

H.T.NO:

--	--	--	--	--	--	--	--	--	--

Question Paper Code: 18ENG101

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)

B.Tech I Year I & II Semester (R18) Regular & Supplementary End Semester Examinations- May 2019

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.1
- i. Add question tags to the following statement. 1M
She eats vegetables and fruits.
 - ii. Provide an antonym for *Chaos* 1M
 - iii. Give a prefix for the word in bracket. Fill in the blank with the word. 1M
A person who can't read and write is ----- (literate).
 - iv. He has been living in Nandyal since 1995. (change into Past Perfect Continuous Tense) 1M
 - v. In case the verb does not agree with its subject, rewrite making the required correction. 1M
Everybody want to become rich.
 - vi. Choose the appropriate article for the following sentence 1M
Raji was too young to go to-----school. (a, an, the, no article)
 - vii. What is coherence in written communication? 1M
 - viii. Provide a synonym for *Eager* 1M
 - ix. "I have made less mistakes" Prepare a relevant question for the given statement. 1M
 - x. Change the following sentence into indirect speech 1M
'Are you coming with us?' he asked me.

-
- Q.2(A) Complete the following sentences by choosing an appropriate verb form. 10M
- a) My father -----in a bank (work/works)
 - b) He ----- for Master of Science in Michigan University (has applied/have applied)
 - c) These controversies on the ruling party -----baseless (is/are)
 - d) I----- introduce you in the party. (am/ will)
 - e) Air India flight to Delhi -----by 7a.m tomorrow. (departs/departed)
 - f) He will be-----your grievances shortly. (addressing/ address)
 - g) I never-----his guidelines (follow/ follows)
 - h) The minister's visit to many countries-----not successful (is/are)
 - i) I -----the letter yesterday (have posted/ posted)
 - j) My sister and brother-----in Berlin (live/lives)

OR

- Q.2(B) Provide Prefix and Suffix for the following root words 10M

	Prefix		Suffix
1	Close	1	Multi
2	Like	2	Counter
3	Come	3	Cardio
4	Paid	4	Omni
5	Legal	5	Colour

Q.3(A) Write a paragraph on *Energy Crisis* in not more than 250 words. 10M

OR

Q.3(B) IDENTIFY AND INSERT THE PROPER WH- QUESTION WORDS 10M

- A. _____ didn't you attend the class? Because I was ill.
B. _____ is the boy standing next to you in this photo? He is my brother.
C. _____ was the hospitality in the conference? Well received.
D. _____ will you complete your Engineering Course? By next year
E. _____ is your house located? At Kukatpally

IDENTIFY AND ASK THE QUESTION

- F. He purchased vegetables in the market.
_____?
G. Namya is my best friend.
_____?
H. I went to Mumbai
_____?
I. I purchased my mobile in the shop
_____?
J. Nov 30 is the last working day of this semester.
_____?

Q.4(A) Construct dialogues for the following situations 10M

- a) Convince a customer to buy a newly introduced smart phone 'Brand Z'.
The customer is actually interested to buy 'Brand Y'.
b) A student approaches a career counsellor seeking suggestion.

OR

Q.4(B) You are given a chance to interview Donald J. Trump, American President. 10M
Construct dialogues for the given situation.

Q.5(A) There has been remarkable decline in the sale of refrigerators manufactured by 'X' 10M
company. The marketing manager has been asked to report with recommendations for
stopping the decline.

OR

Q.5(B) The principal of your college has appointed a committee of two teachers and three 10M
students to suggest new directions in which students' co-curricular activities can be
developed. Write the committee's report.

Q.6(A) We know only a few things about the ancient Olympic Games. An Olympic 10M
sports festival was held in Greece in 776 B.C at Olympia. So it was called the
Olympic Games. There are many interesting events associated with the Olympic
Games. It tells us about a person who not only won a gold medal in the Olympic
Games of 1928 but also won the hearts of all who saw him win.

Pearce was born in Sydney in Australia. His father was a great sculling champion. When Pearce was five, he was rowing around Sydney harbour in a small boat. At the age of six, he won the first race, competing against fourteen year olds. By the time he was twenty, Pearce was the sculling champion of Australia. The following year he went to Amsterdam to compete in the Olympic Games. In the finals he competed against Ken Myers of America. From the start of the race Pearce was in the lead. After half the race was over, he was still leading and very much ahead of Myers. It seemed that Pearce would easily win the race. Then suddenly something happened. Pearce heard a shout from the bank and he looked over his shoulders. He saw a duck

and her ducklings swimming across the waterway. They were swimming into the path of his boat and the boat was going to run into them. The poor birds had no idea that they were in the middle of an Olympic race.

Immediately Pearce slowed down his boat. Myers was catching up very quickly. The people on the bank were cheering and shouting as if they were mad. But Pearce waited until all the ducklings were out of danger. Then he picked up speed again and went on to win the race easily. Of all the Olympic champions, it was he who won everybody's heart. A Dutch newspaper wrote, "He won the goodwill of the children of Amsterdam." His friends in the Australian Olympic team were not surprised by the story of the ducks. "Pearce is that kind of a man," they said.

Questions

1. What do you mean by 'Sculling' in the paragraph?
(a) Cycling (b) Driving (c) Riding (d) Rowing
2. Where did the Olympic Games get their name from?
(a) From the international sports committee
(b) From the Olympic sports festival held in Greece at Olympia.
(c) From Sydney in Australia
(d) None of the above
3. "The people on the bank were cheering and shouting as if they were mad." What does this sentence mean?
(a) The people are very much crazy about the race. (b) The people are mad
(c) The people find it to be very boring (d) They want to tease the players.
4. Were Myers and Pearce on equal pace throughout the race?
(a) Yes (b) No
5. What act of Pearce made him win everybody's heart?
(a) His ability to win the race (b) His friendly nature (c) His contribution to Olympics (d) His act of kindness
6. Which of the following statement is true?
(a) The Olympic games were being held in America
(b) After half the race was over Pearce and Myers were close to each other.
(c) Pearce let the ducks pass and so lost the race
(d) Pearce managed to overcome the time lost.
7. What is the message learnt from the passage?
(a) Everyone should become an athletic like Pearce
(b) Winning is important but it should not be at the cost of destroying something.
(c) To win we can destroy anything which comes in between
(d) Concentration is important while playing games.
8. Name the sport that Pearce and Myers were competing?
(a) Boat race (b) Animal race (c) Motor race (d) Air race
9. Why did Pearce stop and wait in the middle of the race?
(a) He was interested to see the ducklings (b) It is a protocol to stop and continue
(c) To let the duck and ducklings' pass (d) He wanted to play with ducklings.
10. Why Pearce's friends were not surprised by the story of the ducks?
(a) Because of Pearce's winning spirit
(b) Because Pearce is an animal lover.
(c) Because they are aware of his competitor Ken Myer's
(d) Because they were aware of his kind nature.

OR

- Q.6(B) Draft an e-mail to the customer care, Bridge Electronics stating the malfunctioning of the Bluetooth speaker and requesting to replace the same. 10M

*** END***

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)

B.Tech I Year II Semester (R18) Regular End Semester Examinations – May 2019
Physics: Electromagnetic theory

(ECE)

Time: 3Hrs

Max Marks: 60

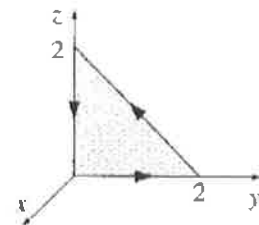
Attempt all the questions. All parts of the question must be answered in one place only.
All parts of Q.no 1 are compulsory. In Q.no 2 to 6 answer either Part-A or B only

- Q.1
- i. What do you mean by solenoidal vector fields? 1M
 - ii. What are the conditions for the field to be an irrotational. 1M
 - iii. Point out under which conditions Poisson's equation reduces to Laplace's equations? 1M
 - iv. Provide differential form and integral form of Gauss law? 1M
 - v. Explain about bound charges? 1M
 - vi. What is displacement current? 1M
 - vii. Comment on the following statement "magnetic force do no work". 1M
 - viii. Write down Amperes' circuital law in magneto statics. 1M
 - ix. Define electromagnetic induction? 1M
 - x. What is modified Amperes law in electrodynamics? 1M

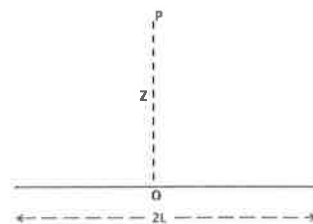
- Q.2(A)
- i) Express the cylindrical unit vectors $(\hat{\rho}, \hat{\phi}, \hat{z})$ in terms of Cartesian unit vectors $(\hat{i}, \hat{j}, \hat{k})$ 4M
 - ii) Prove the following vector identities for the cylindrical coordinate system $\hat{\rho} \cdot \hat{\rho} = \hat{\phi} \cdot \hat{\phi} = \hat{z} \cdot \hat{z} = 1$ and $(\hat{\rho} \times \hat{\phi}) = \hat{z}$, $(\hat{\phi} \times \hat{z}) = \hat{\rho}$ and $(\hat{z} \times \hat{\rho}) = \hat{\phi}$ 6M

OR

- Q.2(B) Test Stokes' theorem for the function $V = xy \mathbf{i} + 2yz \mathbf{j} + 3zx \mathbf{k}$ using the triangular shaded area as shown in the figure. 0M



- Q.3(A) Write down Coulomb' law in electrostatics. Use it to calculate the electric field at point p which is at a distance z above the midpoint of a straight line segment of length 2L and carries a uniform line charge density λ as shown in the figure below 10M



OR

Q.3(B)	i) Discuss about Poisson's equation and Laplace's equation in electrostatics.	5M
	ii) Find the potential of a uniformly charged spherical shell of radius R	5M
<hr/>		
Q.4(A)	i) Explain what happens to a piece of dielectric material when it is placed in electric field.	3M
	ii) Find the electric field produced by a uniformly polarized sphere of radius R.	7M
OR		
Q.4(B)	i) Obtain the expression for the field (electric potential) of polarized object?	6M
	ii) Find the torque for a polar molecule induced by a uniform electric field?	4M
<hr/>		
Q.5(A)	i) State and Explain Biot - Savart Law	3M
	ii) Derive an expression for the force between two long straight parallel current carrying conductors.	7M
OR		
Q.5(B)	i) What are different types of magnetic materials	4M
	ii) Explain Ampere's law in magnetized materials	6M
<hr/>		
Q.6(A)	Derive the wave equation with the help of Maxwell's equations?	10M
OR		
Q.6(B)	i) What do you mean by motional electromotive force (emf). A metal disk of radius R is rotating with angular velocity ω about a vertical axis, through a uniform field B, pointing in the upward direction and perpendicular to the plane of the disc. Calculate the emf induced between the rim and centre of the disc.	5M
	ii) Explain how Maxwell modified Ampere's Circuital law?	5M

*** END***

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS)

B.Tech I Year I & II Semester (R18) Regular & Supplementary End Semester Examinations – May 2019

MODERN PHYSICS

(Common to EEE, CSE, CSIT & CST)

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.1
- i. $Y = 0.8 \sin(40\pi t - 5x)$ cm, what is the frequency of the wave? 1M
 - ii. Write the relationship between path difference and phase relation? What is path difference, when phase difference = π ? 1M
 - iii. Write any two conditions to get interference pattern? 1M
 - iv. Distinguish between Fresnel and Fraunhofer diffraction? 1M
 - v. Write any two significances of wave function Ψ ? 1M
 - vi. What is uncertainty principle? 1M
 - vii. Write any two assumptions of classical free electron theory of metals? 1M
 - viii. What is Fermi energy level? Locate its position in the case of P-type semiconductor at 0K? 1M
 - ix. What is population inversion? 1M
 - x. Write any two applications of Laser in medicine? 1M

-
- Q.2(A)
- i) What are Lissajous figures? On what factor does it depend? 3M
 - ii) Construct the Lissajous figures for the superimposed two perpendicular simple harmonic motions described by following equations? 7M
 $x = 10 \cos(5\pi t)$ and $y = 10 \cos(10\pi t + \pi/3)$

OR

- Q.2(B) Discuss the various cases of damped harmonic oscillator by deriving the necessary expressions? 10M

-
- Q.3(A)
- i). Prove that the diameter of n^{th} dark ring in a Newton's ring set-up is directly proportional to the square root of the ring number. 8M
 - ii). Newton's rings are observed in the reflected light of wavelength 5900 \AA . The diameter of 10^{th} dark ring is 0.5 cm. Find the radius of curvature of lens used. 2M

OR

- Q.3(B)
- i). Discuss the Fraunhofer diffraction due N- slits. Obtain the condition for primary maxima. 7M
 - ii). Find the highest order that can be seen with a grating having 15000 lines/inches. The wavelength of the light used is 600 nm. 3M

-
- Q.4(A)
- i). What are Matter waves? Derive de-Broglie's wavelength associated with matter waves? 5M
 - ii). Derive time-independent Schrodinger wave equation for free particle. 5M

OR

- Q.4(B)
- i). Calculate the wavelength associated with an electron with energy 2000eV. 2M
 - ii). Show that the energies of a one dimensional particle in a box are quantized. 8M

- Q.5(A) i). Discuss the salient features of Kronig - Penny model of a crystal. 6M
ii). Explain the energy band structures of metals, semiconductors and insulators. 4M
OR
- Q.5(B) i). Explain how a PN junction is formed. 5M
ii). Draw I-V characteristic curve of a PN junction diode. 5M

-
- Q.6(A) i). Describe the important characteristics of laser beam 4M
ii). Derive the relation between the various Einstein's coefficients of absorption and emission of radiation. 6M

