Parliament envisage? v. How can sewage system be improved? vi. What has the survey of developing countries revealed? vii. How is human excreta a major source of disease in India? ' viii. Which new threat is the writer talking about? ix. Find out a word from the passage which means: countless . x. Find out a word from the passage which means: complete	10M	1	3
Q.4(A)	A person well prepared for a presentation fails to leave a deep impact if he does not pay attention to effective presentation strategies. State how **body language** and **voice** help a speaker to create a long lasting impact on the audience.	10M	5	6
	OR			
Q.4(B)	Develop the following situation into meaningful conversation with minimum twelve exchanges: Ask your friend and share your routine actions.	10M	4	6
Q.5(A)	Develop the following situation into meaningful conversation with minimum twelve exchanges: Expressing apologies for not attending the meeting conducted by the Manager.	10M	2	3
	OR			
Q.5(B)	Develop the following situation into meaningful conversation with minimum twelve exchanges: A team of three members will discuss organizing a training course to the new employees.	10M	2	3

Q.6(A)	Assume that you are the Public Relations Officer of Kohinoor Glass Factory, Hyderabad. You have been asked to draft a memo to the office staff about the Company's Annual Business Conference. Include the following information: • Venue of the conference • Date and time of the conference • Theme of the conference • List of the special invitees	10M	5	6
	OR			
Q.6(B)	Assume that you are the Managing Director of a company dealing with electronic equipment. Inform all your employees by email about the new community hall which the company is going to inaugurate next week. Highlight the important features of both the hall and inauguration. Sign the email as Prasad. **You should write at least 150 words.**	10M	5	6
	*** END***			

Hall Ticket No: | | | | | | | | | | |

Question Paper Code: 20MAT105

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS INSTITUTION)

B. Tech I Year I Semester (R20) Supplementary End Semester Examinations, July – 2025

CALCULUS & DIFFERENTIAL EQUATIONS

(Electrical & Electronics Engineering)

Time: 3Hrs **Max Marks: 60**

Attempt all the questions. All parts of the question must be answered in one place only.
All parts of Q.no 1 are compulsory. In Q.no 2 to 6 answer either A or B only

Q.No		Question	Marks	CO	BL
Q.1	i.	State the Cauchy's mean value theorem.	1M	1	1
	ii.	Sketch the region $y = x^2$	1M	1	1
	iii.	Evaluate $\underset{x\to 0}{Lt}\dfrac{\sqrt{2+x}-\sqrt{2}}{x}$	1M	2	1
	iv	When the function $f(x,y)$ has Critical point.	1M	2	1
	v.	Evaluate $\int_1^3\int_1^x dy\,dx.$	1M	3	1
	vi	Find grad f, if $f = x+y+z$	1M	3	1
	vii.	Define order and degree of differential equation.	1M	4	1
	viii	Solve $y''-2y'+y=0$	1M	4	1
	ix.	Give one example for linear partial differential equation.	1M	5	1
	x.	Test the convergence of the series $\sum_{n=1}^{\infty}\dfrac{1}{n+2}$	1M	5	1
Q.2(A)		Evaluate $\int_0^{\pi/2}\dfrac{\sqrt{Sinx}}{\sqrt{Sinx}+\sqrt{Cosx}}dx$	10M	1	3
		OR			
Q.2(B)		Sketch the polar curve $r = a(1-\cos\theta)$	10M	1	4
Q.3(A)		Find the derivative of $f(x,y) = xe^y + \cos(xy)$ at the point (2, 0) in the direction of v = 3i - 4j.	10M	2	3
		OR			
Q.3(B)		Find $\dfrac{\partial f}{\partial x}, \dfrac{\partial f}{\partial y}, \dfrac{\partial^2 f}{\partial x^2}, \dfrac{\partial^2 f}{\partial y^2}, \dfrac{\partial^2 f}{\partial x\partial y}$ and $\dfrac{\partial^2 f}{\partial y\partial x}$ for the function $f(x,y,z) = \log(x+2y+3z)$	10M	2	3
Q.4(A)		Sketch the region of integration, reverse the order of integration, and evaluate the integral $\int_0^{\pi}\int_x^{\pi}\dfrac{\sin y}{y}dy\,dx$	10M	3	3
		OR			
Q.4(B)		Use Green's theorem to find the counter clockwise circulation for the field $F=(x^2+4y)i+(x+y^2)j$ over the square bounded by x = 0, x = 1, y = 0, y = 1	10M	3	4
Q.5(A)		Solve $e^y dx+(xe^y+2y)dy=0$	5M	4	3
		OR			
Q.5(B)		Solve $y''+y = Cosec\,x$ using the method of variation of parameter.	10M	4	3

Q.6(A)	Form the partial differential equations by eliminating the arbitrary functions from the following	5M	5	3
	i) $z = f(x) + e^y g(x)$	5M	5	3
	ii) $z = f(x^2 + y^2)$			
	OR			
Q.6(B)	Use any method to determine the series converges or diverges. $\sum_{n=1}^{\infty} \frac{(n+1)(n+2)}{n!}$	10M	5	4

***** END*****

Hall Ticket No: | | | | | | | | | | |

Question Paper Code: 20MAT101

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS INSTITUTION)

