MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)
B.Tech III Year I Semester (R14) Supplementary End Semester Examinations – MAR 2021
CONCRETE TECHNOLOGY
(Civil 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 Part-A or B only

Q.1	i.	Define Workability.		1 M
	ii.	What do you mean by segregation and bleeding ?		1 M
	iii.	Define creep of concrete.		1 M
	iv	Difference between compression and tension test of concrete		1 M
	v.	What do you mean by target strength of concrete?		1 M
	vi	Define W/C ratio.		1 M
	vii.	What do you mean by modulus of elasticity of concrete?		1 M
	viii	Define bleeding of concrete.		1 M
	ix.	Write a short note on F.R.C		1 M
	x.	What do you mean by soundness of cement?		1 M

Q.2(A)	What are different types of admixtures and explain them in details?	10 M
	OR	
Q.2(B)	Define initial and final setting time of cement and explain its procedure.	10 M
Q.3(A)	Explain in detail slump test to check the workability of the concrete.	10 M
	OR	
Q.3(B)	What do you mean by curing of concrete? Explain the methods of curing of concrete.	10 M
Q.4(A)	Explain in detail about compression test of the concrete.	10 M
	OR	
Q.4(B)	Explain in detail about factors affecting the shrinkage of concrete	10 M
Q.5(A)	Design a M 35 grade concrete using IS method of design. Assume that the cement used is OPC, Specific gravity of fine aggregate, coarse aggregate, water and cement are 2.82, 2.65 and 2.93 respectively. Assume density of water to be 1000 kg/m3. The m.s.a of aggregate is 20 mm and the aggregate is rounded , Zone III. Slump required is 175 mm. Water absorption of coarse and fine aggregate is 0.86 % and 1.25 % for Saturated surface dry conditions. Minimum cement content and maximum water content from durability point of view are 300 kg/m^3 and 0.5.	10 M
	OR	
Q.5(B)	Explain mix design of concrete by IS Code method (IS 10262:2019)	10 M
Q.6(A)	What do you mean by light weight concrete and mention its advantages?	10 M
	OR	
Q.6(B)	What are different types of fiber in fiber reinforced concrete and mention their applications?	10 M

END

Hall Ticket No: ☐☐☐☐☐☐☐☐☐☐   Question Paper Code: 14CE110

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

B.Tech III Year I Semester (R14) Supplementary End Semester Examinations – March 2021

HYDROLOGY AND WATER RESOURCES ENGINEERING
(Civil 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.1			
	i.	What is Potential Evapotranspiration?	1M
	ii.	What is Pigmy meter?	1M
	iii.	What is W-index?	1M
	iv.	Why fish weight is used in current meter?	1M
	v.	What do you understand by Drawdown?	1M
	vi.	What is the difference between hydrologic and hydraulic channel routing?	1M
	vii.	What is specific retention of an aquifer?	1M
	viii.	Give one example of recording type gauge for stream flow.	1M
	ix.	What is the main advantage of double ring infiltrometer with respect to single ring infiltrometer?	1M
	x.	What do you understand by the term "initial abstraction from rainfall"?	1M

Q.2(A)	(i) Define the following: Mass curve of rainfall, Hyetograph and Rainfall Excess.	5M
	(ii) Explain Isohyet method of finding average rainfall over an area.	5M

OR

Q.2(B)	Describe different methods of recording rainfall. Draw neat sketches wherever required.	10M

Q.3(A)	(i) What do understand by the term "initial loss" from rainfall? What are the different components?	5M
	(ii) What is infiltration? What are the main factors that affect infiltration? How is the infiltration measured in the field?	5M

OR

Q.3(B)	(i) What do you understand by runoff? What are the components of Runoff? Draw a neat sketch and identify the components.	5M
	(ii) What are the main affecting parameters of Runoff?	5M

Q.4(A)	(i) What is Darcy's law?	10M
	(ii) Using suitable diagram derive the expression to estimate discharge from a confined aquifer of width B.	

OR

Q.4(B)	(i) Draw and describe various components of a hydrograph	5M
	(ii) What are the major factors affecting shape of a hydrograph? Discuss along with suitable example.	5M

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)
B.Tech III Year I Semester (R14) Supplementary End Semester Examinations – March 2021
ANALYSIS OF STRUCTURES – II
(Civil 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 Part-A or B only

Q.1	(i)	Give the mathematical expression for the degree of static indeterminacy of rigid jointed plane frames.	1M
	(ii)	Define static indeterminacy.	1M
	(iii)	What are determinate structures?	1M
	(iv)	Define carry over factor?	1M
	(v)	Classify the arches according to their shapes	1M
	(vi)	What do you mean by "support settlement"?	1M
	(vii)	What is the indeterminacy of a two-hinged arch?	1M
	(viii)	What is rib shortening?	1M
	(xi)	Differentiate between the cable and arch.	1M
	(x)	What is the advantage of an arch compared to beams when used for long spans	1M