OR

- Q.6(B) i). What is optical resonator write its importance. 4M
ii). Explain the construction working of ruby laser 6M

*** END***

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS)

B.Tech I Year I & II Semester (R18) Regular & Supplementary End Semester Examinations – MAY 2019

ENGINEERING PHYSICS

(Common to CE & ME)

Time: 3Hrs

Max Marks: 60

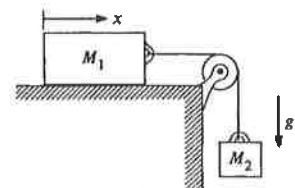
Attempt all the questions. All parts of the question must be answered in one place only.
All parts of Q.no 1 are compulsory. In Q.no 2 to 6 answer either A or B only

- Q.1
- i. \hat{r} and $\hat{\theta}$ represent base vectors in polar coordinate system. what is $\hat{r} \cdot \hat{\theta}$? 1M
 - ii. Velocity, $v(t)=(2t^2+5t)$ cm/sec. Find its acceleration at $t = 2$ sec. 1M
 - iii. Define inertial frame of reference? 1M
 - iv. What is the minimum velocity required for 100 kg object to escape from the surface of the Earth. 1M
 - v. Mention the characteristics of SHM. 1M
 - vi. What is transverse wave? 1M
 - vii. Give an example for interference formed by division of amplitude. 1M
 - viii. Write the difference between Fresnel and Fraunhofer diffraction. 1M
 - ix. Differentiate between Laser beam and ordinary light beam. 1M
 - x. Which pumping method is used in ruby laser to achieve population inversion? 1M

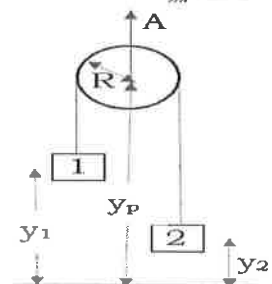
- Q.2(A)
- i) Derive the expression of velocity in polar coordinates by starting from position $\vec{r} = r\hat{r}$ of the particle. 5M
 - ii) A particle moves in a plane with constant radial velocity $\dot{r} = 4$ m/s, starting from the origin. The angular velocity is constant and has magnitude $\dot{\theta} = 2$ rad/s. when the particle is 3 m from the origin, find the magnitude of (i) the velocity and (ii) the acceleration. 5M

OR

- Q.2(B)
- i) The two blocks shown in the sketch are connected by a string of negligible mass. If the system is released from rest, find how far block ' M_1 ' slides in time ' t '. Neglect friction. 6M



- ii) Two masses, ' M_1 ' and ' M_2 ', are connected by a string that passes over a pulley. The pulley is accelerating upward at rate ' A ', as shown. Find how the accelerations of the bodies are related. Assume that there is no horizontal motion. 4M



- Q.3(A) Derive rocket equation and discuss the motion of a rocket under a constant gravitational field? 10M

OR

- Q.3(B)
- i) State and prove work-energy theorem. 5M
 - ii) Define elastic and inelastic collisions. Find the final velocities of two balls of masses m_1 and m_2 , with $m_2 = 3m_1$ in an elastic collision. Assume the two balls have equal and opposite velocities before the collision. 5M

- Q.4(A) Derive the differential equation of forced oscillations and obtain the solution. 10M
- OR
- Q.4(B) i) Construct the Lissajous figure of the motions $x = \cos(\omega t)$ and $y = \cos(\omega t + \pi/2)$. 7M
- ii) Derive differential equation which governs the propagation of one-dimensional wave. 3M
-
- Q.5(A) What is interference? With the suitable diagram, obtain the expressions for the diameters of dark and bright rings in Newton's ring experiment. 10M
- OR
- Q.5(B) Describe the construction and working of a Michelson's interferometer with neat diagram. 10M
-
- Q.6(A) i) With the neat diagram, explain stimulated absorption, spontaneous emission and stimulated emission of light. 6M
- ii) Explain in brief the characteristics of laser. 4M
- OR
- Q.6(B) Describe the construction and working of Ruby laser with suitable diagram. 10M

*** END***

--	--	--	--	--	--	--	--	--	--

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS)

B.Tech I Year I & II Semester (R18) Regular & Supplementary End Semester Examinations – June 2019

ENGINEERING CHEMISTRY

(Common to CE, ME, ECE, CSE, CSIT & CST)

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.1
- A sample of water contains $\text{Ca}(\text{HCO}_3)_2 = 32.4 \text{ mg/L}$ and $\text{Mg}(\text{HCO}_3)_2 = 14.6 \text{ mg/L}$. Calculate the carbonate hardness in terms of ppm. 1M
 - Write the reactions involved in disinfection of water by Cl_2 gas. 1M
 - State Pauli exclusion principle. 1M
 - Write an example for additional polymerization reaction. 1M
 - Define Beer-Lamberts law. 1M
 - Write the selection rule for IR spectroscopy. 1M
 - State second law of thermodynamics. 1M
 - Give examples for strong and weak electrolytes. 1M
 - Brief out the composition of cement. 1M
 - Define flash point of a lubricant. 1M
-
- Q.2(A) (i) Write the significance of break-point chlorination with neat diagram. 5M
(ii) Discuss the desalination of water by reverse osmosis method with appropriate diagram. 5M
- OR
- Q.2(B) Describe the principle and procedure of estimation of alkalinity of water. 10M
-
- Q.3(A) Discuss about the trends in ionization potential and oxidation state of the elements. 10M
- OR
- Q.3(B) Elaborate on $\text{S}_{\text{N}}1$ and $\text{S}_{\text{N}}2$ reactions in organic molecule. 10M
-
- Q.4(A) Explain Rayleigh scattering, stokes and anti-stokes lines with an appropriate diagram. 10M
- OR
- Q.4(B) (i) Determine the number of signals and multiplicity expected for heptan-2-one in its NMR spectrum. 5M
(ii) Discuss the application of UV-Visible spectroscopy. 5M
-
- Q.5(A) Elaborate on the estimation of entropy of an isothermal, isobaric and isochoric processes with suitable examples. 10M
- OR
- Q.5(B) (i) Explain the principle and construction of $\text{H}_2\text{-O}_2$ fuel cell. 5M
(ii) Describe the charging and discharging process of rocking chair battery. 5M
-
- Q.6(A) Elaborate on sol-gel and hydrothermal methods of synthesis of nanomaterials. 10M
- OR
- Q.6(B) Discuss the applications of nanomaterials as hydrogen energy storage materials. 10M

*** END***

--	--	--	--	--	--	--	--	--	--

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)

B.Tech I Year II Semester (R18) Regular & Supplementary End Semester Examinations – May/June 2019

LINEAR ALGEBRA AND DIFFERENTIAL EQUATIONS

(CE)

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 Part-A or B only

- Q.1
- i. Define diagonal matrix and give an example? 1M
 - ii. Write the following system of equations in algebraic form, i.e. $AX = B$ form: 1M

$$\begin{aligned} x + 3y + 2z &= -3 \\ 3x + 5y + 6z &= -5 \end{aligned}$$
 - iii. Find the order and degree of the given differential equation $y' = \sqrt{x} + \sqrt{y}$. 1M
 - iv. Write the general form of the Clairaut's Differential Equation. 1M
 - v. Define singular point of a differential equation. 1M
 - vi. Write the general form of second order differential equation. 1M
 - vii. Define particular integral for PDE. 1M
 - viii. Define complete integral for nonlinear PDE 1M
 - ix. Explain the general form of Laplace's equation for two dimensional. 1M
 - x. Write the general form of Wave equation. 1M

Q.2(A) Balance the Chemical Equation $C_3H_8 + O_2 \rightarrow CO_2 + H_2O$. 10M

OR

Q.2(B) Find the Eigen values and Eigen vectors of the matrix $A = \begin{bmatrix} 3 & 1 & 4 \\ 0 & 2 & 6 \\ 0 & 0 & 5 \end{bmatrix}$. 10M

Q.3(A) Solve the differential equation for p : $p^3(x + 2y) + 3p^2(x + y) + p(2x + y) = 0$. 10M

OR

Q.3(B) Obtain the general solution and the singular solution of the nonlinear equation $y = xy' + (y')^2$. 10M

Q.4(A) Verify that the function $y = 3e^{2x} + e^{-2x} - 3x$ is a solution of the initial value problem: 10M

$$y'' - 4y = 12x, \quad y(0) = 4; \quad y'(0) = 1.$$

OR

Q.4(B) Find the general solution of the equation $y'' + 3y' + 2y = 2e^x$, using the method of variation of parameters. 10M

Q.5(A) Find the differential equation of all planes which are at a constant distance " a " from the origin. 10M

OR

Q.5(B) Form the partial differential equation by eliminating the constants from $(x - a)^2 + (y - b)^2 = z^2 \cot^2 \alpha$, where α is a parameter. 10M

Q.6(A) Derive the One dimensional heat equation. 10M

OR

Q.6(B) A tightly stretched string with fixed ends points $x = 0$ and $x = l$ is initially in a position given by $y = y_0 \sin^3\left(\frac{\pi x}{l}\right)$. If it is released from rest from this position, find the displacement $y(x, t)$. 10M

*** END***

--	--	--	--	--	--	--	--	--	--

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)

B.Tech I Year II Semester (R18) Regular End Semester Examinations – MAY 2019
LINEAR ALGEBRA AND TRANSFORM CALCULUS

(EEE)

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 Part-A or B only

- Q.1
- i. Define the Rank of a matrix 1M
 - ii. Determine Eigenvalues of a matrix $A = \begin{bmatrix} 11 & 50 \\ 0 & -11 \end{bmatrix}$. 1M
 - iii. Write the function $f(z) = \sin z$ in the form of $f(z) = u(x, y) + iv(x, y)$. 1M
 - iv. Define Removable Singular point and Essential singular point 1M
 - v. $L\{t^2 e^{2t}\} = ?$ 1M
 - vi. $L^{-1}\left\{\frac{1}{(s-2)^3}\right\} = ?$ 1M
 - vii. Define fourier transform of $f(x)$. 1M
 - viii. Find the Fourier sine transform of $f(x) = \frac{1}{x}$. 1M
 - ix. Determine the Z-transform of $\frac{1}{n!}$ 1M
 - x. Define Damping rule of Z-transform. 1M

Q.2(A) Investigate the values of α and β for which the system of equations are consistent. 10M

$$x + \alpha y + z = 3$$

$$x + 2y + 2z = \beta$$

$$x + 5y + 3z = 9$$

When will these equations have a unique solution?

OR

Q.2(B) Reduce the quadratic form $2xy + 2zx - 2yz$ to the canonical form and specify the matrix of transformation. Discuss its nature 10M

Q.3(A) Find the Laurent series expansion of $f(z) = \frac{(7z-2)}{(z+1)z(z-2)}$ in the region $1 < |z+1| < 3$. 10M

OR

Q.3(B) Evaluate $\int_C \frac{e^{2z}}{z^2} dz$ where C is $|z-1| = 3$. 10M

Q.4(A) Find the Laplace transforms of (i) $e^{2t} \cos^2 2t$ (ii) $te^{-t} \sin 3t$. 10M

OR

Q.4(B) Apply Convolution theorem to find $L^{-1}\left(\frac{s^2}{(s^2+a^2)(s^2+b^2)}\right)$. 10M

Q.5(A) Find the Fourier sine transform of $f(x) = \frac{e^{-ax}}{x}$. 10M

OR

Q.5(B) Solve the integral equation $\int_0^\infty f(\theta) \cos \alpha \theta d\theta = \begin{cases} 1-\alpha & \text{for } 0 \leq \alpha \leq 1 \\ 0 & \text{for } \alpha > 1 \end{cases}$. 10M

Q.6(A) Find the Z-transform of (i) $\cosh n\theta$ (ii) ne^{an} . 10M

OR

Q.6(B) Using Z-transform, solve $y_{n+2} - 4y_{n+1} + 3y_n = 0$ with $y_0 = 2, y_1 = 4$. 10M

*** END***

--	--	--	--	--	--	--	--	--	--

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)

B.Tech I Year II Semester (R18) Regular End Semester Examinations – May/June 2019

LINEAR ALGEBRA, COMPLEX VARIABLES AND ORDINARY DIFFERENTIAL EQUATIONS
(Common to ECE & 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 Part-A or B only

- Q.1
- i. Define the rank of a matrix 1M
 - ii. Find the eigenvalues of the matrix $A = \begin{bmatrix} 2 & 8 \\ 0 & 1 \end{bmatrix}$ 1M
 - iii. Determine the singular points of the function $f(z) = \frac{2z+1}{z(z+1)}$ and state why the function is not analytic 1M
 - iv. Find all values of z such that $e^z = 1+i$ 1M
 - v. Find the residue at $z = 0$ of the function $f(z) = z \cos\left(\frac{1}{z}\right)$ 1M
 - vi. State the Cauchy-Goursat theorem 1M
 - vii. Write the general form of Bernoulli's differential equation 1M
 - viii. Solve $p = \sin(y - xp)$, where $p = \frac{dy}{dx}$ 1M
 - ix. Find the complementary function of the differential equation $y'' + y = \sec x$ 1M
 - x. Find the inverse Laplace transform of $\frac{p+3}{p^2+2p+5}$ 1M

- Q.2(A) Test for consistency and solve $2x - 3y + 7z = 5, 3x + y - 3z = 13, 2x + 19y - 47z = 32$ 10M

OR

- Q.2(B) Find the eigenvalues and eigenvectors of $A = \begin{bmatrix} 6 & -2 & 2 \\ -2 & 3 & -1 \\ 2 & -1 & 3 \end{bmatrix}$ 10M

- Q.3(A) Verify Cauchy-Riemann equations at $z = (0,0)$ for the function defined by 10M

$$f(z) = \begin{cases} \frac{\bar{z}^2}{z}, & \text{when } z \neq 0 \\ 0, & \text{when } z = 0 \end{cases}, \text{ yet } f'(0) \text{ doesn't exist}$$

OR

- Q.3(B) (i) Find the roots of the equation $\sin z = 2$ 5M
(ii) Determine whether the function $f(z) = e^z$ is entire or not. 5M

Q.4(A) Give two Laurent series expansions in powers of z for the function 10M
 $f(z) = \frac{-1}{(z-2)(z-1)}$ and specify the regions in which those expansions are valid.