B. Tech I Year I Semester (R20) Supplementary End Semester Examinations, July – 2025

ENGINEERING CALCULUS

(Common to CE, ME, ECE, CSE, CST, CSE-AI, CSE-DS, CSE-CS, CSE-IOT)

Time: 3Hrs **Max Marks: 60**

Attempt all the questions. All parts of the question must be answered in one place only.
All parts of Q.no 1 are compulsory. In Q.no 2 to 6 answer either A or B only

Q.No		Question	Marks	CO	BL
Q.1	i.	Find the area of the curve $y=x^2$ between $x=0$ and $x=4$.	1M	1	2
	ii.	Find the value of $\int_0^\infty e^{-x^2}dx$	1M	1	2
	iii.	State Lagrange's mean value theorem	1M	2	1
	iv	Evaluate $\underset{x\to\pi/2}{Lt}\dfrac{\log(\sin x)}{(x-(\pi/2))}$	1M	2	2
	v.	Define Alternating series test	1M	3	1
	vi	Write the formula for half range cosine series for the function $f(x)$ in $(0,l)$	1M	3	1
	vii.	Find f_x and f_y, if $f(x,y)=\ln(7x+2y)$	1M	4	2
	viii	Find the gradient of the function $f(x,y)=y^2-x^2$ at $(2,1)$	1M	4	2
	ix.	Evaluate $\iint_R dA$, when $0\le x\le 2, 0\le y\le 2$	1M	5	2
	x.	State Stoke's theorem	1M	5	1
Q.2(A)		Find the length of one arch of the cycloid $x=a(t-\sin t)$, $y=a(1-\cos t)$	10M	1	3
		OR			
Q.2(B)		Define Beta function. Show that $\int_0^{\frac{\pi}{2}}\sqrt{\sin\theta}\,d\theta\times\int_0^{\frac{\pi}{2}}\dfrac{d\theta}{\sqrt{\sin\theta}}=\pi$	10M	1	3
Q.3(A)		Verify the Cauchy's mean value theorem for the functions a) e^x and e^{-x} in the interval (a,b) b) $\log_e x$ and $\frac{1}{x}$ in the interval $[1,e]$	10M	2	3
		OR			
Q.3(B)		A rectangular sheet of metal of length 6 metres and width 2 metres is given. Four equal squares are removed from the corners. The sides of this sheet are now removed from the corners. The sides of this sheet are now turned up to form an open rectangular box. Find approximately the height of the box, such that the volume of the box is maximum	10M	2	3
Q.4(A)		Test whether the series converges or diverges a) $\sum_{n=1}^{\infty}\dfrac{n(n+1)}{(n^2+1)(n-1)}$ b) $\sum_{n=1}^{\infty}\dfrac{(2n+3)(2^n+3)}{3^n+2}$	10M	3	3
		OR			
Q.4(B)		Expand $f(x)=x\cos x$ as a sine series in the interval $0<x<\pi$	10M	3	3

Q.5(A)	Express $\frac{\partial w}{\partial r}$ and $\frac{\partial w}{\partial s}$ in terms of r and s if $w = x + 2y + z^2$, $x = \frac{r}{s}$, $y = r^2 + \ln s$ and $z = 2r$.	10M	4	3
	OR			
Q.5(B)	Find the local extreme values of function $f(x,y) = x^3 - y^3 - 2xy + 6$	10M	4	3
Q.6(A)	Find the volume of the tetrahedron cut from the first octant by the plane $6x + 3y + 2z = 6$	10M	5	3
	OR			
Q.6(B)	Verify Green's theorem for the vector field $F(x, y) = 2xi - 3yj$ and the region R bounded by the circle $C : r(t) = (a\cos t)i + (a\sin t)j$, $0 \le t \le 2\pi$.	10M	5	3

***** END*****

Hall Ticket No: | | | | | | | | | | |

Question Paper Code: 20CHE101

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS INSTITUTION)

B. Tech I Year I & II Semesters (R20) Supplementary End Semester Examinations, July – 2025

ENGINEERING CHEMISTRY

(Common to All)

Time: 3Hrs **Max Marks: 60**

Attempt all the questions. All parts of the question must be answered in one place only.
All parts of Q.no 1 are compulsory. In Q.no 2 to 6 answer either A or B only

Q.No		Question	Marks	CO	BL
Q.1	i.	Define Hardness.	1M	1	1
	ii.	Name the indicator used for the estimation of alkalinity.	1M	1	2
	iii.	Define metallic radii.	1M	2	2
	iv	Draw the Lewis dot structure of ammonia molecule.	1M	2	2
	v.	State Beer Lambert's law.	1M	3	1
	vi	Calculate the number of vibrational modes in CH_4 molecule	1M	3	2
	vii.	State and explain second law of thermodynamics.	1M	4	1
	viii	Name the electrolyte used in Pb-acid battery.	1M	4	2
	ix.	Define Viscosity Index.	1M	5	2
	x.	Define nanomaterial and give two examples.	1M	5	1
Q.2(A)		Discuss the determination of alkalinity present in impure water using volumetric titration.	10M	1	2
		OR			
Q.2(B)		Explain Ion-Exchange process for softening of water with a neat diagram.	10M	1	2
Q.3(A)		Apply VSEPR theory to elucidate the shape and bond angle for the following molecules. (i) H_2O, (ii) SF_4, (iii) PCl_5	10M	2	3
		OR			
Q.3(B)		Discuss the characteristics of S_N1 & S_N2 reaction mechanisms in detail.	10M	2	2
Q.4(A)		Brief out the principle and applications of Raman Spectroscopy	10M	3	2
		OR			
Q.4(B)		(i) Explain the principles of IR spectroscopy.	5M	3	2
		(ii) List the applications of NMR Spectroscopy.	5M	3	2
Q.5(A)		Explain the working principles, advantages and applications of H_2-O_2 F	10M	4	2
		OR			
Q.5(B)		Define entropy. Derive the expression for change in entropy change for the expansion of an ideal gas in isothermal and isochoric processes.	10M	4	2
Q.6(A)		Discuss the manufacturing of Portland cement in detail.	10M	5	2
		OR			
Q.6(B)		What are lubricants? Classify them. Brief out various properties of lubricants.	10M	5	2