Q.2(A)   Determine the forces in all the members of a truss shown in Figure. Take L/A as constant.   10M
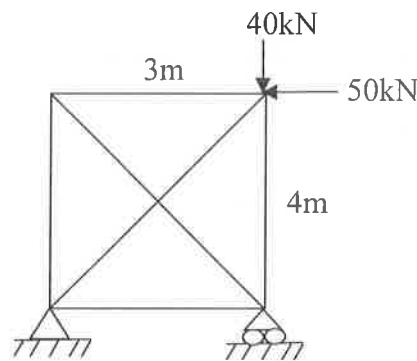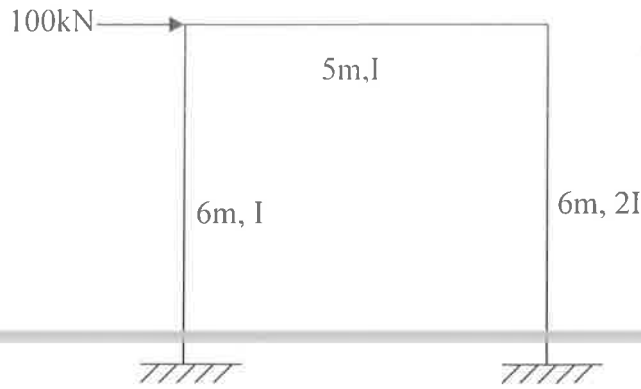

OR

Q.2(B)   Determine the forces in all the members of a truss shown in Figure. Take areas as 2000mm^2 for vertical and horizontal, and 3000mm^2 for diagonal members.   10M
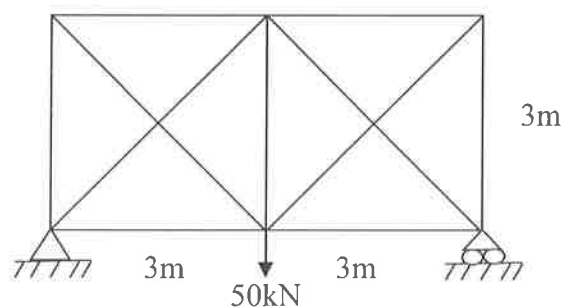
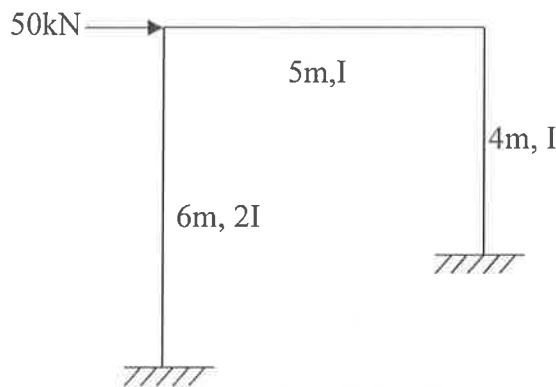**Q.3(A)** Analyse the frame shown in the figure by Moment distribution method   10M

100kN

5m,I

6m, I   6m, 2I

OR

Q.3(B) Analyse the frame shown in the figure by Kani's method   10M

50kN

5m,I

4m, I

6m, 2I

Q.4(A) Analyse the continuous beam shown in Figure by flexibility method.   10M

30kN   40kN   50kN/m

A   B   C   D

4m   1m   1.5m   1.5m   3m

OR

Q.4(B) Analyse the continuous beam shown in Figure by stiffness method   10M

50kN   40kN   30kN/m

3m   3m   1m   3m

A   B   C   D

6m, 2I   4m,I   5m, 2I
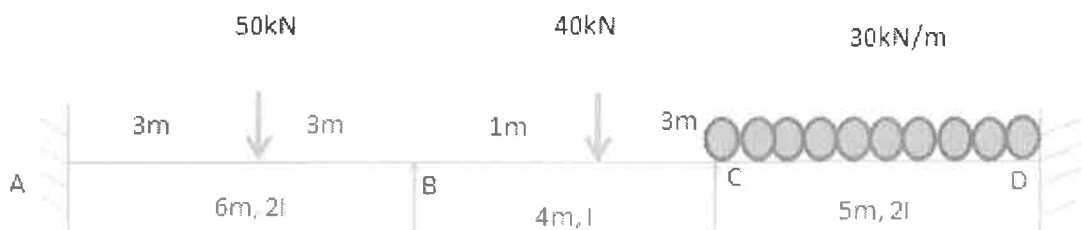
Q.5(A) A two hinged parabolic arch of span 25m and central rise 4m carries a uniformly   10M
distributed load of 30kN/m over the left half of the span. Determine the position
and value of maximum bending moment. Also find the normal thrust and radial shear
force at the section. Assume that the moment of inertia is constant
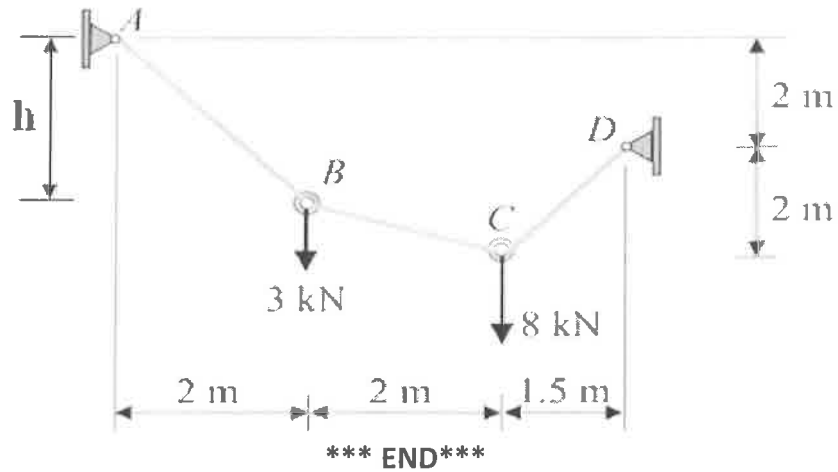
OR