OR

Q.4(B) Evaluate the integral of the following functions around the circle $C: |z|=3$ in the 5M
counter clock-wise direction. (i) $f(z) = \frac{\exp(-z)}{z^2}$ (ii) $\frac{z+1}{z^2+2z}$ 5M

Q.5(A) Solve the differential equation $(1-x^2)\frac{dy}{dx} - xy = 1$ 10M
OR

Q.5(B) (i) Solve $y = 2px + y^2 p^3$, where $p = \frac{dy}{dx}$ 5M

(ii) Solve $p(p+y) = x(x+y)$, where $p = \frac{dy}{dx}$ 5M

Q.6(A) Solve $\frac{d^2y}{dx^2} + y = \tan x$ by the method of variation of parameters 10M

OR

Q.6(B) Solve $y'' + y = x$ given that $y(0) = 1, y'(0) = 0$ by the method of Laplace transforms 10M
*** END***

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)

B.Tech I Year I & II Semester (R18) Regular End Semester Examinations – May/June 2019

LINEAR ALGEBRA

(CSE, CSIT & CST)

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 Part-A or B only

- Q.1
- i. Suppose that the augmented matrix of a system of equations has been reduced to a reduced row echelon form $\begin{bmatrix} 1 & 0 & 0 & 4 & -1 \\ 0 & 1 & 0 & 2 & 6 \\ 0 & 0 & 1 & 3 & 2 \end{bmatrix}$. Solve the system. 1M
 - ii. Find the reduced row echelon form of $A = \begin{bmatrix} 1 & -2 & 0 \\ 2 & 2 & 2 \end{bmatrix}$. 1M
 - iii. State rank and nullity theorem. 1M
 - iv. Find a basis for a 3x3 skew symmetric matrices. 1M
 - v. Determine whether the functions $T(x, y, z) = (x + y, 0, 2x + 4z)$ is a linear transformation. 1M
 - vi. Determine the value of k so that the vectors $\{(2, 3, k, 4), (1, k, 3, -5)\}$ are orthogonal with respect to the Euclidean inner product in \mathbb{R}^4 . 1M
 - vii. Determine whether the function $\langle x, y \rangle = x_1y_1 + 3x_2y_2$ on \mathbb{R}^2 is inner product or not, for $x = (x_1, x_2), y = (y_1, y_2)$. 1M
 - viii. Any finite dimensional vector space is isomorphic to its dual space. Yes or No? 1M
 - ix. Define projection matrix? 1M
 - x. Determine whether two different subspaces of \mathbb{R}^m have the same projection. 1M

Q.2(A) Solve the following system of linear equations $5x - 5y - 15z = 40, 4x - 2y - 6z = 19,$ 10M
 $3x - 6y - 17z = 41.$

OR

Q.2(B) Find eigenvalues and eigenvectors for the matrix $A = \begin{bmatrix} -4 & 8 & -12 \\ 6 & -6 & 12 \\ 6 & -8 & 14 \end{bmatrix}$ 10M

Q.3(A) Determine whether the set of all twice differentiable function f defined on \mathbb{R} such that $f''(x) + f(x) = 0$ is a vector space with the usual addition and scalar multiplication of functions? 10M

OR

Q.3(B) Find bases for the row space, the column space, and the null space for the given matrices, $A = \begin{bmatrix} 1 & 3 & 2 \\ 2 & 6 & 4 \\ 3 & 9 & 6 \end{bmatrix}$? 10M

Q.4(A) (i) Let $T: V \rightarrow W$ be a linear transformation from a vector space V to a vector space W . Then show that the kernel $\ker(T)$ and the image $\text{Im}(T)$ are subspaces of V and W respectively. 5M

(ii) Let $w_1 = (1, 0)$, $w_2 = (2, -1)$, $w_3 = (4, 3)$ be three vectors in \mathbb{R}^2 . 5M
Let $\beta = \{v_1, v_2, v_3\}$ be another basis for 3-space \mathbb{R}^3 , where $v_1 = (1, 1, 1)$, $v_2 = (1, 1, 0)$, $v_3 = (1, 0, 0)$, and let $T: \mathbb{R}^3 \rightarrow \mathbb{R}^2$ be the linear transformation defined by, $T(v_1) = w_1$, $T(v_2) = w_2$, $T(v_3) = w_3$. Find the formula for $T(x_1, x_2, x_3)$, and then use it to compute $T(2, -3, 5)$.

OR

Q.4(B) If $T: \mathbb{R}^3 \rightarrow \mathbb{R}^3$ is defined by $T(x, y, z) = (2x - z, 3x - 2y, x - 2y + z)$ 10M

i) Determine the null-space $N(T)$ of T .

ii) Determine whether T is one-to-one.

iii) Find a basis for $N(T)$.

Q.5(A) Let D be the differential operator on the vector space $P_2(\mathbb{R})$. Given two ordered bases 10M

$\alpha = \{1, x, x^2\}$ and $\beta = \{1, 2x, 4x^2 - 2\}$ for $P_2(\mathbb{R})$. Show that $[D]_\beta = Q^{-1}[D]_\alpha Q$, where Q is the transition matrix from β to α .

OR

Q.5(B) Let T be the linear transformation on $V = \mathbb{R}^3$, for which the associated matrix with 10M

respect to the standard ordered basis is $A = \begin{bmatrix} 1 & 2 & 1 \\ 0 & 1 & 1 \\ -1 & 3 & 4 \end{bmatrix}$. Find the basis for the range

and the null space of the transpose T^* on V^* .

Q.6(A) Find an orthogonal basis for \mathbb{R}^3 with the Euclidean inner product by applying the 10M
Gram-Schmidt orthogonalization to the vectors $x_1 = (1, 0, -1)$, $x_2 = (1, 0, 1)$, $x_3 = (1, -3, 4)$.

OR

Q.6(B) Let W be the subspace of \mathbb{R}^3 spanned by the vectors $x_1 = (1, 1, 1, 1)$, $x_2 = 10M$
 $(1, -1, 1, -1)$, $x_3 = (-1, 1, 1, 0)$, and $b = (1, 2, 1, 1)$. Find the projection matrix P
for the subspace W and the null space $N(P)$ of P . Also compute Pb .

*** END***

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS)

B.Tech I Year II Semester (R18) Regular & Supplementary End Semester Examinations – May/June 2019

C PROGRAMMING & 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 Part-A or B only

Q.1	i. What is a keyword? List various keywords.	1M
	ii. List various operators in C.	1M
	iii. What the difference between predefined and user defined function.	1M
	iv. What is recursion	1M
	v. What is generic pointer?	1M
	vi. Define a structure	1M
	vii. Explain LIFO and FIFO	1M
	viii. What are the applications of Stack.	1M
	ix. Define File and how to store a file.	1M
	x. Difference between 1-D and 2-D array.	1M
<hr/>		
Q.2(A)	Explain decision making statements with syntax and example program.	10M
	OR	
Q.2(B)	(i) Difference between break and continue	5M
	ii) Write a program to print factorial of a number	5M
<hr/>		
Q.3(A)	i) Explain recursion with an example.	5M
	ii) Write a program to find minimum and maximum numbers in an array	5M
	OR	
Q.3(B)	Write a program to implement Bubble Sort	10M
<hr/>		
Q.4(A)	Explain various parameter passing techniques with an example	10M
	OR	
Q.4(B)	i) List and explain various dynamic memory allocation functions.	5M
	ii) Define a structure and give its syntax	5M
<hr/>		
Q.5(A)	i) What is a data structure and give its classification	5M
	ii) List various applications of stack and queue	5M
	OR	
Q.5(B)	Write source code for implementation of stack using an array(push, pop, display)	10M
<hr/>		
Q.6(A)	List and explain all string handling functions.	10M
	OR	
Q.6(B)	i) List and explain various file opening modes.	5M
	ii) Explain various file input and output functions.	5M

*** END***

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)

B.Tech I Year I & II Semester (R18) Regular & Supplementary End Semester Examinations – June 2019

BASIC ELECTRICAL ENGINEERING

(Common to ALL)

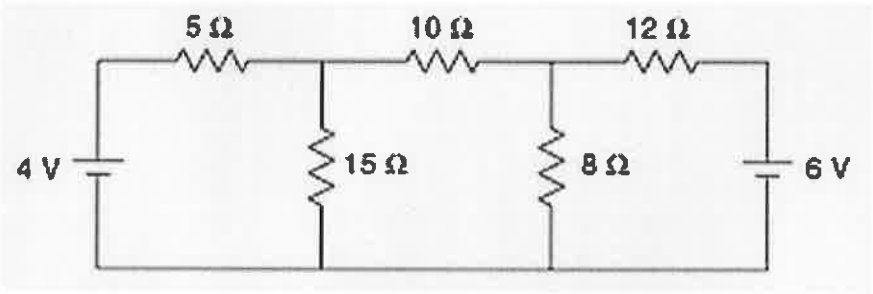
Time: 3Hrs

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

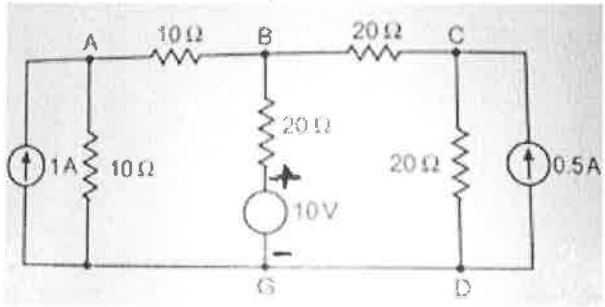
- Q.1
- i. State Kirchoff's Voltage Law and mention its significance. 1M
 - ii. 200 W electric light bulb is connected to a 250V supply. Determine the resistance of the bulb. 1M
 - iii. If an R-L load is drawing 6 kW at a power factor of 0.8 (lagging) from a single-phase A.C. supply, find the apparent power drawn by the load. 1M
 - iv. Define a balanced three phase load. 1M
 - v. Give the relation between magnetic field intensity and magnetic flux density. 1M
 - vi. Why do we use iron core in a transformer? 1M
 - vii. What is the function of a Commutator? 1M
 - viii. Determine the synchronous speed of an induction motor with 4-pole, 440 V, 50 Hz. 1M
 - ix. What is value of voltage drop across a non-ideal P-N junction silicon diode in Forward-bias condition? 1M
 - x. What is a Fuse? 1M

Q.2(A) Find the current through the 8Ω resistor using Mesh Analysis. 10M



OR

Q.2(B) Using nodal analysis, determine current in each branch of the network as shown in Figure. 10M



Q.3(A) In a series R-L-C circuit, $R = 8\Omega$, $C = 2\ \mu\text{F}$, $L = 10\ \text{mH}$. A voltage V is applied across the combination such that the series current is 2 A. Assuming the system frequency to be 50 Hz, find the voltage drops across each element and impedance of the circuit. 10M

OR

Q.3(B) i) Write the advantages of three phase system. 4M

ii) Derive the relationship between phase and line voltage in a balanced three phase star connected system. 6M

Q.4(A) Draw and explain about the B-H characteristics of ferromagnetic materials. 10M

OR

Q.4(B) i) Write in brief the principle of operation of a single-phase transformer. 5M

ii) A 10 kVA, 500/250-V, 50-Hz transformer has a high voltage winding resistance of 0.25Ω and a leakage reactance of 0.75Ω . The low voltage winding resistance is 0.125Ω and the leakage reactance is 0.375Ω . Find the equivalent winding resistance, reactance and impedance referred to the (i) high voltage side and (ii) the low-voltage side. 5M

Q.5(A) Discuss in detail about the armature control method and field control method with reference to a DC motor. 10M

OR

Q.5(B) Discuss in detail how a rotating magnetic field is produced in a Three phase Induction Motor. 10M

Q.6(A) Explain in detail about the operation of full wave rectifier with centre tapped transformer. 10M

OR

Q.6(B) Write in brief about different types of cables and earthing. 10M

*** END***

Hall Ticket No:

Question Paper Code: 18ME11T01

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS)

B.Tech I Year II Semester (R18) Supplementary End Semester Examinations –JUNE 2019**Engineering Graphics**

(Common to All)