***** END*****

Hall Ticket No: | | | | | | | | | | |

Question Paper Code: 20PHY102

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS INSTITUTION)

B.Tech I Year I & II Semester (R20) Supplementary End Semester Examinations, July – 2025

APPLIED PHYSICS

(Common to All)

Time: 3Hrs **Max Marks: 60**

Attempt all the questions. All parts of the question must be answered in one place only.
All parts of Q.no 1 are compulsory. In Q.no 2 to 6 answer either A or B only

Q.No		Question	Marks	CO	BL
Q.1	i.	What is the speed of the pendulum in SHM at the mean position and at extreme position?	1 M	1	1
	ii.	Define Standing Wave Ratio (SWR).	1 M	1	2
	iii.	What is grating element?	1 M	2	2
	iv	Calculate the thickness of quarter wave plate for light of wavelength 5460 Å. The refractive indices of ordinary and extraordinary rays are 1.652 and 1.488 respectively.	1 M	2	2
	v.	The position of an electron is determined to within 2Å. What is the minimum uncertainty in its momentum?	1 M	3	2
	vi	An electron is accelerated in an electric field of 1600 volt. What is the wavelength associated with it?	1 M	3	1
	vii.	What is Fermi energy level?	1 M	4	1
	viii	Give example of Direct band gap semiconductors.	1 M	4	1
	ix.	Define Pumping.	1 M	5	1
	x.	Give any two applications of LASER.	1 M	5	1
Q.2(A)	i)	What are Lissajous figures? On what factors they depend?	2 M	1	4
	ii)	Construct the Lissajous figures for the superimposed two perpendicular simple harmonic motions described by following equations, $x = 10 \cos(5\pi t)$ and $y = 10 \cos(5\pi t + \pi/4)$	8 M		
		OR			
Q.2(B)	i)	Deduce the differential equation of propagation of one dimensional transverse wave.	5 M	1	3
	ii)	Obtain the differential equation for a damped harmonic oscillator.	5 M		
Q.3(A)		Describe Fraunhoffer diffraction due to single slit with a suitable diagram and obtain the conditions for maxima, minima, and secondary maxima intensities in the diffracted spectrum.	10 M	2	4
		OR			
Q.3(B)	i)	What is Double Refraction?	2 M	2	3
	ii)	Explain the construction and working of Nicol Prism.	8 M		
Q.4(A)	i)	Applying Schrodinger time independent wave equation, show that the energies of a particle trapped in a potential well with infinite walls is quantized.	8 M	3	4
	ii)	Calculate the first two energy levels for an electron in a quantum well of width 10Å with infinite walls.	2 M		
		OR			
Q.4(B)		What is the significance of wave function? Derive Schrodinger's time independent wave equations.	10 M	3	3
Q.5(A)		What is Hall effect? Derive expression for Hall voltage and Hall coefficient.	10 M	4	3
		OR			

Q.5(B)	i) On the basis of band theory, explain how the solids are classified into metals, semiconductors and insulators?	5 M	4	3
	ii) Distinguish between direct and indirect band gap semiconductors.	5 M		
Q.6(A)	Explain with schematic diagram, the construction and working of a Ruby Laser.	10 M	5	3
	OR			
Q.6(B)	i) Describe the principle, construction and working optical fiber.	8 M	5	3
	ii) An optical fiber has a core of refractive index 1.563 and cladding of refractive index 1.498 The light is launched into it in air. Calculate its numerical aperture.	2 M		

***** END*****

Hall Ticket No: | | | | | | | | | | |

Question Paper Code: 20ME101

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS INSTITUTION)

B.Tech I Year I & II Semesters (R20) Supplementary End Semester Examinations, July– 2025