Page **2** of **3**

Q.5(B) A two hinged parabolic arch of span 15m and central rise 3m has secant variation for the moment of inertia of the rib and is loaded with two concentrated loads of 25kN at a distance of 7m from right support. Find the horizontal thrust and BM at a distance of 7m from left support.   10M

Q.6(A) The equation of three hinged arch with origin at its left support is $y = x - \dfrac{x^2}{40}$. The span of the arch is 40m. Find the normal thrust and radial shear at a section 5m from the left support when the arch is carrying a UDL of 3 kN/m for the left of half span.   10M

OR

Q.6(B) Determine the tension in each segment of the cable shown in the figure below. Also, find what is the dimension h?   10M

*** END ***

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.	Identify the operators available in java?	1M
	ii.	Examine the ambiguity of instant variable and local variable?	1M
	iii.	Distinguish the use of *implements* and *extends* keywords?	1M
	iv	Evaluate full abstraction in java?	1M
	v.	Justify the need for an Exception.	1M
	vi	What is a Thread?	1M
	vii.	What is java applet?	1M
	viii.	Differentiate between paint() and repaint() method	1M
	ix.	Justify the need for JDBC?	1M
	x.	Classify the key Swing features.	1M

Q.2(A)	Propose the usage of control statement in detail with suitable example for each.	10M
	OR	
Q.2(B)	Classify any five string handling functions with suitable example.	10M
Q.3(A)	Elaborate about polymorphism and its usage with example.	10M
	OR	
Q.3(B)	Construct an interface to achieve multiple inheritances with example program.	10M
Q.4(A)	Construct a thread using Thread class and Runnable interface.	10M
	OR	
Q.4(B)	Create custom exception and distinguish between throws and throw?	10M
Q.5(A)	Demonstrate the usage of various swing components to create UI Elements for online job portal application.	10M
	OR	
Q.5(B)	Compile the life cycle of an Applet and its description with a neat flow diagram.	10M
Q.6(A)	Justify about JDBC ODBC Connectivity and its procedure.	10M
	OR	
Q.6(B)	Examine the Swing components and Justify any 5 swing components usages.	10M

END

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)
B.Tech III Year I Semester (R14) Supplementary End Semester Examinations – March 2021
SIGNALS & SYSTEMS
(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.	What is the period T of the signal x(t)=2cos(t/4)?	1M
	ii.	The signal $x(t)=e^{-2t}u(t)$ is...	1M
	iii.	Write the Fourier series formula for complex exponential form.	1M
	iv.	Find the Fourier transform of the signal $x(t)= \delta(t)$.	1M
	v.	What are the applications of FFT algorithms?	1M
	vi.	Draw the basic butterfly diagram for DIF algorithm.	1M
	vii.	Find Laplace transform of $\delta(t) + u(t)$.	1M
	viii.	State the time shifting property of Laplace transform.	1M
	ix.	What are the different methods of evaluating inverse z-transform?	1M
	x.	Find the z-transform for an impulse sequence.	1M

Q.2(A)	Check whether the system $y(n) = x(n+1)-x(n-1)$ is i) static or dynamic ii) linear or non-linear iii) causal or non-causal and iv) time variant or time invariant.	10M

OR

Q.2(B)	Explain in detail about the classification of systems.	10M
Q.3(A)	State and prove any five properties of Fourier Transform.	10M

OR

Q.3(B)	(i) Find the inverse Fourier transform of the following signal i) $\delta(\omega)$ ii) $\delta(\omega- \omega_o)$ using the above result find the Fourier transform of $x(t) =1$ or DC signal.	5M
	(ii) Write the Fourier series formula for trigonometric form.	5M
Q.4(A)	Find the DFT of a sequence $x(n) = \{1,2,3,2,1,2,3,2\}$ using DIF algorithm.	10M

OR

Q.4(B)	Find X(k) using DIT and DIF, FFT when $x(n) = \{1, 2, 3, 4\}$.	10M
Q.5(A)	Find the Laplace transform of the following: (a) Cosh at (b) Sin ωt	10M

OR

Q.5(B)	(i) Discuss in brief about analog filters.	5M
	(ii) State the initial and final value theorems of Laplace transform.	5M
Q.6(A)	State and prove any five properties of Z-transform.	10M

OR

Q.6(B)	Find impulse and step response for the system given below $y(n) - \frac{3}{4}y(n-1) + \frac{1}{8}y(n-2) = x(n)$.	10M

*** END ***

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)
B.Tech III Year I Semester (R14) Supplementary End Sem Examinations –MARCH 2021
POWER ELECTRONICS
(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.	What is the most effective method of turning on an SCR?	1M
	ii.	What is the difference between a semi convertor & fully controlled convertor?	1M
	iii.	Draw Switching Time characteristics of BJT?	1M
	iv.	Define power factor.	1M
	v.	What is meant by duty-cycle?	1M
	vi.	Explain the use of TRC for controlling the output voltage in choppers	1M
	vii.	What are the control strategies for the regulation of output voltage in ac voltage controller?	1M
	viii.	List the various PWM techniques.	1M
	ix.	What are the applications of Inverters?	1M
	x.	What is Cyclo-Converter? List some industrial applications of it.	1M

Q.2(A)   i. Write the short note for TRIAC with its characteristics.   4M
         ii. Explain the operation and characteristics for GTO.   6M
                                              OR
Q.2(B)   Explain the operation of SCR using two-transistor model and derive an expression for   10M
         anode current.