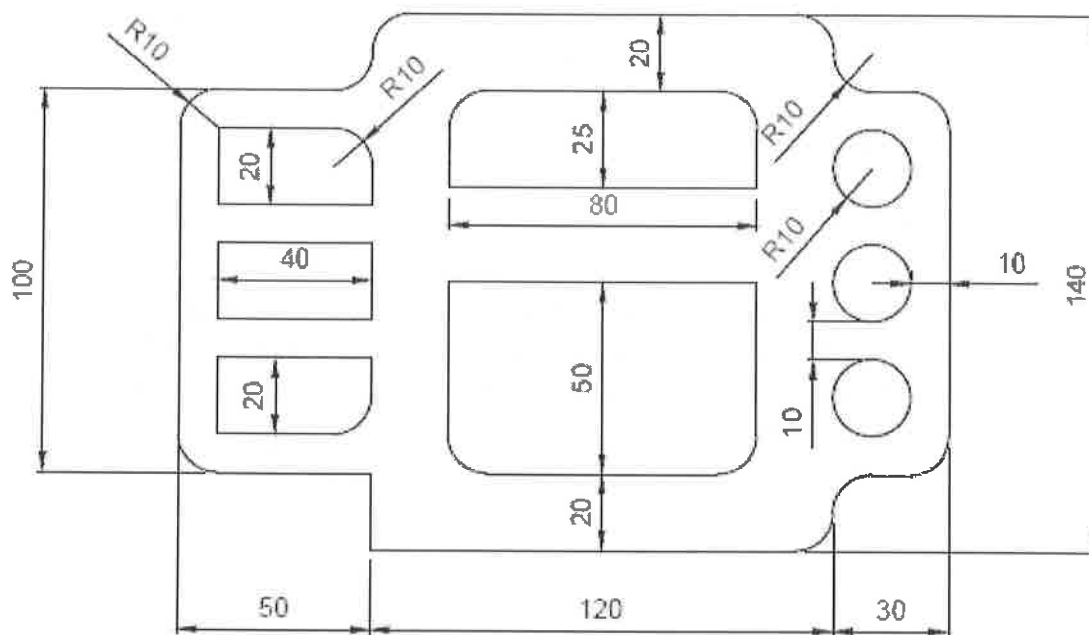
Time: 3Hrs**Max Marks: 60**

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

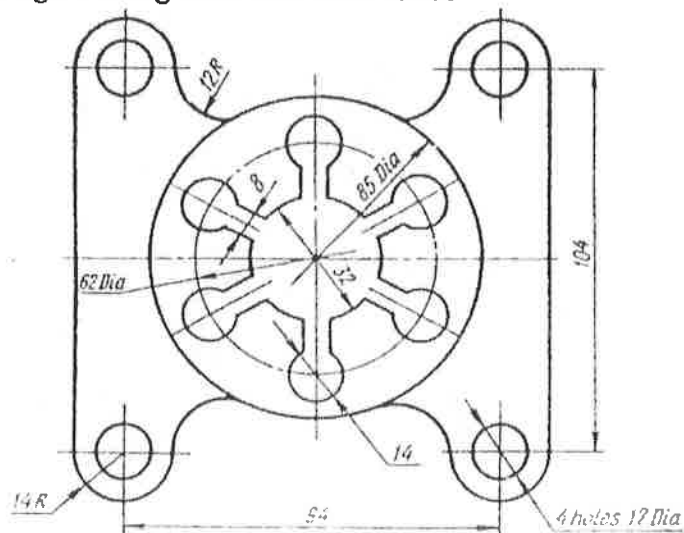
Q.1(A) Draw the below figure using Auto CAD commands

12M

**OR**

Q.1(B) Draw the below figure using Auto CAD commands

12M



- Q.2(A) i. Draw the projections of the following points on the same ground line xy , keeping the distance between the projectors is 50mm apart. 5M
 a. Point A is 45mm above the H.P and 30mm behind the V.P.
 b. Point B is 50mm below the H.P. and 60 mm in front of the V.P.
 ii. Two points F and G are on H.P. The point F being 15mm in front of V.P, while G is 20 behind V.P. The line joining their top views makes an angle of 45° with xy . Find the horizontal distance between two points. 5M

OR

- Q.2(B) A long line AB of 100mm length is inclined at an angle of 35° to the H.P and 45° to V.P. One end point of the line is 30 mm above HP and 40mm in front of the VP. Draw its projections and find its apparent inclinations with HP and VP. 12M

- Q.3(A) Draw the projections of a regular hexagon of 25mm side having one of its sides in the H.P and inclined at 60° to V.P and its surface making an angle of 45° with H.P 12M

OR

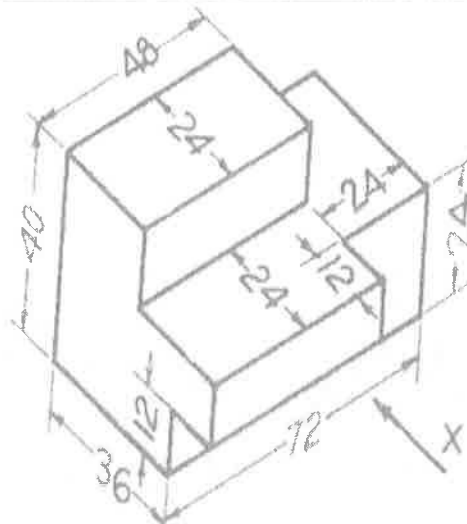
- Q.3(B) A pentagonal prism with side of base 40mm and axis 100mm long is resting with an edge of its base on H.P., such that the rectangular face containing that edge is inclined at 30° to HP. Draw the projections of the prism when its axis is parallel to V.P. 12M

- Q.4(A) A Hexagonal prism base 30mm side and axis 65mm is resting with its base on the Horizontal Plane. The section plane which is parallel to VP and perpendicular to HP passing through the solid bisecting the axis. Draw its front and sectional top view. 12M

OR

- Q.4(B) A cylinder of base 50mm and axis 60mm is resting on ground with its axis vertical. It is cut by a section plane perpendicular to V.P and inclined at 45° to H.P passing through the top of the generator and cuts all other generators. Draw its development of its lateral surface. 12M

- Q.5(A) 12M



Draw the three views for the above figure.

OR

- Q.5(B) A Vertical cylinder of 80mm diameter is completely penetrated by another cylinder of 60mm diameter, their axes bisecting each other at right angles. Draw their projections showing curves of penetration, assuming the axis of penetrating cylinder to be parallel to the V.P. 12M

*** END***

Hall Ticket No:

--	--	--	--	--	--	--	--	--	--

Question Paper Code: 18ME101

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)

B.Tech I Year II Semester (R18) Regular End Semester Examinations –JUNE 2019

Engineering Graphics

(Common to All)

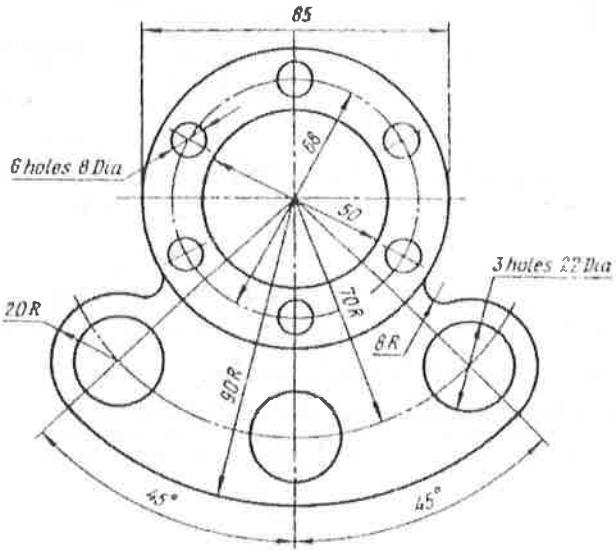
Time: 3Hrs

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.1(A) Draw the below figure using Auto CAD commands

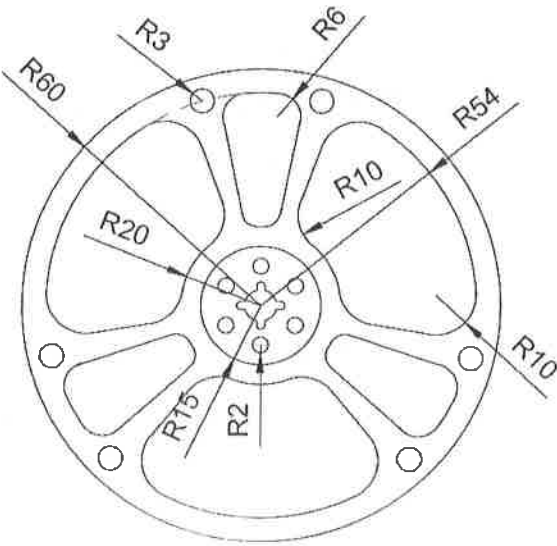
12M



OR

Q.1(B) Draw the below figure using Auto CAD commands

12M



- Q.2(A) Draw the projections of the following points on the same reference line xy , and keeping the distance between the projectors is 50mm apart. 12M
- A – 30mm above HP and 60mm in front of VP
 - B – 60mm below HP and 40mm in front of VP
 - C – 50mm below HP and 80mm behind VP
 - D – 40mm above HP and 80mm behind VP

OR

- Q.2(B) A line PQ of 90mm long has its end P at 20mm above H.P. and 25mm in front of V.P. Its front view and top view measure 75mm and 80mm respectively. Draw the projections of the line and determine its inclinations with H.P. and V.P. 12M

- Q.3(A) An equilateral triangle plate of negligible thickness having 40mm edge length is resting on one of its side on HP. The surface makes an inclination of 30° to HP and resting side makes an inclination of 60° to VP. Draw the projection of the plate. 12M

OR

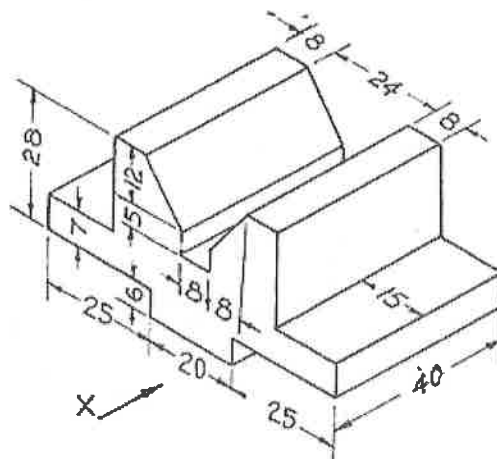
- Q.3(B) A Hexagonal Prism of base edge 50 mm and axis 80mm long is resting with its edge of base on HP. The axis of the solid is inclined at 45° to the H.P and parallel to the VP. Draw its projections. 12M

- Q.4(A) A cylinder of base diameter 40 mm and height 80 mm rests on its base on HP. It is cut by section plane perpendicular to VP and inclined at 45° to HP and passing through the axis at a distance 40 mm from base. Draw the front view and sectional top view. 12M

OR

- Q.4(B) A square prism of base side 30mm and height 80mm resting on H.P. with its base and one of its sides is 35° with the V.P. A plane cuts the prism, which is perpendicular V.P. and 40° to H.P. and passing through axis 40mm above the base. Draw the development the lower portion of the solid. 12M

- Q.5(A) Draw the front view, top view and side view of the below figure. 12M



OR

- Q.5(B) A Vertical square prism base 50mm side, is completely penetrated by a horizontal square prism, base 35mm side, so that their axes intersect. The axis of the horizontal prism is parallel to the V.P., while the faces of the two prisms are equally inclined to the V.P. Draw the projections of the solids, showing lines of intersection. (Assume suitable lengths for the prisms) 12M

*** END***

Hall Ticket No:

--	--	--	--	--	--	--	--	--	--

Question Paper Code: 18ME11T01

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)
B.Tech I Year II Semester (R18) Supplementary End Semester Examinations –JUNE 2019
Engineering Graphics
(Common to All)

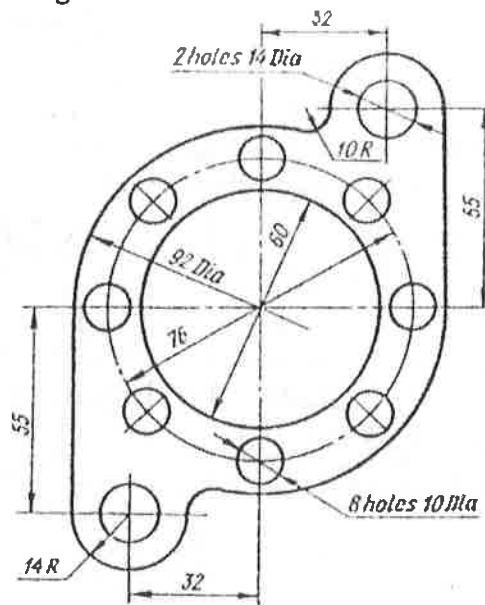
Time: 3Hrs

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.1(A) Draw the below figure using Auto CAD commands

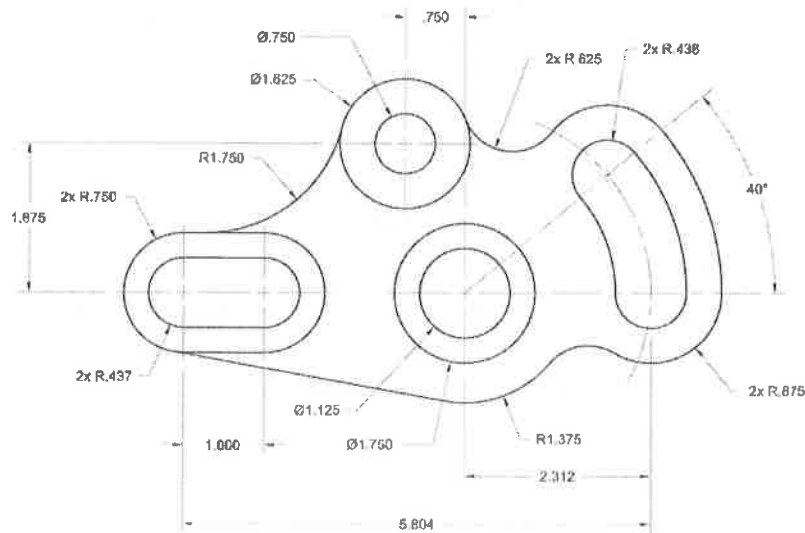
12M



OR

Q.1(B) Draw the below figure using Auto CAD commands

12M



- Q.2(A) i. Two points C and D are in the H.P. The point C is 15mm in front of V.P and D is behind the V.P. the distance between their projectors is 40mm and line joining their top views makes an angle of 40° with xy. Find the distance of the point C from the V.P. 6M
- ii. A point M is 40mm above H.P, 50mm in front of V.P and 30mm in front of P.P. Draw front view, top view and left side view of the point. 6M