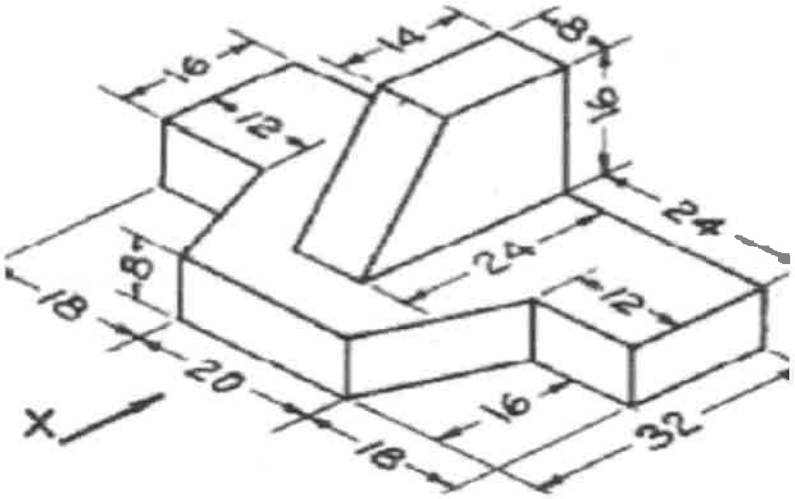
ENGINEERING GRAPHICS

(Common to All)

Time: 3Hrs **Max Marks: 60**

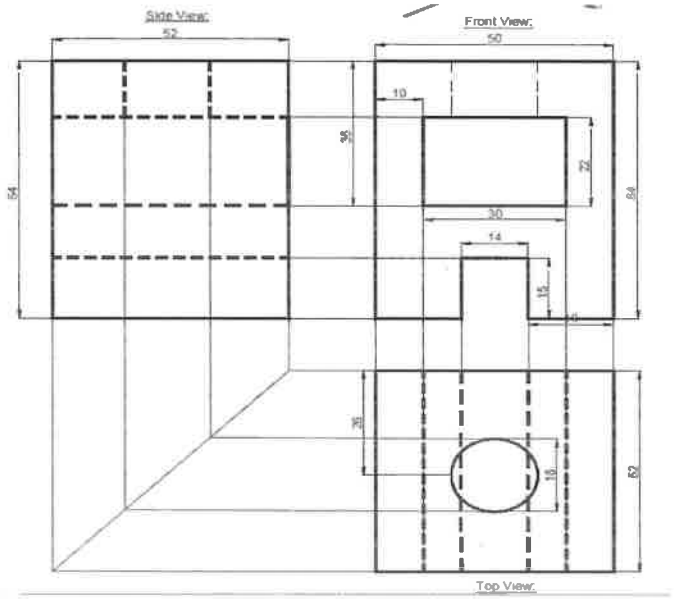
Attempt all the questions. All parts of the question must be answered in one place only.
In Q.no 1 to 5 answer either Part-A or B only

Q.No	Question	Marks	CO	BL
Q.1(A)	Construct a parabola when the distance between the focus and directrix is 30mm. Also draw the tangent and normal 20 mm from the directrix.	12M	1	3
	OR			
Q.1(B)	Construct a cycloid for one and half revolutions when the radius of the generating circle is 25mm.	12M	1	3
Q.2(A)	(i) Draw the projections of the following points on the same reference line by keeping the distance between projectors as 40mm. a) E – 30mm below HP and 50mm behind VP b) F – 40mm above HP and 60mm behind VP c) G – 50mm above HP and 60mm in front of VP d) H – 40mm below HP and 30mm in front of VP	6M	2	3
	(ii) Front View of a line AB is 50^0 inclined to XY and measures 55mm long. While its Top View is 60^0 inclined to XY line. If end A is 10mm above HP and 15mm in front of VP, draw its projections, find True Length, inclinations of line with HP and VP.	6M	2	3
	OR			
Q.2(B)	A pentagonal plane ABCDE of side 40mm has its surface parallel to VP and a) A side is parallel to HP b) A side is perpendicular to HP A side is inclined at 35^0 to HP. Draw its projections.	12M	2	3
Q.3(A)	A square pyramid of base side 40 mm and axis 60 mm is resting on its base on the H.P. Draw its projections when (a) a side of the base is parallel to the V.P., (b) a side of the base is inclined at 30° to the V.P., (c) all the sides of the base are equally inclined to the V.P.	12M	3	3
	OR			
Q.3(B)	Draw the top and the front views of a right circular cylinder of base 45 mm diameter and 60 mm long when it lies on HP such that its axis is inclined at 35° to HP. Draw Its projections.	12M	3	3
Q.4(A)	A Cylinder of 45mm diameter and 70mm long is resting on one of its HP. It is cut by a section plane, inclined at 60° with HP and passing through a point on the axis at 15mm from one end. Draw the three vie solid and also obtain the true shape of the section.	12M	4	3
	OR			
Q.4(B)	A cone, 50 mm base diameter and 70 mm axis is standing on its base on HP. It cut by a section plane 45 degrees inclined to HP through base end of end generator. Draw the development of surface of remaining solid. Use radial line method.	12M	4	3
Q.5(A)	Draw the front view, top view and right side view of the following object. Use first angle projection.	12M	5	4



OR

Q.5(B) Draw the isometric view of the object, the multi view projection of which is shown below: 12M 5 4



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Hall Ticket No: | | | | | | | | | | |

Question Paper Code: 20EEE101

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS INSTITUTION)

B. Tech I Year I & II Semesters (R20) Supplementary End Semester Examinations, July – 2025

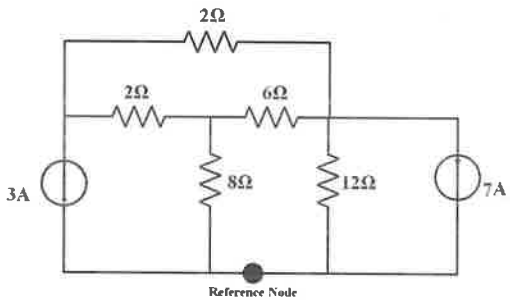
BASIC ELECTRICAL ENGINEERING

(Common to all)