Q.3(A)   Explain the operation of a three-phase half-wave rectifier with R-load with suitable   10M
         waveforms .Derive expressions for average voltage and current of 3-phase half-wave
         rectifier.
                                              OR
Q.3(B)   Describe the working of single-phase fully controlled bridge converter in the   10M
         Rectifying mode and inversion mode. And derive the expressions for average output
         voltage and rms output voltage.

Q.4(A)   i. Explain in detail about the classification of converter.   5M
         ii. A step down chopper with an input voltage of 220 V feeds a load resistance of 10 Ω.   5M
         The chopping frequency is 1 KHz, and the voltage drop is 4V. If the duty cycle is 0.5,
         calculate the average output voltage, chopper efficiency and effective input
         resistance.
                                              OR
Q.4(B)   Describe the operation of a Boost converter and derive its output voltage equation.   10M

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

B.Tech III Year I Semester (R14) (MOOCs) Supplementary End Semester Examinations – March 2021

POWER SYSTEM ANALYSIS
(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.	Define diversity factor	1M
	ii.	Write the formula for transmission loss by B coefficient	1M
	iii.	If the spacing between the conductors of a symmetrical line is numerically equal to the self GMD of conductors, what is the inductance of the line?	1M
	iv.	The inductance of a 100 km long transmission line is 0.0004 Henry/km, and capacitance is 100 micro-farads. What is the surge impedance?	1M
	v.	Per unit impedance of a circuit element is 0.15. If the base kV and base MVA are halved, then find the new value of the per unit impedance.	1M
	vi.	What is the choice of optimal value of acceleration factor for Gauss-Siedel power flow problem.	1M
	vii.	Consider the symmetrical component complex operator $\alpha = 1\llcorner 120^0$. Then determine the value of $1+ \alpha^{25}+ \alpha^5$.	1M
	viii.	Write the relationship among positive, negative and sequence voltages of a three phase system during LLG fault.	1M
	ix.	If a generator of 100 MVA rating has an inertia constant of 10 MJ/MVA, Find its inertia constant on 200 MVA base.	1M
	x.	Write the formula for maximum power that can be transmitted in an overhead transmission line.	1M
	xi.		

Q.2(A) (i)A generating station has a maximum demand of 25MW, a load factor of 60%, plant capacity factor of 50%, and plant use factor of 72%. (a) Find the daily energy produced by the plant. (b) find the reserve capacity of the plant.   5M

(ii) A power plant has to meet the following load demand   5M
Load A: 100MW from 8 AM – 6 PM
Load B: 150MW from 6 AM – 10 AM
Load C: 50MW from 6 AM – 10 AM
Load D: 20MW from 10 AM – 6 AM
Determine diversity factor

OR

Q.2(B) Three genetating stations supply powers of P_1 = 100 MW, P_2 = 200 MW, and P_3 = 400 MW respectively into the power network. Calculate the transmission loss in the network and the value of $\partial P_L/\partial P_i$. Given that B_{11}= 0.01, B_{22}= 0.03, B_{33}= 0.04, B_{12}= 0.001, B_{23}= 0.0004 and B_{31}= -0.001.   10M

Q.3(A) Derive the expression of inductance of a three phase transmission line with symmetrical and unsymmetrical spacing.   10M

OR

Q.3(B) Derive the ABCD parameters for long transmission lines by Rigorous method   10M

Above figure shows the schematic diagram of a radial transmission system. The ratings and reactances of the various components are shown. A load of 50 MW at 0.8 p.f. lagging is taken from the 33 kV substation which is to be maintained at 30 kV. The system is three-phase. Consider 100 MVA as base MVA and 11 kV as base voltage on generator side. What is the per unit load current. Also, find the per unit voltage at the generator terminal (Vs).

OR

Q.4(B)   Explain the algorithm for Gauss-Seidel method in solving the power flow problem in   10M
detail.

Q.5(A)   In the figure shown below there are two generating stations of identical rating of   10M
13.8kV, 21 MVA and transient reactance of 30% at their own VA base. The two
transformers are also of same rating as 13.8 kV/66kV, 7MVA and reactance of 8.4% to
their own kVA base. The tie line is 50km long. The line has a reactance of 0.848
ohm/km. A three phase fault is occurred at point F which is at a distance of 20km from
transformer 1. (a) Find the equivalent reactance upto the fault (in pu). (b) Find the
fault current in A.
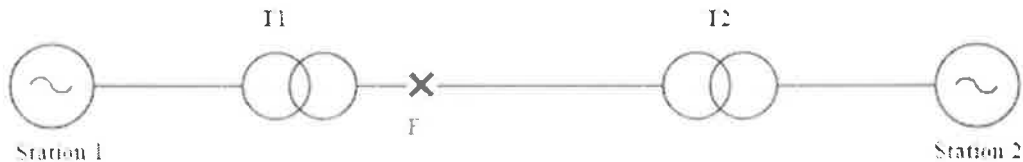
OR

Q.5(B)   A 33 kV bus bar has a 3 phase fault level of 1000 MVA. The negative and zero   10M
sequence source reactances are 2/3 and 1/3 of positive sequence reactance. The zero
sequence source resistance is 60 ohm. A 30 MVA 33kV/132 kV solidly grounded
delta/star transformer having a reactance of 0.1 pu is fed from 33 kV bus. Find fault
current at 132 kV bus for double line to ground fault. Phase sequence is a-b-c and b, c
are the faulted phases.