OR

- Q.2(B) A line AB 100mm long is inclined at an angle of 30° to the H.P and 45° to V.P. The point A is 40mm above H.P and 50mm in front of V.P. Draw its Projections and find the apparent inclinations. 12M

- Q.3(A) A rectangle plate of 200mm \times 100mm is resting on one of its smaller sides on the VP. It is tilted about that side so that it appears as a square in the elevation (FV). Find the inclination of the plane with the VP. 12M

OR

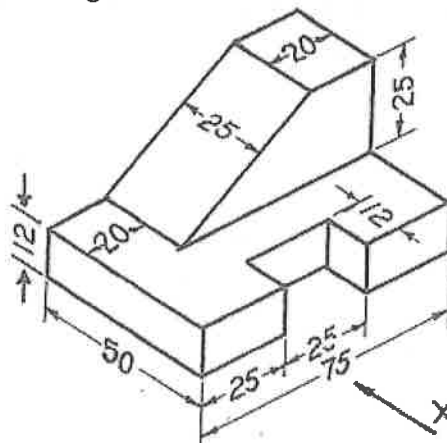
- Q.3(B) A Pentagonal Prism of base edge 30 mm and axis 60mm rests on an edge of its base in the H.P. Its axis is parallel to V.P and inclined at 45° to H.P. Draw its projections. 12M

- Q.4(A) A Hexagonal prism base 30mm side and axis 65mm is resting with its base on the Horizontal Plane. The section plane which is parallel to VP and perpendicular to HP passing through the solid bisecting the axis. Draw its front and sectional top view. 12M

OR

- Q.4(B) A cylinder of base 50mm and axis 60mm is resting on ground with its axis vertical. It is cut by a section plane perpendicular to V.P and inclined at 45° to H.P passing through the top of the generator and cuts all other generators. Draw its development of its lateral surface. 12M

- Q.5(A) Draw the three views for the figure shown. 12M



OR

- Q.5(B) A cylinder of diameter 45mm pierces through another vertical cylinder of diameter 30mm. The axes are at right angles. The axis of the vertical cylinder is nearer to the V.P. The axis of the penetrating cylinder is parallel to the both the H.P. and the V.P. Draw the projections of the cylinder and show the curves of intersection. 12M

*** END***

Hall Ticket No:

--	--	--	--	--	--	--	--	--	--

Question Paper Code: 18ME101

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)

B.Tech I Year II Semester (R18) Regular End Semester Examinations –JUNE 2019
Engineering Graphics
(Common to All)

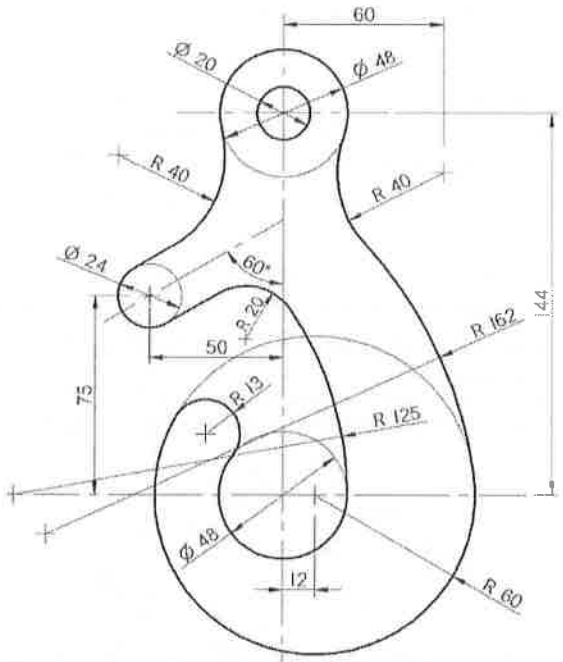
Time: 3Hrs

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.1(A) Draw the below figure using Auto CAD commands

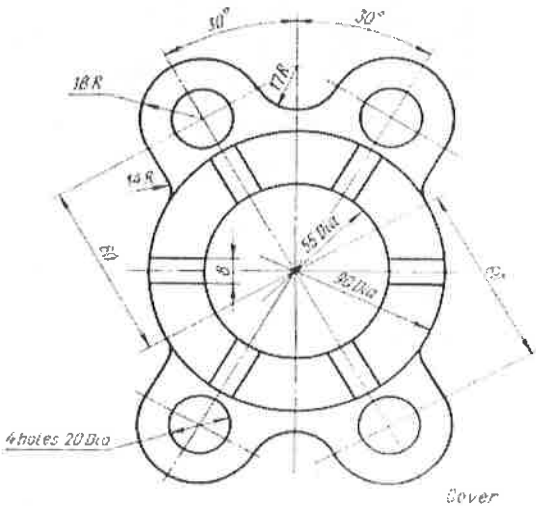
12M



OR

Q.1(B) Draw the below figure using Auto CAD commands

12M



- Q.2(A) Draw the projections for the below mentioned cases and also state the quadrant in which the point lies. Show all the projections by keeping the distance between the projection lines as 80mm. 12M
- Point E, 25mm above the H.P. and 50mm in front of V.P.
 Point F, 50mm below the H.P. and 10mm behind the V.P.
 Point G, 30mm above the H.P. and 40mm behind the V.P.
 Point H, 15mm below the H.P. and point on VP.

OR

- Q.2(B) A line AB 90mm long is inclined at 45° to HP and its Top view makes an angle of 60° to V.P. The end A is in H.P and 12mm in front of V.P. Draw its Front view and find its True inclination with V.P 12M

- Q.3(A) A circular lamina is resting on the HP on its circumferential point. It is inclined with the HP such that its TV appears as an ellipse with minor axis 100mm and major axis 150mm. Find the surface inclination with the HP as well the diameter of the circular lamina. 12M

OR

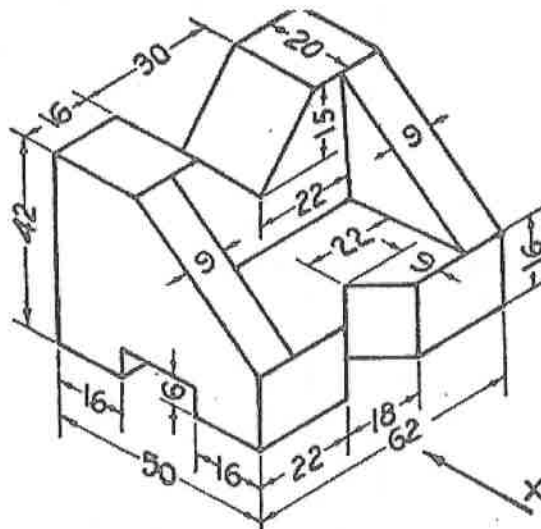
- Q.3(B) A Hexagonal Prism of base edge 30 mm and axis 60mm has a corner on the H.P with its axis inclined at 45° to the H.P. Draw the projections when the plane containing the resting corner and the axis is parallel to V.P. 12M

- Q.4(A) A cylinder of base diameter 50 mm and height 100 mm rests on its base on HP. It is cut by section plane inclined at 50° to HP and perpendicular to VP, passing through the axis at a distance 40 mm from base. Draw the front view and sectional top view. 12M

OR

- Q.4(B) A pentagonal prism of base side 30mm and height 70 mm resting on its base on H.P with the rectangular face parallel to V.P. It is cut by a section plane inclined at 45 degrees to the H.P and passing through the mid point of the axis. Draw the development of the lateral surface of the truncated prism. 12M

- Q.5(A) Draw the front view, top view and side view of the below figure. 12M



OR

- Q.5(B) A vertical square prism, base 50mm side and height 90mm has a face inclined at 30° to the VP. It is completely penetrated by another square prism, base 40mm side and 100mm long, faces of which are equally inclined to the VP. The axes of the two prisms are parallel to the VP and bisect each other at right angles. Draw the projections showing lines of the inter section. 12M

*** END***

Hall Ticket No:

--	--	--	--	--	--	--	--	--	--

Question Paper Code: 18ME11T01

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)
B.Tech I Year II Semester (R18) Supplementary End Semester Examinations –JUNE 2019
Engineering Graphics
(Common to All)

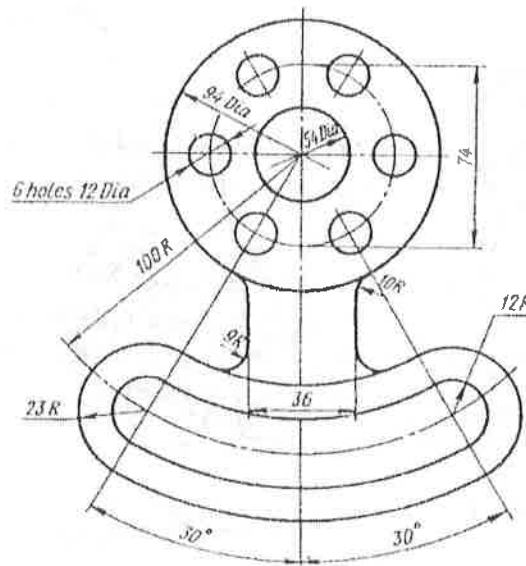
Time: 3Hrs

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.1(A) Draw the below figure using Auto CAD commands

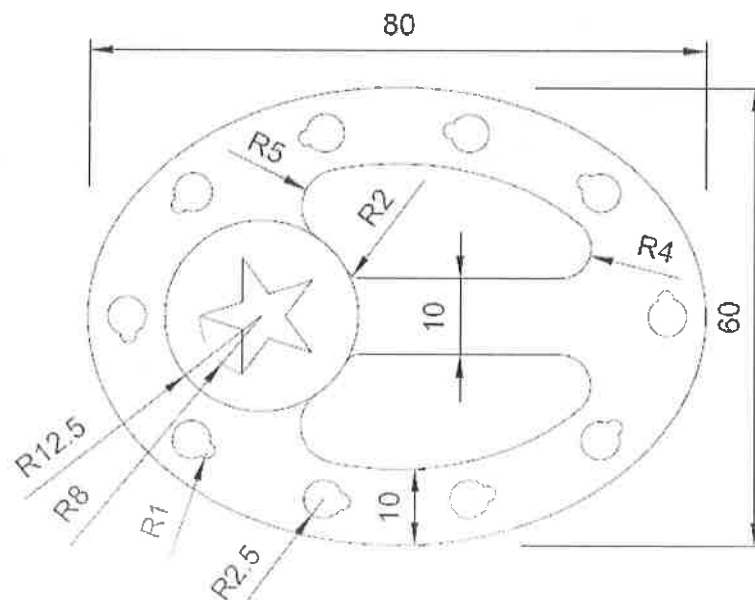
12M



OR

Q.1(B) Draw the below figure using Auto CAD commands

12M



- Q.2(A) i) A point A is 10mm below H.P, 20mm behind V.P and 30mm in front of Profile plane. Draw front view, top view and left side view of the point. 6M
 ii) A point B is 20mm above H.P, 10mm in front of V.P and 30mm in front of Profile plane. Draw front view, top view and left side view of the point. 6M

OR

- Q.2(B) A line RS 80mm long is inclined 30° to HP and 45° to VP. The end R of the line is 20mm above HP and 30mm in front of VP. Draw the projections of the line. 12M

- Q.3(A) An equilateral triangle plate of negligible thickness having 40mm edge length is resting on one of its side on HP. The surface makes an inclination of 30° to HP and resting side makes an inclination of 60° to VP. Draw the projection of the plate. 12M

OR

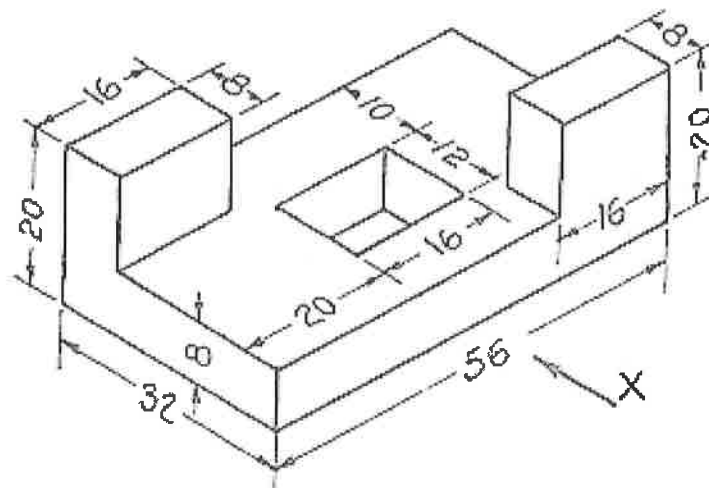
- Q.3(B) A Hexagonal pyramid of base side 30mm and axis 60mm has an edge of its base on the ground. Its axis is inclined at 30° to the ground and parallel to V.P. Draw its projections. 12M

- Q.4(A) A Hexagonal prism of base side 30 mm and axis length 60 mm is resting on H.P. on one of its rectangular faces, with its axis perpendicular to V.P. It is cut by a plane inclined at 50° to V.P. and perpendicular to H.P. and passing through a point 25 mm from rear base of the prism. Draw its top view and sectional front view of solid. 12M

OR

- Q.4(B) A Pentagonal prism of base side 30mm and height 70 mm resting on its base on H.P with the rectangular face parallel to V.P. It is cut by a section plane inclined at 45 degrees to the H.P and passing through the mid point of the axis. Draw the development of the lateral surface of the truncated prism. 12M