Time: 3Hrs **Max Marks: 60**

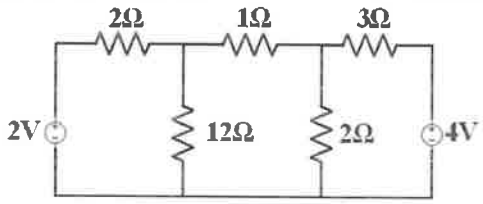
Attempt all the questions. All parts of the question must be answered in one place only.
All parts of Q.no 1 are compulsory. In Q.no 2 to 6 answer either A or B only

Q. No.		Questions	Marks	CO	BL
Q.1	i.	A current of 10A flows through an 12Ω resistor. What is the power delivered in the resistor?	1M	1	1
	ii.	In superposition theorem, when we consider the effect of one voltage source, all the other voltage sources are ..... a) Shorted b) Opened c) Removed d) Undisturbed	1M	1	1
	iii.	If an R-C load is drawing 5 kVA at a power factor of 0.6 (leading) from a single-phase A.C. supply, find the active power drawn by the load.	1M	2	1
	iv.	Sketch the phasor diagram for series R-L circuit.	1M	2	2
	v.	A flux density of 1.2 T is produced in a piece of cast steel having relative permeability of 764. Find the magnetic field strength required to produce the given flux density.	1M	3	2
	vi.	What is condition for maximum efficiency in transformer?	1M	3	1
	vii.	In a DC generator, what is the function of brush?	1M	4	1
	viii.	Write the applications of three phase slip ring induction motor.	1M	4	1
	ix.	How will an ideal diode behave in an electric circuit, when it is reverse biased?	1M	5	1
	x.	Mention different types of cables.	1M	5	1
Q.2(A)		Compute the voltage across each current source using node voltage method.	10M	1	3



OR

Q.2(B)		By using superposition theorem, determine the current in 3Ω resistor.	10M	1	3



Q.3(A)		A Pure inductance of 318 mH is connected in series with a pure resistance of 75Ω. The circuit is supplied from 50HZ source and the voltage across 75Ω resistor is found to be 150V. Calculate the supply voltage and the phase angle.	10M	2	3

	OR			
Q.3(B)	Derive the relationship between phase and line voltages in a balanced three phase star connected system. Also write the expressions for active, reactive and apparent powers.	10M	2	3
Q.4(A)	With the help of neat sketch explain hysteresis loop for a ferromagnetic material.	10M	3	2
	OR			
Q.4(B)	Explain the construction and working principle of a single-phase transformer.	10M	3	2
Q.5(A)	With the help of neat sketch, explain the constructional details of a DC machine.	10M	4	3
	OR			
Q.5(B)	Explain the principle of operation of three phase induction motor.	10M	4	3
Q.6(A)	Discuss in detail the operation of a full wave rectifier with a neat circuit diagram and relevant waveforms.	10M	5	3
	OR			
Q.6(B)	What is earthing? Explain different types of earthing. Also, write the importance of earthing.	10M	5	2

***** END*****

Hall Ticket No: | | | | | | | | | | |

Question Paper Code: 20MAT110

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS INSTITUTION)

B. Tech I Year (R20) Supplementary End Semester Examinations, July – 2025

LINEAR ALGEBRA

(Common to CSE, CST, CSE-AI, CSE-DS, CSE-CS, CSE-IOT)

Time: 3Hrs **Max Marks: 60**

Attempt all the questions. All parts of the question must be answered in one place only.
All parts of Q.no 1 are compulsory. In Q.no 2 to 6 answer either A or B only

Q.No		Question	Marks	CO	BL
Q.1	i.	Define Rank of a matrix	1M	1	1
	ii.	Find the reduced row echelon form of the matrix $A=\begin{bmatrix}1 & -3 & 2\\ 3 & -9 & 10\\ 2 & -6 & 4\end{bmatrix}$	1M	1	2
	iii.	Determine whether the given set of vectors $\{[1,2,-1],[3,6,-3]\}$ is Linearly Independent (or) not	1M	2	1
	iv	Define basis of a vector space	1M	2	2
	v.	Define Linear transformation	1M	3	1
	vi	Define Kernel of a Linear transformation	1M	3	1
	vii.	Write the standard basis with respect to R^3	1M	4	1
	viii	Let $T:R^2\to R^2$ be the Linear transformation defined by $T(x_1,x_2)=(x_1+x_2,-x_1+x_2)$. Compute $[T]_\alpha$ for the standard basis	1M	4	2
	ix.	Define Inner product space	1M	5	1
	x.	Determine k so that the vectors are orthogonal with respect to Euclidean inner product space of R^4 $\{(2,3,k,4),(1,k,3,-5)\}$	1M	5	1
Q.2(A)		Solve the following system of linear equations using Gaussian elimination. $w+x+y=3;\ -3w-17x+y+2z=1;\ 4w-17x+8y-5z=1;\ -5x-2y+z=1$	10M	1	3
		OR			
Q.2(B)		Find the inverse of the matrix and A^4 for the matrix $A=\begin{bmatrix}1 & 1 & 2\\ -1 & 2 & 1\\ 0 & 1 & 3\end{bmatrix}$ using Cayley-Hamilton theorem.	10M	1	3
Q.3(A)		Show that the vectors $v_1=(1,2,1), v_2=(2,9,0)$ and $v_3=(3,3,4)$ in the 3-space $\mathbb{R}^3$ form a basis.	10M	2	3
		OR			
Q.3(B)		Find bases for the row space $R(A)$ and Null space $N(A)$ and column space $C(A)$ of the matrix $A=\begin{bmatrix}1 & 2 & 0 & 2 & 5\\ -2 & -5 & 1 & -1 & -8\\ 0 & -3 & 3 & 4 & 1\\ 3 & 6 & 0 & -7 & 2\end{bmatrix}$	10M	2	3
Q.4(A)		If $T:R^3\to R^3$ is defined by $T(x,y,z)=(2x-z,3x-2y,x-2y+z)$ i) Determine the null-space N(T) of T.	10M	3	3