Q.6(A)   Derive the expression for real and reactive powers of a SMIB system.   10M

OR

Q.6(B)   A generator is delivering 0.6 of maximum power to an infinite bus through a   10M
transmission line. A fault occurs such that the reactance between the generator and
the infinite bus is increased to 3 times its pre-fault value. When the fault is cleared,
the maximum power that can be delivered is 0.8 of the original maximum value.
Determine the critical clearing angle.

*** END ***

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS)

B.Tech III Year I Semester (R14) Supplementary End Semester Examinations – Mar' 2021

(Regulations: R14)

MODERN DIGITAL COMMUNICATION TECHNIQUES

(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 Part B only

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Q.1	i.	What is the importance of Source coding?	1M
	ii.	Draw the block diagram of Digital Communication System	1M
	iii.	What is Gram Schmidt Procedure?	1M
	iv.	What is Hilbert Transform?	1M
	v.	MAP stands for _____	1M
	vi.	QPSK stands for _____	1M
	vii.	What is M-ary PAM?	1M
	viii.	ML stands for _____	1M
	ix.	Define Ideal Nyquist Pulse.	1M
	x.	Define Channel Capacity.	1M

Q.2(A)	Explain various Digital Modulation techniques with a real time example.	10M
	OR	
Q.2(B)	Explain with a neat block diagram of transmitter and receiver of wireless communication system.	10M
Q.3(A)	Write a brief note on signal space representation.	10M
	OR	
Q.3(B)	Write a brief note on representation of Band Pass Signals	10M
Q.4(A)	Derive the probability of error for M-ary PAM.	10M
	OR	
Q.4(B)	Explain in detail about correlator demodulator.	10M
Q.5(A)	Derive the probability of error for M-ary orthogonal signals	10M
	OR	
Q.5(B)	Discuss the realization of Optimum AWGN receiver for Maximum Likelihood	10M
Q.6(A)	Explain about the Signal Parameter Estimation	10M
	OR	
Q.6(B)	Explain in detail about Maximum Likelihood Estimator (MLE)	10M

*** END***

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)
B.Tech III Year I Semester (R14) Supplementary End Semester Examinations – MAR 2021
PRINCIPLES OF MANAGEMENT
(Mechanical 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.1			
	i.	What is Job Simplification?	1M
	ii.	What is Business Ethics?	1M
	iii.	Explain Strategic plan?	1M
	iv.	What is confirmation Bias?	1M
	v.	Define Job Enlargement.	1M
	vi.	What is Recruitment?	1M
	vii.	Define Leadership.	1M
	viii.	What is Esteem need?	1M
	ix.	Explain Concurrent control.	1M
	x.	What is Marketing Management?	1M

Q.2(A)	Discuss about the contemporary theories of management.	10M
	OR	
Q.2(B)	Explain about the functions of Management.	10M
Q.3(A)	What is Planning and explain the contemporary issues in planning	10M
	OR	
Q.3(B)	Elaborate the concept of Decision making process.	10M
Q.4(A)	Explain about the concept of HRM in detail.	10M
	OR	
Q.4(B)	Discuss the concept of Managing change and Innovation.	10M
Q.5(A)	Explain the contemporary theories of motivation	10M
	OR	
Q.5(B)	Discuss about the theories of Leadership in detail.	10M
Q.6(A)	Explain the concept of value chain management in detail.	10M
	OR	
Q.6(B)	Elaborate feedback control, feed forward control and concurrent control	10M

*** END***

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS)

B.Tech III Year I Semester (R14) (MOOCs) Supplementary End Semester Examinations – March 2021

SOFT SKILLS

(Mechanical 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.1(A)	Explain all listening techniques.	12M
	OR	
Q.1(B)	Explain the different body language techniques	12M
Q.2(A)	Explain the importance of team work with suitable examples.	12M
	OR	
Q.2(B)	Write a note on decision making, leadership skills, empathy, self realization?	12M
Q.3(A)	What are the different presentation skills required for a formal presentation?	12M
	OR	
Q.3(B)	Explain the objectives and skills tested in a GD	12M
Q.4(A)	Explain the tips in writing a resume	12M
	OR	
Q.4(B)	What are the different skills required in handling an interview?	12M
Q.5(A)	What are the different email etiquettes.	12M
	OR	
Q.5(B)	Explain the basic rules of electronic communication etiquettes?	12M

*** END***

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

B.Tech III Year I Semester (R14) Supplementary End Semester Examinations – MAR 2021

MACHINE DESIGN-II

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.	Differentiate between radial and thrust bearing.	1M
	ii.	Find the temperature of the bearing, if temperature of the oil film and the temperature of the outside air are 65°C and 45°C, respectively.	1M
	iii.	Discuss the advantage of helical gear as compared to spur gear.	1M
	iv	What are the factors affecting the bending strength of gear tooth?	1M
	v.	A shaft can transmit torque (T) with diameter (d). If shaft is changed with a new shaft with half diameter. Find the maximum allowable torque for new shaft.	1M
	vi	What is function of key?	1M
	vii.	What is self-locking of power screw?	1M
	viii	What are the advantages of chain drive over belt drive?	1M
	ix.	What are dry and wet cylinder liners?	1M
	x.	What are the various types of rings available in four stroke engine piston?	1M