- Q.5(A) Draw the three views for the above figure. 12M



OR

- Q.5(B) A Vertical cylinder of 80mm diameter is completely penetrated by another cylinder of 60mm diameter, their axes bisecting each other at right angles. Draw their projections showing curves of penetration, assuming the axis of penetrating cylinder to be parallel to the V.P. 12M

*** END***

Hall Ticket No:

Question Paper Code: 18ME101

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)

B.Tech I Year II Semester (R18) Regular End Semester Examinations –JUNE 2019
Engineering Graphics
(Common to All)

Time: 3Hrs

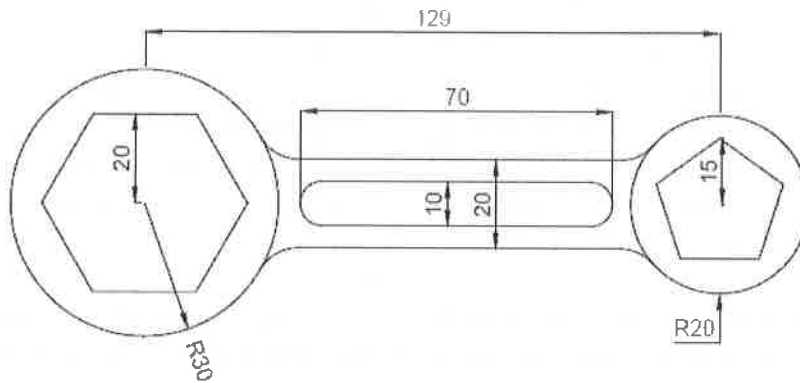
Max Marks: 60

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.1(A) Draw the below figure using Auto CAD commands

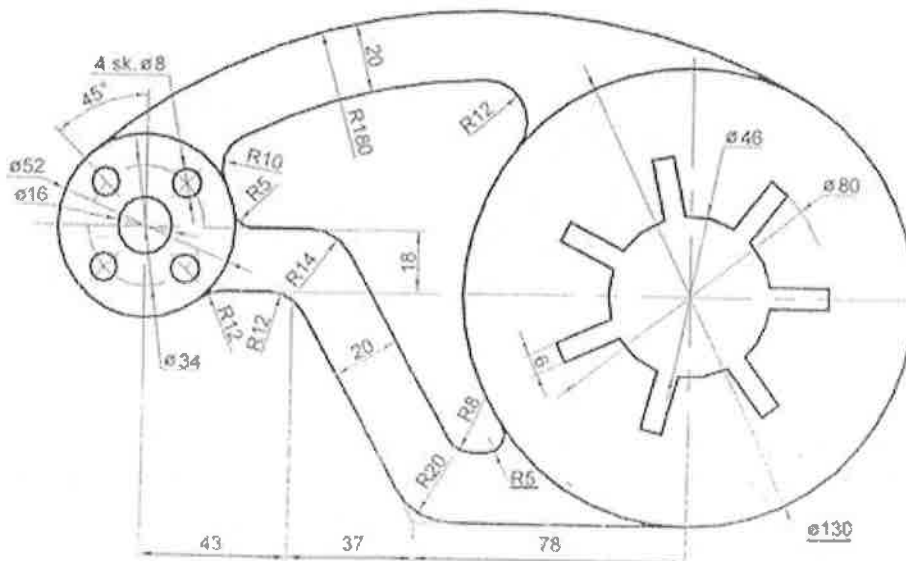
12M



OR

Q.1(B) Draw the below figure using Auto CAD commands

12M



- Q.2(A) Draw the projections of the following points on the same reference line by keeping the distance between projection lines as 60mm 12M
 A – 40mm below HP and point on VP
 B – 60mm below HP and 40mm in front of VP
 C – Point on HP and 60mm in front of VP
 D – 40mm above HP and 80mm behind VP

OR

- Q.2(B) i. The Top view of a 80mm long line measures 50mm. The line is in V.P its one end being 25mm above H.P. Draw its projections. 6M
 ii. The Front view of a line inclined at 45° to the V.P is 60mm long. Draw the projections of the line when it is parallel to and 40mm above H.P, its one end being 30mm in front of V.P. 6M

- Q.3(A) A Hexagonal plate of 50mm side has a circular hole of 30mm diameter in its center. The plane stands on one of its sides on the H.P. with its plane perpendicular to V.P. and 45° inclined to H.P. Draw its projections. 12M

OR

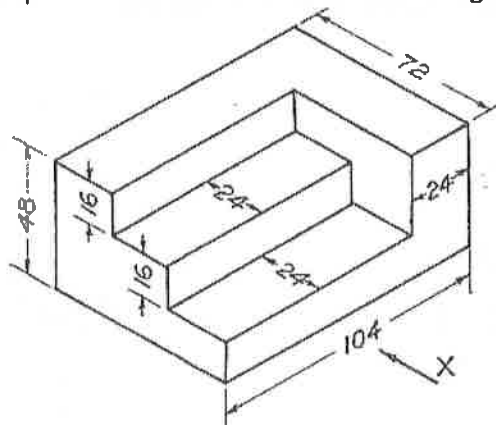
- Q.3(B) A Pentagonal Prism of base edge 30 mm and axis 60mm has a corner on the H.P with its axis inclined at 45° to the H.P. Draw the projections when the plane containing the resting corner and the axis is parallel to V.P. 12M

- Q.4(A) A Hexagonal prism base 40mm side and axis 80mm is resting with its base on the Ground. The section plane which is inclined at 45° to HP and parallel to VP bisecting the axis. Draw its front, side and sectional top view. 12M

OR

- Q.4(B) A cylinder of base 50mm and axis 60mm is resting on ground with its axis vertical. It is cut by a section plane inclined at 35° to H.P and perpendicular to the VP which is bisecting the axis. Draw its development of its lateral surface. 12M

- Q.5(A) Draw the front view, top view and side view of the below figure. 12M



OR

- Q.5(B) A Vertical square prism base 50mm side and height 80mm, is completely penetrated by a horizontal square prism, base 30mm side and axis 80mm long, so that their axes intersect each other. The axis of the horizontal prism is parallel to the V.P., while the faces of the two prisms are equally inclined to the V.P. Draw the projections of the solids, showing lines of intersection. 12M

*** END***

Hall Ticket No:

Question Paper Code: 18ME11T01

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)

B.Tech I Year II Semester (R18) Regular End Semester Examinations –JUNE 2019
ENGINEERING GRAPHICS

(Common to All)

Time: 3Hrs

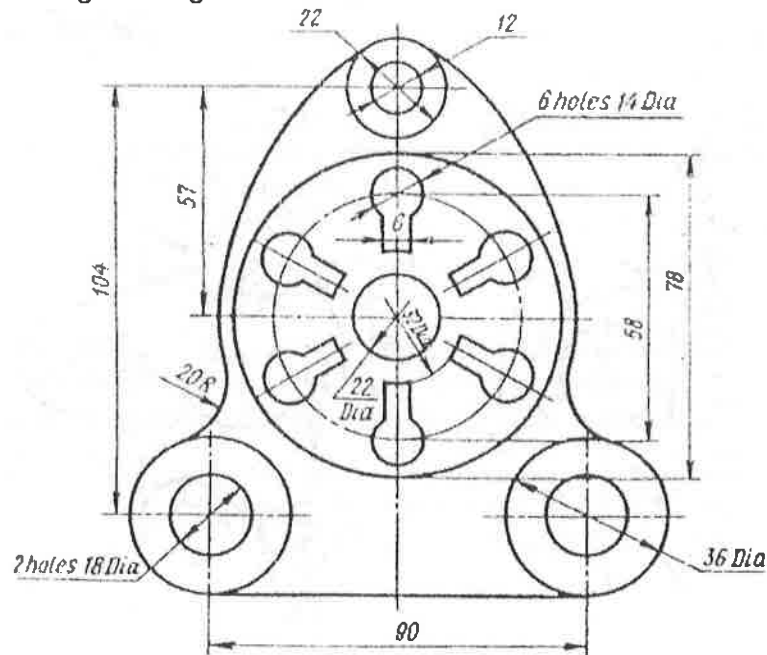
Max Marks: 60

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.1(A) Draw the below figure using Auto CAD commands

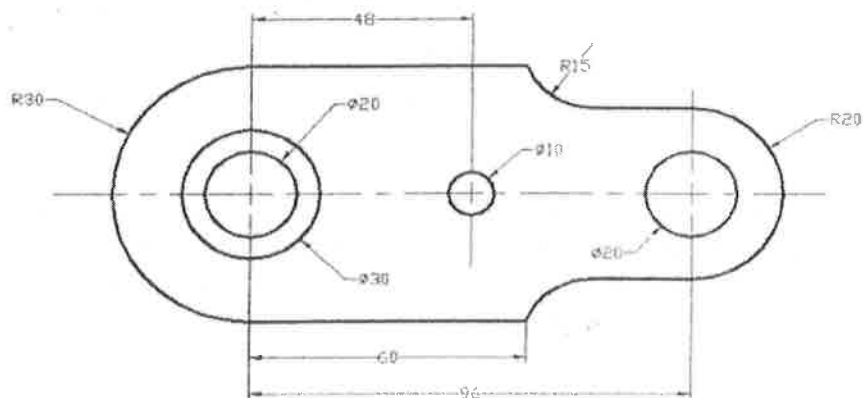
12M



OR

Q.1(B) Draw the below figure using Auto CAD commands

12M



- Q.2(A) i. Draw the projections of the following points on the same ground line xy , keeping the distance between the projectors is 70mm apart. 6M
- Point A: 50mm above HP, 60mm in front of VP
 - Point B: 60mm below HP, 80mm behind VP
- ii. Two points A and B are lying on H.P. The point A is 15mm in front of V.P, while the other point B is 30mm behind V.P. The line joining their top views makes an angle of 45° with xy . Find the horizontal distance between two points. 6M

OR

- Q.2(B) A line PQ 70mm long has its end P 10mm above H.P and 15mm in front of V.P. Its Top view and Front view measures 60mm and 40mm respectively. Draw the projections of the line and determine its inclinations with H.P and V.P. 12M

- Q.3(A) Draw the projections of a regular pentagon of 40mm side having one of its sides on the H.P and inclined at 60° to V.P and its surface making an angle of 45° with H.P. 12M

OR

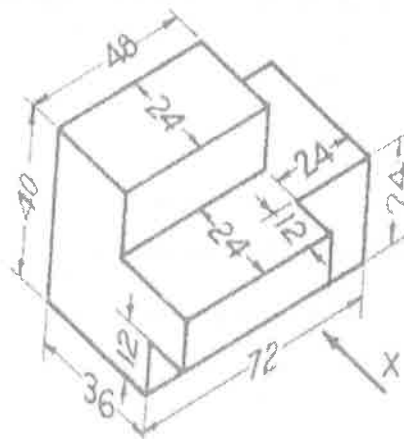
- Q.3(B) A triangular prism having base edge 40mm and height 70mm is resting on one of its base edges on the ground with axis parallel to VP. Draw projections of solid if the axis makes an angle of 40° to the ground. 12M

- Q.4(A) A pentagonal prism of base side 30 mm and axis length 60 mm is resting on H.P. on one of its rectangular faces, with its axis perpendicular to V.P. It is cut by a plane inclined at 50° to V.P. and perpendicular to H.P. and passing through a point 25 mm from rear base of the prism. Draw its top view and sectional front view of solid. 12M

OR

- Q.4(B) A cylinder of base 50mm and axis 60mm is resting on ground with its axis vertical. It is cut by a section plane perpendicular to V.P and inclined at 45° to H.P passing through the top of the generator and cuts all other generators. Draw its development of its lateral surface. 12M

- Q.5(A) Draw the three views for the figure shown. 12M



OR

- Q.5(B) A Vertical cylinder of 60mm diameter and height 100mm is completely penetrated by another cylinder of 50mm diameter and height 80mm, their axes bisecting each other at right angles. Draw their projections showing curves of penetration, assuming the axis of penetrating cylinder to be parallel to the V.P. 12M

*** END***

Hall Ticket No:

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Question Paper Code: 18ME11T01

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)

B.Tech I Year II Semester (R18) Regular End Semester Examinations –JUNE 2019

ENGINEERING GRAPHICS

(Common to All)

Time: 3Hrs

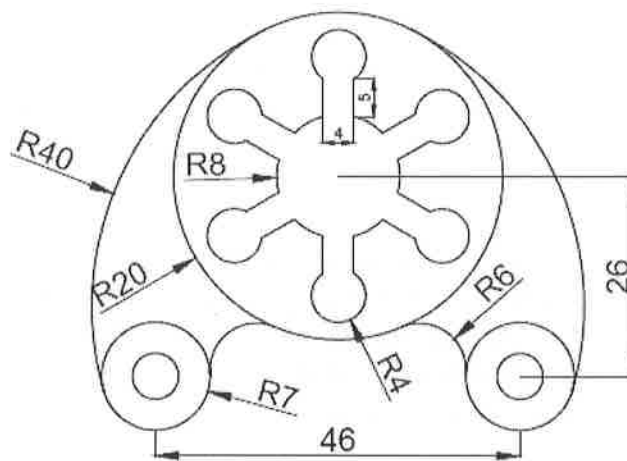
Max Marks: 60

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.1(A) Draw the below figure using Auto CAD commands

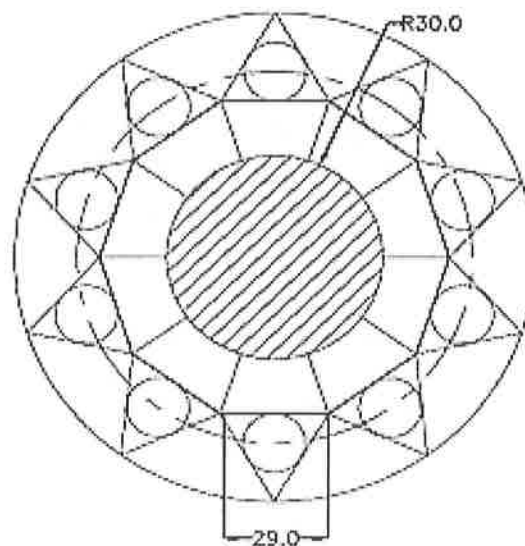
12M



OR

Q.1(B) Draw the below figure using Auto CAD commands

12M



- Q.2(A) Draw the projections of the following points on the same ground line xy ; keeping the distance between the projectors is 50mm, Name the quadrants in which they lie. 12M
- Point A, in the V.P. and 15mm above the H.P.
 - Point B, 15mm below the H.P. and 10mm behind the V.P.
 - Point C, 10mm above the H.P. and 15mm behind the V.P.
 - Point D, 15mm below the H.P. and 10mm in front of the V.P.