ii) Determine whether T is one-to-one.
iii) Find a basis for N(T).

OR

Q.4(B)	Show that the linear transformation $T(x,y,z)=(2x,4x-y,2x+3y-z)$ on R^3 is invertible and find T^{-1}.	10M	3	3
Q.5(A)	Consider the following ordered bases of R^3: $\alpha = \{e_1, e_2, e_3\}$ the standard basis and $\beta = \{u_1 = (1,1,1), u_2 = (1,1,0), u_3 = (1,0,0)\}$. i. Find the transition matrix P from α to β. ii. Find the transition matrix Q from β to α. iii. Show that $[T]_\beta = Q^{-1}[T]_\alpha Q$ for the linear transformation T defined by $T(x,y,z) = (2y+x, x-4y, 3x)$	10M	4	3

OR

Q.5(B)	Let D be the differential operator on the vector space $P_2(R)$. Given two ordered basis $\alpha = \{1, x, x^2\}$ and $\beta = \{1, 2x, 4x^2 - 2\}$ for $P_2(R)$. Find the associated matrix of D with respect to α and the associated matrix of D with respect to β. Are they similar?	10M	4	3
Q.6(A)	Let $v_1 = (1,1,-1,-2)$, $v_2 = (5,8,-2,-3)$, $v_3 = (3,9,3,8)$ be basis in the Euclidean space. Construct orthogonal basis using Gram-Schmidt orthogonalization process.	10M	5	3

OR

Q.6(B)	Find all the least square solutions to $Ax = b$, where $A = \begin{bmatrix} 1 & -2 & 1 \\ 2 & -3 & -1 \\ -1 & 1 & 2 \\ 3 & -5 & 0 \end{bmatrix}, b = \begin{bmatrix} 1 \\ 0 \\ 1 \\ 0 \end{bmatrix}$	10M	5	3

***** END*****

Hall Ticket No: | | | | | | | | | | |

Question Paper Code: 20MAT106

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS INSTITUTION)

B. Tech I Year (R20) Supplementary End Semester Examinations, July – 2025

LINEAR ALGEBRA AND TRANSFORM CALCULUS

(Electrical & Electronics Engineering)

Time: 3Hrs **Max Marks: 60**

Attempt all the questions. All parts of the question must be answered in one place only.
All parts of Q.no 1 are compulsory. In Q.no 2 to 6 answer either A or B only

		Question	Marks	CO	BL
Q.1	i.	Find the characteristic polynomial of a matrix $A=\begin{bmatrix} 3 & 1 \\ -2 & 4 \end{bmatrix}$	1M	1	2
	ii.	What are the Eigen vectors of a matrix $A=\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$?	1M	1	1
	iii.	Determine the singular points of the function $f(z)=\dfrac{z^2-2z+3}{(z-2)^2(z+1)}$	1M	2	1
	iv	Find the residue at $z=0$ of the function $f(z)=z\cos\left(\dfrac{1}{z}\right)$	1M	2	1
	v.	Find $L\{\cos^2 t\}$	1M	3	2
	vi	Find $L^{-1}\left(\dfrac{s^2-3s+4}{s^3}\right)$	1M	3	1
	vii.	What is the change scale property for Fourier transform?	1M	4	1
	viii	Find the Fourier sine transform of $f(x)=\dfrac{1}{x}$	1M	4	2
	ix.	Find the value of Z-transform of 1.	1M	5	1
	x.	Find $Z^{-1}\left(\dfrac{z}{(z+7)}\right)$	1M	5	2
Q.2(A)		Use Gauss-Jordan method, find the inverse of a matrix $\begin{bmatrix} 1 & 1 & 3 \\ 1 & 3 & -3 \\ -2 & -4 & -4 \end{bmatrix}$	10M	1	3
		OR			
Q.2(B)		Find Eigen values and Eigen vectors of the matrix $\begin{bmatrix} 1 & 1 & 3 \\ 1 & 5 & 1 \\ 3 & 1 & 1 \end{bmatrix}$	10M	1	3
Q.3(A)		Show that $f(x)=\sqrt{\lvert xy\rvert}$ is not analytic at the origin even though C.R equations are satisfied thereof.	10 M	2	3
		OR			
Q.3(B)		Find Taylor's expansion of $f(z)=\sin z$ about the point z=0.	10M	2	3
Q.4(A)		Find the Laplace transforms of	10M	3	3