Q.2(A) A single-row deep groove ball bearing is subjected to a radial force of 8 kN and a thrust force of 3 kN. The values of X and Y factors are 0.56 and 1.5 respectively. The shaft rotates at 1200 rpm. The diameter of the shaft is 75 mm and Bearing No. 6315 (C =112 000 N) is selected for this application.
   (i)   Estimate the life of this bearing, with 90% reliability.
   (ii)   Estimate the reliability for 20 000 h life.   10M

OR

Q.2(B) A full journal bearing of 50 mm diameter and 100 mm long has a bearing pressure of 1.4 N/mm². The speed of the journal is 900 r.p.m. and the ratio of journal diameter to the diametral clearance is 1000. The bearing is lubricated with oil whose absolute viscosity at the operating temperature of 75°C may be taken as 0.011 kg/m-s. The room temperature is 35°C. Find: The amount of artificial cooling required, and
The mass of the lubricating oil required, if the difference between the outlet and inlet temperature of the oil is 10°C.
Take specific heat of the oil as 1850 J/kg/°C and Heat dissipation coefficient equal to 280 W/m² /°C.   10M

Q.3(A) A pair of spur gears consists of a 20 teeth pinion meshing with a 120 teeth gear. The module is 4 mm. Calculate
(i) the centre distance; (ii) the pitch circle diameters of the pinion and the gear;
(iii) the addendum; (iv) dedendum; (v) the bottom clearance; (vi) gear ratio,
(vii) Clearance and (viii) tooth thickness   10M

OR

Q.3(B) A pair of parallel helical gears consists of a 20 teeth pinion meshing with a 100 teeth gear. The pinion rotates at 720 rpm. The normal pressure angle is 20°, while the helix angle is 25°. The face width is 40 mm and the normal module is 4 mm. The pinion as well as the gear is made of steel 4OC8 (Sut = 600 N/mm²) and heat treated to a surface hardness of 300 BHN. The service factor and the factor of safety are 1.5 and 2 respectively. Assume that the velocity factor accounts for the dynamic load and calculate the power transmitting capacity of gears.   10M

Q.4(A) Design a shaft to transmit power from an electric motor to a lathe head stock through a pulley by means of a belt drive. The pulley weighs 200 N and is located at 300 mm from the centre of the bearing. The diameter of the pulley is 200 mm and the maximum power transmitted is 1 kW at 125 r.p.m. The angle of lap of the belt is 180° and coefficient of friction between the belt and the pulley is 0.3. The shock and fatigue factors for bending and twisting are 1.5 and 2.0 respectively. The allowable shear stress in the shaft may be taken as 35 MPa.   10M

OR

Q.4(B) A rigid coupling is used to transmit 20 kW power at 720 rpm. There are four bolts and the pitch circle diameter of the bolts is 125 mm. The bolts are made of steel 45C8 $(S_{yt} = 380 N/mm^2)$ and the factor of safety is 3. Determine the diameter of the bolts. Assume that the bolts are finger tight in reamed and ground holes.   10M

Q.5(A) A chain drive is used in a special purpose vehicle. The vehicle is run by a 30 kW rotary engine. There is a separate mechanical drive from the engine shaft to the intermediate shaft. The driving sprocket is fixed to this intermediate shaft. The efficiency of the drive between the engine and the intermediate shafts is 90%. The driving sprocket has 17 teeth and it rotates at 300 rpm. The driven sprocket rotates at 100 rpm. Assume moderate shock conditions and select a suitable four-strand chain for this drive.   10M

OR

Q.5(B) A leather belt 9 mm × 250 mm is used to drive a cast iron pulley 900 mm in diameter at 336 r.p.m. If the active arc on the smaller pulley is 120° and the stress in tight side is 2 MPa, find the power capacity of the belt. The density of leather may be taken as 980 kg/m³, and the coefficient of friction of leather on cast iron is 0.35.   10M

Q.6(A) The following data is given for a four-stroke diesel engine: Cylinder bore = 100 mm, Length of stroke = 125 mm, Speed = 2000 rpm, Maximum gas pressure = 5 MPa, Brake mean effective pressure = 0.65 MPa, Fuel consumption = 0.25 kg per BP per h, Higher calorific value of fuel = 42 000 kJ/kg, Assume that 5% of the total heat developed in the cylinder is transmitted by the piston.   10M
The piston is made of grey cast iron and the permissible tensile stress is 37.5 N/mm² (thermal conductivity factor K = 46.6 W/m/°C). The temperature difference between the centre and edge of the piston head is 220°C.
    a) Calculate the thickness of the piston head by strength consideration.
    b) Calculate the thickness of the piston head by thermal consideration.
    c) Which criterion decides the thickness of the piston head?
    d) State whether the ribs are required. If so, calculate the number and thickness of piston ribs.
State whether a cup is required in the top of piston head. If so, calculate the radius of the cup

OR

Q.6(B) The cylinder of a four-stroke diesel engine has the following specifications: Cylinder bore = 150 mm, Maximum gas pressure = 3.5 MPa, Cylinder material = Grey cast iron FG 200 (S_{ut} = 200 N/mm²), Factor of safety = 5, Poisson's ratio = 0.25.   10M
Determine the thickness of the cylinder wall. Also, calculate the apparent and net circumferential and longitudinal stresses in the cylinder wall.