OR

- Q.2(B) The mid point of a straight line AB is 70mm above HP and 50mm in front of VP. The line measures 80mm long and inclined at an angle of 30° to the HP & 45° to the VP. Draw its projections. 12M

- Q.3(A) A square ABCD of 50mm side has its corner A in the H.P. its diagonal AC is inclined at 30° to the H.P and the diagonal BD inclined at 45° to the VP and parallel to H.P. Draw its projections. 12M

OR

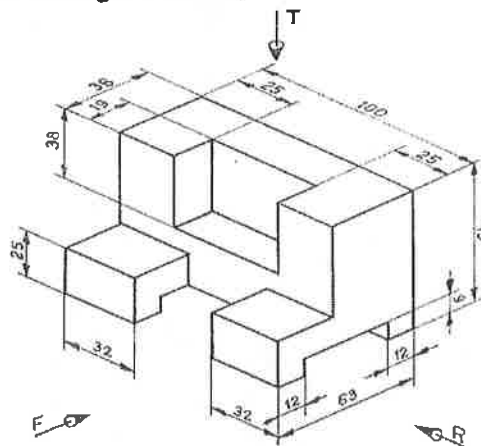
- Q.3(B) A Cylinder of base diameter 50mm and axis 70mm has a generator in V.P and inclined at 45° to H.P. Draw its projections. 12M

- Q.4(A) A cylinder of base diameter 40 mm and height 80 mm rests on its base on HP. It is cut by section plane perpendicular to VP and inclined at 45° to HP and passing through the axis at a distance 40 mm from base. Draw the front view and sectional top view and true shape. 12M

OR

- Q.4(B) A square prism of base side 30mm and height 80mm resting on H.P. with its base and one of its sides is 35° with the V.P. A plane cuts the prism, which is perpendicular V.P. and 40° to H.P. and passing through axis 40mm above the base. Draw the development the lower portion of the solid. 12M

- Q.5(A) Draw the three views for the figure shown. 12M



OR

- Q.5(B) A vertical square prism, base 50mm side and height 90mm has a face inclined at 30° to the VP. It is completely penetrated by another square prism, base 40mm side and 100mm long, faces of which are equally inclined to the VP. The axes of the two prisms are parallel to the VP and bisect each other at right angles. Draw the projections showing lines of the inter section. 12M

*** END***

Hall Ticket No:

Question Paper Code: 18ME11T01

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
 (UGC-AUTONOMOUS)
B.Tech I Year II Semester (R18) Regular End Semester Examinations –JUNE 2019
ENGINEERING GRAPHICS
 (Common to All)

Time: 3Hrs

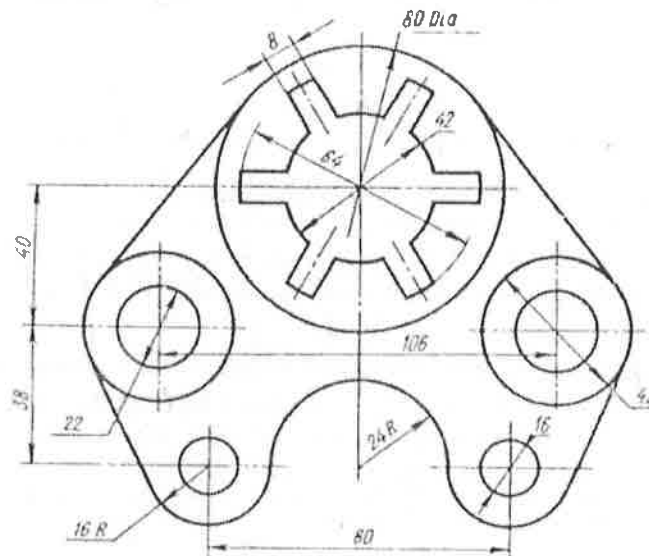
Max Marks: 60

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.1(A) Draw the below figure using Auto CAD commands

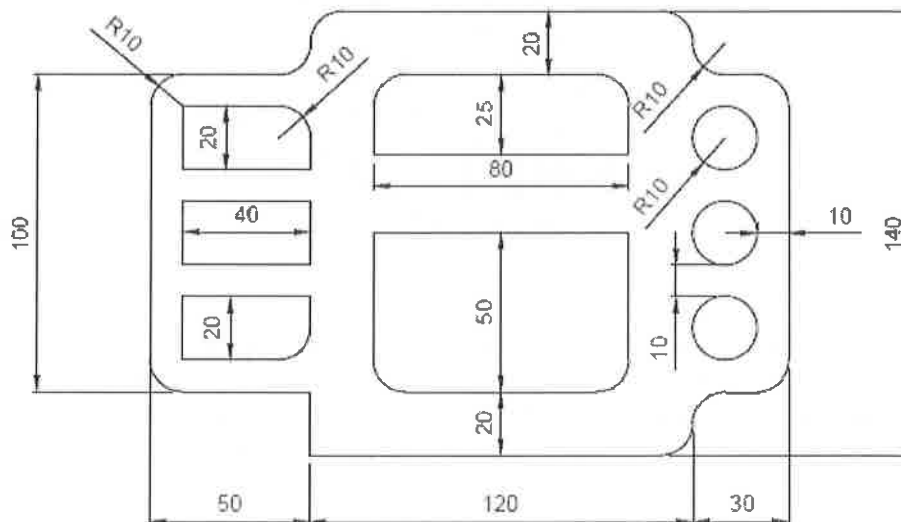
12M



OR

Q.1(B) Draw the below figure using Auto CAD commands

12M



- Q.2(A) i. A point 15mm above xy line is the plan view (top) of two points P and Q. The elevation of P is 25mm above the H.P while that of the point Q is 20mm below the H.P. Draw the projections of the points and state their positions and quadrants. 6M
 ii. A point H is 50mm below H.P, 40mm behind V.P and 30mm in front of P.P. Draw front view, top view and left side view of the point. 6M

OR

- Q.2(B) Draw the projections of a 75mm long line in the following positions 12M
 i. Inclined at 30° to H.P, its one end 20mm above H.P, parallel to and 30mm in front of V.P
 ii. Inclined at 60° to V.P, its one end 15mm in front of V.P. Parallel to and 25mm above H.P

- Q.3(A) A rectangular plate of negligible thickness having 150mm length and 100mm width is resting on one of its smaller side on HP. The surface makes an inclination of 30° to HP and smaller side makes an inclination of 60° to VP. Draw the projection of the plate. 12M

OR

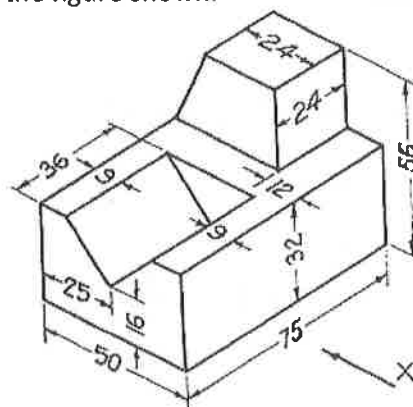
- Q.3(B) A Hexagonal pyramid of base side 30mm and axis 60mm has an edge of its base on the ground. Its axis is inclined at 30° to the ground and parallel to V.P. Draw its projections. 12M

- Q.4(A) A pentagonal prism, 30 mm base side & 50 mm axis is standing on Hp on it's base whose one side is perpendicular to Vp. It is cut by a section plane 45° inclined to Hp, through mid point of axis. Draw Front view, top view and sectional side view. 12M

OR

- Q.4(B) A pentagonal prism of base side 30mm and height 70 mm resting on its base on H.P with the rectangular face parallel to V.P. It is cut by a section plane inclined at 45 degrees to the H.P and passing though the mid point of the axis. Draw the development of the lateral surface of the truncated prism. 12M

- Q.5(A) Draw the three views for the figure shown. 12M



OR

- Q.5(B) A square prism of base side on 40 mm and axis length 60 mm is resting on H.P. on one of its bases, with a base side inclined at 45° to V.P. It is interpenetrated by another square prism having base edge 40mm and height 80mm, whose axis is parallel to HP and perpendicular to VP and its all faces are making equal inclination to HP. Draw the profile of interpenetration. 12M

*** END**

Hall Ticket No:

--	--	--	--	--	--	--	--	--	--

Question Paper Code: 18ME11T01

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)

B.Tech I Year II Semester (R18) Regular End Semester Examinations –JUNE 2019

ENGINEERING GRAPHICS

(Common to All)

Time: 3Hrs

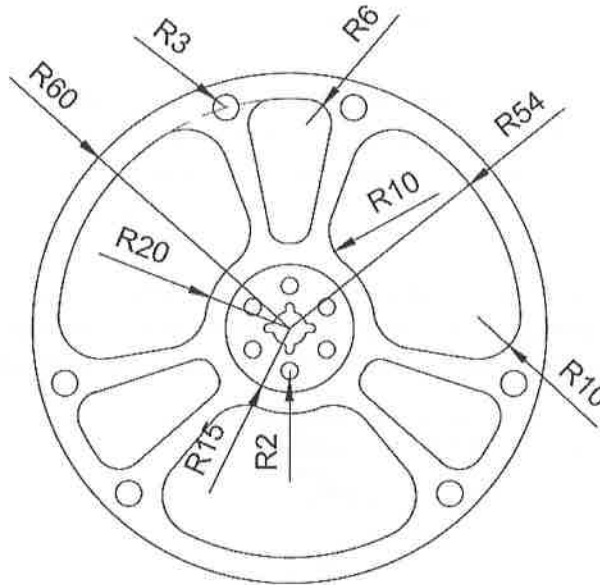
Max Marks: 60

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.1(A) Draw the below figure using Auto CAD commands

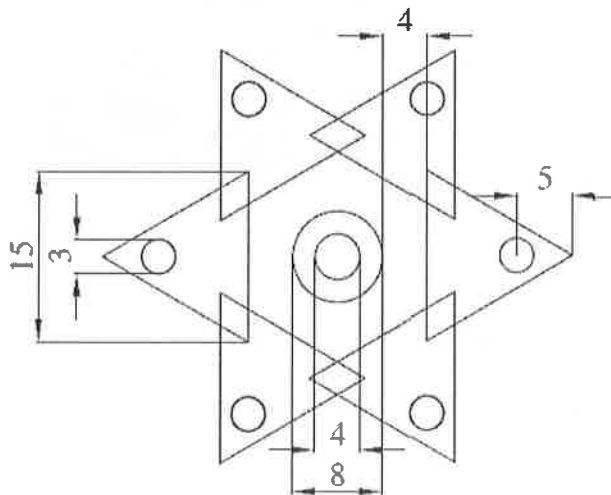
12M



OR

Q.1(B) Draw the below figure using Auto CAD commands

12M



- Q.2(A) i. Two points C and D are in the H.P. The point C is 15mm in front of V.P and D is behind the V.P. the distance between their projectors is 40mm and line joining their top views makes an angle of 40° with xy. Find the distance of the point C from V.P.
 ii. A point M is 40mm above H.P, 50mm in front of V.P and 30mm in front of P.P. Draw front view, top view and left side view of the point.

OR

- Q.2(B) A long line AB of 100mm length is inclined at an angle of 45° to the H.P and 35° to V.P. One end point of the line is 40 mm above HP and 30mm in front of the VP. Draw its projections and find its appaarent inclinations with HP and VP.

- Q.3(A) Draw the projections of a circular plane of 60mm diameter resting in the H.P and a point A on the circumference. Its plane is inclined at 45° to the HP and the top view of the diameter AB making an angle of 40° with the VP.

OR

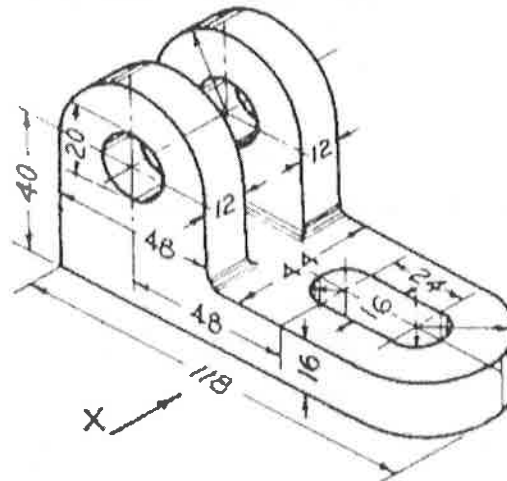
- Q.3(B) A pentagonal pyramid of base side 30mm and axis 60mm has an edge of base parallel to H.P. Its axis is parallel to V.P and inclined at 45° to H.P. Draw its projections when the apex lies in the H.P.