(a). t^3e^{-3t} (b). $t^2e^{-3t}\sin 2t$

OR

Q.4(B)	Apply Convolution theorem to evaluate (a). $L^{-1}\frac{s}{(s^2+a^2)^2}$ (b). $L^{-1}\frac{s^2}{(s^2+a^2)(s^2+b^2)}$	10M	3	3
Q.5(A)	Find the Fourier transform of $f(x)=\begin{cases}1 & for\ |x|<1\\ 0 & for\ |x|>1\end{cases}$. Hence evaluate $\int_0^\infty \frac{\sin x}{x}dx$.	10M	4	3

OR

Q.5(B)	Find the Fourier cosine transform of e^{-x^2}	10M	4	4
Q.6(A)	Find the Z-transform of the following: (a). $3n-4\sin\frac{n\pi}{4}+5a$ (b) . $\cosh n\theta$	10M	5	3

OR

Q.6(B)	Solve $y_{n+2}+6y_{n+1}+9y_n=2^n$ *with* $y_0=y_1=0$, using Z-transforms.	10M	5	4

***** END*****

Hall Ticket No: | | | | | | | | | | |

Question Paper Code: 20MAT107

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS INSTITUTION)

B. Tech I Year (R20) Supplementary End Semester Examinations, July – 2025

LINEAR ALGEBRA, COMPLEX VARIABLE AND ORDINARY DIFFERENTIAL EQUATIONS

(Electronics & Communication Engineering)

Time: 3Hrs **Max Marks: 60**

Attempt all the questions. All parts of the question must be answered in one place only.
All parts of Q.no 1 are compulsory. In Q.no 2 to 6 answer either A or B only

Q. NO.		Question	Marks	CO	BL
Q.1	i.	Under which condition a system of linear equations $AX = b$ has unique solution.	1M	1	1
	ii.	Find the rank of the matrix $A = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 4 & 6 \\ -1 & -2 & -3 \end{bmatrix}$.	1M	1	1
	iii.	Find principal value of $(i)^i$.	1M	2	1
	iv.	Determine the value of $2\log i$.	1M	2	2
	v.	Find order and degree of a differential equation $\frac{d^2y}{dx^2} - \frac{dy}{dx} = e^x$.	1M	3	1
	vi.	Solve $\frac{dy}{dx} = \frac{y}{x}$.	1M	3	1
	vii.	Evaluate $\int_C \frac{1}{z-2} dz$, where C is the positive oriented unit circle $\|z\| = 1$.	1M	4	1
	viii	Classify that the following differential equation is linear or non-linear $(x^2 - ay)dx = (ax - y^2)dy$.	1M	4	1
	ix.	Find complementary function for the equation $x^2\frac{d^2y}{dx^2} - 4x\frac{dy}{dx} + 6y = x$.	1M	5	1
	x.	Find Wronskian if $y_1 = \cos x$ and $y_2 = \sin x$	1M	5	1
Q.2(A)		Test for consistency and solve if consistent $x - 2y + 3t = 2$, $2x + y + z + t = -4$ and $4x - 3y + z + 7t = 8$	10M	1	1
		OR			
Q.2(B)		Find the Eigenvalues and Eigenvectors of the matrix $A = \begin{pmatrix} -2 & 2 & -3 \\ 2 & 1 & -6 \\ 1 & -2 & 0 \end{pmatrix}$.	10M	1	3
Q.3(A)		Verify that each of the following functions is analytic or not (i) $f(z) = 3x + y + i(3y - x)$ (ii) $f(z) = \sin x \cosh y + i \cos x \sinh y$	10M	2	3
		OR			
Q.3(B)		Find all roots of the equation $\text{Sinh}\, z = 1$	10M	2	3
Q.4(A)		Evaluate $\int_C f(z)dz$ where $f(z) = y - x - 3ix^2$ and C consists of the line segments z=0 to z= i and other from z=i to z=1+i	10M	3	3
		OR			
Q.4(B)		Use Cauchy's Residue theorem to evaluate the integral $\int_C f(z)dz$ around the circle $\|z\|$=3 in the positive sense $f(z) = \frac{z+1}{z^2-2z}$	10M	3	3

Q.5(A)	Solve the differential equation $\frac{dy}{dx} + x \sin 2y = x^3 \cos^2 y$	10M	4	3
	OR			
Q.5(B)	Solve the differential equation $y = 2px + y^2p^3$, (where $p = \frac{dy}{dx}$)	10M	4	3
Q.6(A)	Solve the differential equation $x^2 \frac{d^2y}{dx^2} - x\frac{dy}{dx} + 2y = x\, sin(logx)$	10M	5	3
	OR			
Q.6(B)	Find the solution of differential equation $y'' + a^2y = Cosec\,(ax)$, using the method of variation of parameters.	10M	5	3

***** END*****

Hall Ticket No: | | | | | | | | | | |

Question Paper Code: 20MAT102

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS INSTITUTION)