END

Hall Ticket No: ⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚   Question Paper Code: 14ME112

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

B.Tech III Year I Semester (R14) Supplementary End Semester Examinations – March 2021

HEAT TRANSFER
(Mechanical 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.1	i.	Give the mathematical expression for Newton's law of cooling?	1M
	ii.	Give the mathematical expression for critical radius of insulations for a cylinder?	1M
	iii.	Give two examples from everyday life where fins (extended surfaces) are used to enhance heat transfer.	1M
	iv.	In what medium will the lumped capacity assumption more likely to be valid: in air or in water?	1M
	v.	How is thickness of hydrodynamic boundary layer defined?	1M
	vi.	What is the condition for flat plate boundary layer flow to become turbulent?	1M
	vii.	Give the mathematical expression for Wein's displacement law.	1M
	viii.	If absorptivity and transmissivity of a body are 0.2 and 0.3 respectively, what would be its reflectivity?	1M
	ix.	Between parallel flow and counter flow type of heat exchangers, which ones have larger LMTD?	1M
	x.	What is the difference between boiling and evaporation?	1M

Q.2(A)   Derive the general heat conduction equation in Cartesian coordinate system.   10M

OR

Q.2(B)   Describe different types of boundary conditions applied to heat conduction problems. How many boundary conditions are needed to solve a second-order differential equation of heat conduction?   10M

Q.3(A)   Consider a sphere of diameter 5 cm, a cube of side length 5 cm both initially at 0°C and both made of silver (k = 429 W/m·K, ρ = 10,500 kg/m3, cp = 0.235 kJ/kg·K). Now both of these geometries are exposed to ambient air at 33°C with a heat transfer coefficient of 12 W/m2·K. Determine how long it will take for the temperature of each geometry to rise to 25°C.   10M

OR

Q.3(B)   i. Under what circumstances from the heat transfer point of view, will the use of finned walls be better?   5M

ii. Explain the significance of the fin effectiveness and fin efficiency.   5M

Q.4(A)   Explain the concept of velocity and thermal boundary layers for a flow over flat plate   10M
         using neat sketches.

                                          OR

Q.4(B)   Hot exhaust gases leaving a stationary diesel engine at 450 °C enter a 15-cm-diameter   10M
         pipe at an average velocity of 4.5 m/s. The surface temperature of the pipe is 180 °C.
         Determine the pipe length if the exhaust gases are to leave the pipe at 250 °C after
         transferring heat to water in a heat recovery unit. Use properties of air for exhaust
         gases.

Q.5(A)   i. What does the view factor represent? When is the view factor form a surface to   5M
         itself not zero?
         ii. Consider an enclosure consisting of five surfaces. How many view factors does this   5M
         geometry involve? How many of these view factors can be determined by the
         application of reciprocity and the summation rules?

                                          OR

Q.5(B)   Two very large parallel plates are maintained at uniform temperatures T_1 = 800 K and   10M
         T_2 = 500 K and have emissivities e_1 = 0.2 and e_2 = 0.7, respectively. Determine the net
         rate of radiation heat transfer between the two surfaces per unit surface area of the
         plates.

Q.6(A)   Discuss briefly the various regimes in pool boiling heat transfer.   10M

                                          OR

Q.6(B)   Water with a flow rate of 0.05kg/s enters an automobile radiator at 400K and leaves   10M
         at 330 K. The water is cooled by air in cross flow which enters at 0.75kg/s and leaves
         at 300K. If the overall heat transfer coefficient is 200W/m².K, what is the required
         heat transfer surface area?

                                     *** END***

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)
B.Tech III Year I Semester (R14) Supplementary End Semester Examinations – March 2021
SOFT SKILLS
(Common to CE, ME, CSE)

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)	Explain in detail the verbal and non verbal communication.	12M
	OR	
Q.1(B)	Explain the process of communication with a diagram.	12M
Q.2(A)	What is Team work? Explain its importance with a suitable example	12M
	OR	
Q.2(B)	What are the skills and attributes which distinguish a leader from others?	12M
Q.3(A)	Explain about mock presentations and feedback?	12M
	OR	
Q.3(B)	Explain the objectives and skills tested in a GD	12M
Q.4(A)	Detail the process involved in preparing a resume.	12M
	OR	
Q.4(B)	State the different answering techniques in an interview.	12M
Q.5(A)	Discuss in detail the types of dining etiquettes.	12M
	OR	
Q.5(B)	Explain the basic rules of electronic communication etiquettes?	12M

*** END***

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS)

B.Tech III Year I Semester (R14) Supplementary End Semester Examinations – MARCH 2021

PRODUCTION TECHNIQUES-II

(Mechanical 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 Part A or Part B only**

Q.1	i.	What do you understand by oblique cutting?	1M
	ii.	Define cutting shaping process?	1M
	iii.	How will you adjust the "Stroke length" of a shaper?	1M
	iv.	What is the use of Pit planer?	1M
	v.	List out any two methods used for measuring surface roughness.	1M
	vi.	What do you mean by optimum cutting condition?	1M
	vii.	State the disadvantages of ECM process?	1M
	viii.	Can you machine electrically non-conducting materials using EBM process?	1M
	ix.	Write on the some of the programming languages used for NC machine tools.	1M
	x.	Justify the need for NC machines.	1M