- Q.4(A) A Hexagonal prism of base side 30 mm and axis length 60 mm is resting on H.P. on one of its rectangular faces, with its axis perpendicular to V.P. It is cut by a plane inclined at 40° to V.P. and perpendicular to H.P. and passing through a point 25 mm from rear base of the prism. Draw its top view and sectional front view of solid.

OR

- Q.4(B) A Hexagonal prism of base side 40mm and axis height 70 mm resting on its base on H.P with the rectangular face parallel to V.P. It is cut by a section plane inclined at 50° to the HP and bisecting the axis. Draw the development of the lateral surface of the truncated prism.

- Q.5(A) Draw the three views for the figure shown.



OR

- Q.5(B) A Vertical cylinder of 60mm diameter is completely penetrated by another cylinder of 40mm diameter, their axes bisecting each other at right angles. Draw their projections showing curves of penetration, assuming the axis of penetrating cylinder to be parallel to the V.P.

*** END***

Hall Ticket No:

--	--	--	--	--	--	--	--	--	--

Question Paper Code: 18ME101

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)

B.Tech I Year I Semester (R18) Supplementary End Semester Examinations –JUNE 2019

Engineering Graphics

(Common to All)

Time: 3Hrs

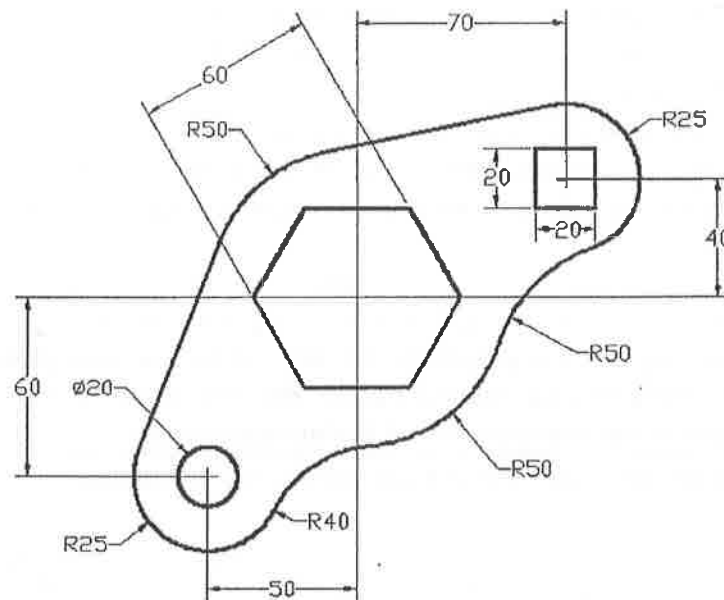
Max Marks: 60

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.1(A) Draw the below figure using Auto CAD commands

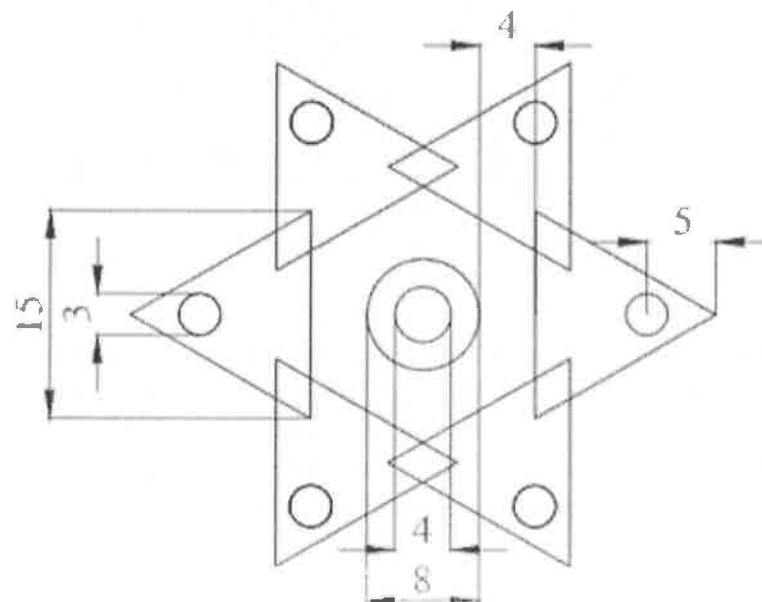
12M



OR

Q.1(B) Draw the below figure using Auto CAD commands

12M



- Q.2(A) Draw the projections of the following points on the same reference line xy, and keeping the distance between the projectors is 50mm apart. 12M
 E – 30mm above HP and Point on VP
 F – 60mm below HP and 40mm in front of VP
 G – On HP and 80mm behind VP

OR

- Q.2(B) i. A. 100mm long line is parallel to and 40mm above H.P. Its two ends are 25mm and 50mm in front of V.P. Draw its projections and find its inclination with V.P. 6M
 ii. The Top view of a 75mm long line measures 55mm. The line is in V.P its one end being 25mm above H.P. Draw its projections. 6M

- Q.3(A) An equilateral triangle plate of negligible thickness having 40mm edge length is resting on one of its side on HP. The surface makes an inclination of 30° to HP and resting side makes an inclination of 60° to VP. Draw the projection of the plate. 12M

OR

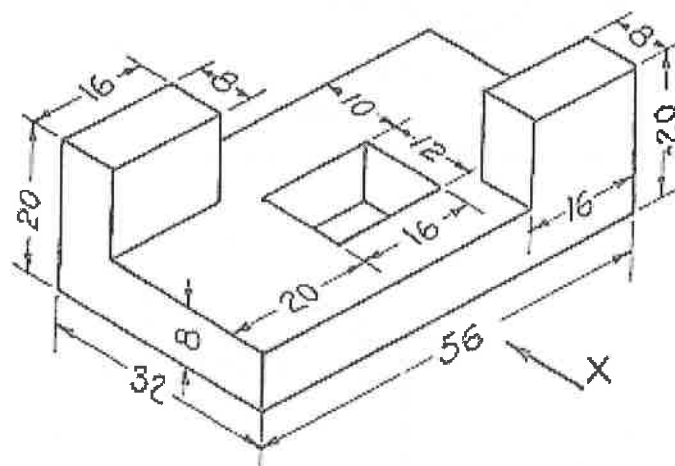
- Q.3(B) A Pentagonal Prism of base edge 50 mm and axis 90mm long is resting with its base corner on HP. The axis of the solid is inclined at 40° to the H.P and parallel to the VP. Draw its projections.. 12M

- Q.4(A) A cylinder of base diameter 40 mm and height 80 mm rests on its base on HP. It is cut by section plane perpendicular to VP and inclined at 45° to HP and passing through the axis at a distance 40 mm from base. Draw the front view and sectional top view. 12M

OR

- Q.4(B) A pentagonal prism of base side 30mm and height 70 mm resting on its base on H.P with the rectangular face parallel to V.P. It is cut by a section plane inclined at 45 degrees to the H.P and passing through the mid point of the axis. Draw the development of the lateral surface of the truncated prism. 12M

- Q.5(A) Draw the front view, top view and side view of the below figure. 12M



OR

- Q.5(B) A Vertical square prism base 50mm side, is completely penetrated by a horizontal square prism, base 35mm side, so that their axes intersect. The axis of the horizontal prism is parallel to the V.P., while the faces of the two prisms are equally inclined to the V.P. Draw the projections of the solids, showing lines of intersection. (Assume suitable lengths for the prisms) 12M

*** END***

--	--	--	--	--	--	--	--	--	--

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS)

B.Tech I Year I Semester (R18) Supplementary End Semester Examinations – JUNE 2019

ENGINEERING CALCULUS

(Common to CE, ME, ECE, CSE, CS&IT, CST)

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 Part-A or B only

- Q.1
- Evaluate $\int_0^2 e^x dx$ 1M
 - Evaluate $\Gamma(5/2)$ 1M
 - State Lagrange's theorem 1M
 - Evaluate $\lim_{x \rightarrow 0} \frac{e^x - 1}{x}$ 1M
 - Examine the sequence for convergence $a_n = 2^n$ 1M
 - Write the formula for half range sine series for the function $f(x)$ in $(0, l)$ 1M
 - Find the first order partial derivatives $\frac{\partial f}{\partial x}, \frac{\partial f}{\partial y}$ of $f = ax^2 + 2hxy + by^2$ 1M
 - When the function $f(x, y)$ is minimum 1M
 - Evaluate $\int_0^1 \int_0^x dy dx$ 1M
 - State Stokes's theorem 1M

Q.2(A) Graph the curve of the cardioid $r = a(1 + \cos \theta)$. 10M

OR

Q.2(B) State and Prove the relation between Beta and Gamma relation 10M

Q.3(A) Prove that (if $0 < a < b < 1$), $\frac{b-a}{1+b^2} < \tan^{-1} b - \tan^{-1} a < \frac{b-a}{1+a^2}$ and hence show that 10M

$$\frac{\pi}{4} + \frac{3}{25} < \tan^{-1} \left(\frac{4}{3} \right) < \frac{\pi}{4} + \frac{1}{6}$$

OR

Q.3(B) i. Evaluate $\lim_{x \rightarrow 0} \frac{xe^x - \log(1+x)}{x^2}$ 5M

ii. Show that $\sin x (1 + \cos x)$ is a maximum when $x = \pi/3$ 5M

Q.4(A) Discuss the convergence of the series i) $\sum_{n=1}^{\infty} (-1)^{n+1} \frac{1}{n^2}$ ii) $\sum_{n=1}^{\infty} \frac{2n+1}{(n+1)^2}$ 10M

OR

Q.4(B) Obtain the Fourier series for $f(x) = x^2$ in $-\pi \leq x \leq \pi$. 10M

Q.5(A) $\frac{\partial w}{\partial u}$ and $\frac{\partial w}{\partial v}$, if $w = xy + yz + zx$, $x = u + v$, $y = u - v$, $z = uv$ at (1,2) 10M

OR

Q.5(B) Find the local extreme values of function $f(x, y) = x^3 - y^3 - 2xy + 6$ 10M

Q.6(A) i. Evaluate $\int_0^{\infty} \int_0^{\infty} e^{-(x^2+y^2)} dx dy$ by using polar coordinates. 5M

ii. Evaluate $\int_1^e \int_1^{\log y} \int_1^{e^x} \log z dz dy dx$ 5M

OR

Q.6(B) Use divergence theorem to evaluate $F = x^3 i + y^3 j + z^3 k$ taken over the cube bounded by $x=0, x=a, y=0, y=a, z=0, z=a$. 10M

*** END***

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)

B.Tech I Year I Semester (R18) Supplementary End Semester Examinations –JUNE 2019
CALCULUS AND DIFFERENTIAL EQUATIONS

(EEE)

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.1
- i. Write Taylor's series expansion of $f(x)$ about $x = a$ 1M
 - ii. Find the length of the arc of the curve $y = x^{3/2}$ from $x = 0$ to $x = 4/3$. 1M
 - iii. Find the greatest value of the directional derivative of $f = x^2 y^3 z^4$ at $(1, 1, -1)$ 1M
 - iv. Find $\lim_{\substack{x \rightarrow \infty \\ y \rightarrow 2}} \frac{xy + 1}{x^2 + 2y^2}$ 1M
 - v. Find the limits of the integration $\iint (x^2 + y^2) dx dy$ over the domain bounded by $y^2 = x$ and $y = x^2$ 1M
 - vi. If $\vec{f} = (x + 3y)\vec{i} + (y - 2z)\vec{j} + (x + pz)\vec{k}$ is solenoidal, find p . 1M
 - vii. Write the general solution of exact differential equation. 1M
 - viii. Find PI (particular integral) of $(D^2 + 9)y = \cos 3x$. 1M
 - ix. State comparison test for convergence. 1M
 - x. Examine the sequence for convergence $a_n = 3 + (-1)^n$ 1M
-
- Q.2(A) Show that $\log(1 + e^x) = \log 2 + \frac{x}{2} + \frac{x^2}{8} - \frac{x^4}{192} + \dots$ 10M
- OR
- Q.2(B) Sketch the graph of the cycloid $x = a(t - \sin t)$, $y = a(1 - \cos t)$. 10M
-
- Q.3(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
- OR
- Q.3(B) Investigate the maxima and minima, if, any of the function $f(x, y) = \sin x + \sin y + \sin(x + y)$. 10M
-
- Q.4(A) Calculate $\iint_R f(x, y) dA$ for $f(x, y) = 100 - 6x^2 y$ and $R: 0 \leq x \leq 2$ and $-1 \leq y \leq 1$ 10M
- OR
- Q.4(B) Verify Divergence theorem for $\vec{F} = x^2\vec{i} + y^2\vec{j} + z^2\vec{k}$ over the surface S of the solid cut off by the plane $x + y + z = a$ in the first octant. 10M

Q.5(A) Solve $\frac{dy}{dx} - 2xy = 6xe^{x^2}$. 10M

OR

Q.5(B) Find the complete solution of $y'' + 4y' + 20y = 23\sin t$, $y(0) = 0, y'(0) = -1$. 10M

Q.6(A) (i) Form the partial differential equations by eliminating the arbitrary constants from $z = \log\left[\frac{b(y-1)}{1-x}\right]$. 5M

(ii) Form the partial differential equations by eliminating the arbitrary functions from $z = yf(x) + xg(y)$ 5M

OR

Q.6(B) Show that p -series $\sum_{n=1}^{\infty} \frac{1}{n^p} = \frac{1}{1^p} + \frac{1}{2^p} + \frac{1}{3^p} + \dots + \frac{1}{n^p} + \dots$ (p a real constant) 10M
converges if $p > 1$, and diverges if $p \leq 1$

*** END***