B. Tech I Year (R20) Supplementary End Semester Examinations, July – 2025

LINEAR ALGEBRA AND DIFFERENTIAL EQUATIONS

(Common to CE and ME)

Time: 3Hrs **Max Marks: 60**

Attempt all the questions. All parts of the question must be answered in one place only.
All parts of Q.no 1 are compulsory. In Q.no 2 to 6 answer either A or B only

Q.No.		Question	Marks	CO	BL
Q.1	i.	Define the rank of a matrix.	1M	1	1
	ii.	Find the Eigenvalues of the matrix $A=\begin{pmatrix} 2 & 0 \\ -1 & 6 \end{pmatrix}$.	1M	1	2
	iii.	Describe the order and degree of the differential equation $\frac{d^2y}{dx^2}+\frac{dy}{dx}=(xy)^{3/2}$	1M	2	1
	iv	Write the condition for an exact D.E.	1M	2	1
	v.	Write the complementary solution of $y''-2y'+y=\sin x$.	1M	3	1
	vi	What is Wronskian in the differential equation	1M	3	1
	vii	Find the Laplace transform of the $f(t)=e^{at}$.	1M	4	2
	viii.	State the convolution theorem.	1M	4	1
	ix.	Write a PDE with order 2 and degree 1.	1M	5	1
	x.	Define wave equation in one dimensional space.	1M	5	1
Q.2(A)		Show that every square matrix can be expressed uniquely as sum of a symmetric and skew symmetric matrix and give one example.	10M	1	3
		OR			
Q.2(B)		If $A=\begin{bmatrix} 1 & 1 & 1 \\ 0 & 2 & 1 \\ -4 & 4 & 3 \end{bmatrix}$ then find A^4 using diagonalization of a matrix.	10M	1	3
Q.3(A)		Solve $y'+y=\frac{1}{1+e^{2x}}$	10 M	2	3
		OR			
Q.3(B)		Solve the differential equation $x\log x\frac{dy}{dx}+y=\log x^2$	10M	2	3
Q.4(A)		Solve the differential equation $x^2y''-3xy'+4y=0$.	10M	3	3
		OR			
Q.4(B)		Solve by using method of variation of parameters $y''-2y'+y=e^x\log x$	10M	3	3
Q.5(A)		Find the Laplace transformation of the following (i) $f(t)=t^3e^{-3t}$ (ii) $f(t)=(1+te^{-t})^3$	10M	4	3

OR

Q.5(B)	Find solution of differential equation $y''-y=t$ with initial condition $y(0)=1, y'(0)=2$ by using Laplace transformation	10M	4	3
Q.6(A)	Solve the partial differential equation by $3\frac{\partial u}{\partial x}+2\frac{\partial u}{\partial y}=0$ with the condition $u(x,0)=4e^{-x}$.	10M	5	3

OR

Q.6(B)	Form the partial differential equation by eliminating the arbitrary constants (i) $\log(az-1)=x+ay+b$ (ii) $z=f(x)+e^{y}g(x)$.	10M	5	3

***** END*****

Hall Ticket No: | | | | | | | | | | |

Question Paper Code: 20CSE102

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS INSTITUTION)

B. Tech I Year (R20) Supplementary End Semester Examinations, July – 2025

C PROGRAMMING AND DATA STRUCTURES

(Common to All)

Time: 3Hrs **Max Marks: 60**

Attempt all the questions. All parts of the question must be answered in one place only.
All parts of Q.no 1 are compulsory. In Q.no 2 to 6 answer either A or B only

Q.No		Question	Marks	CO	BL
Q.1	i.	What is a variable?	1M	1	1
	ii.	Differentiate break and continue statements in C.	1M	1	2
	iii.	Write the syntax to declare and initialize a one-dimensional array.	1M	2	1
	iv	What is meant by Function?	1M	2	1
	v.	Define string with an example.	1M	3	1
	vi	How can you declare a pointer variable? Give an example.	1M	3	1
	vii.	How would you access the members of structures?	1M	4	1
	viii	What are the different modes in opening a file?	1M	4	1
	ix.	Define Data Structures.	1M	5	1
	x.	State any two applications of Queue.	1M	5	1
Q.2(A)		Explain in detail about the various operators in C with suitable examples.	10M	1	2
		OR			
Q.2(B)		Describe the different types of conditional and looping statements with your own examples.	10M	1	2
Q.3(A)		Summarize about the various user defined function prototypes in C with suitable examples.	10M	2	2
		OR			
Q.3(B)		Illustrate and build a code to perform Selection sort for the following data. 36, 9, 97, 56, 21, 82, 120, 43,25,6	10M	2	3
Q.4(A)		Explain the following standard string functions with examples to support each type: (a) strcmp() (b) strcpy() (c) strrev() (d) strlen().	10M	3	2
		OR			
Q.4(B)		Compare pass by value and pass by reference with examples.	10M	3	2
Q.5(A)		Define a structure. Describe how to declare and initialize structure member with an example program.	10M	4	2
		OR			
Q.5(B)		Explain about the fopen(), fclose(), fprintf(), fscanf(), fgetc() and fputc() functions with example.	10M	4	2
Q.6(A)		Discuss in detail about queue and its implementation using C.	10M	5	2
		OR			
Q.6(B)		Discuss in detail about insertion and display operation in single linked list.	10M	5	2

*** **END*****