Q.2(A) The following data were recorded while turning the work piece on the lathe: Cutting speed = 25m/min, feed rate = 0.3 mm/rev, depth of cut = 2.0 mm, Tool life = 100 minutes. The tool life equation for the operation is expressed as,

$$VT^{0.12}.f^{0.7}.d^{0.3} = C$$

What will be the effect on the tool life, if the cutting speed, feed and Depth of cut are all increased by 25 % each, and also collectively.   **10M**

OR

Q.2(B) How many types of chips are formed in metal cutting? What factors are responsible for formation of these different types of chips? What is Built up edge?   **10M**

Q.3(A) Explain the principle of centerless grinding. Explain "Through feed", "Infeed", & "End feed" methods of centerless grinding. Where are they used?   **10M**

OR

Q.3(B) Draw a block diagram of a standard double housing planer, showing its main parts, and briefly describe these parts.   **10M**

Q.4(A) Derive the expression for determining the optimum cutting speed for maximum rate of production in turning operation.   **10M**

OR

Q.4(B) Bring out the significance of flank wear and crank wear.   **10M**

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

B.Tech III Year I Semester (R14) (MOOCs) Supplementary End Semester Examinations – March 2021

CONTROL ENGINEERING
(Mechanical 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.1	(i)	Write note on transfer function.	1M
	(ii)	Define Mason's gain formula.	1M
	(iii)	What are the standard test signals?	1M
	(iv)	Write note on Peak time and Settling time.	1M
	(v)	Define Gain Margin.	1M
	(vi)	Write note on Frequency domain specification.	1M
	(vii)	Write note on breakaway point and breaking point.	1M
	(viii)	What are the effects of adding poles?	1M
	(xi)	Define state model.	1M
	(x)	Write note on state transition matrix.	1M

Q.2(A) Write the differential equation governing the system for the given system and find the Force-Voltage anology.   10M
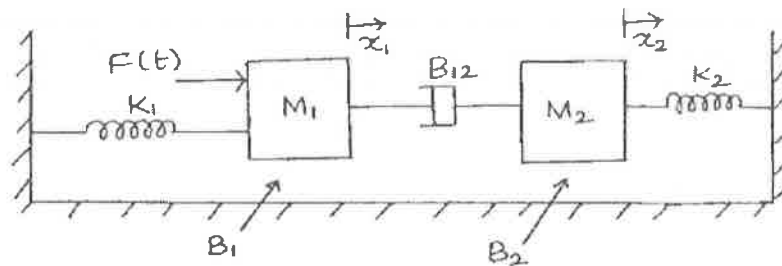
OR

Q.2(B) Convert given block diagram in to signal flow graph and find overall transfer function using Masons gain formula.   10M
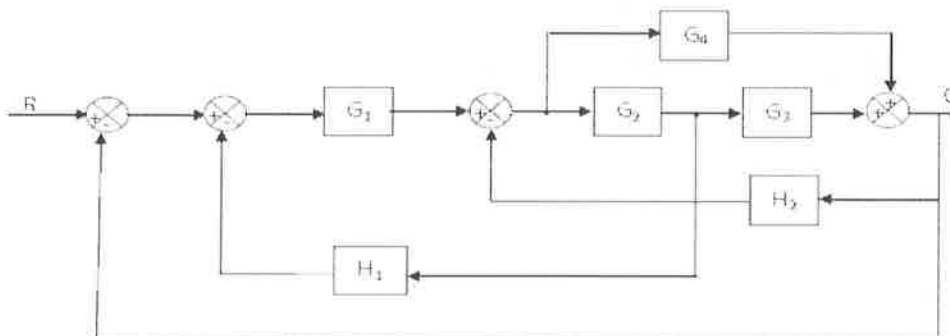
Q.3(A) Derive the expression for 2nd order under damped system with unit step as input.   10M

OR

Q.3(B) What is steady state error? Derive the expression for Static and generalized error coefficients.   10M

Q.4(A) For the given open loop system draw the Bode plot.   10M
$$G(s) = \frac{75(1 + 0.2s)}{s(s^2 + 16s + 100)}$$

OR

Q.4(B) Plot polar graph for the given system.   10M
$$G(s)H(s) = \frac{500}{s(s+6)(s+9)}$$

Q.5(A) For Routh array for the given characteristics equation and also comments on the roots.   10M
$S^6+2S^5+8S^4+12S^3+20S^2+16S+16=0$

OR

Q.5(B) Sketch root locus for different values of for the given system.   10M
$$G(s) = \frac{K}{s(s+2)(s+4)}$$

Q.6(A) The transfer function of a system is given by $\dfrac{Y(S)}{U(S)} = \dfrac{s^2+3s+2}{S^3+9s^2+26S+24}$.   10M

Determine State model

OR

Q.6(B) Obtain the state transition matrix in the form of e^{At} for the system $\dot{X} = AX$ where   10M

$A = \begin{bmatrix} 0 & 1 \\ -2 & 0 \end{bmatrix}$ and x₁(0)=1, x₂(0)=1

*** END***

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)
B.Tech III Year I Semester (R14) Supplementary End Semester Examinations – March 2021
(Regulations: R14)

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.	Can two vectors be divided?	1M
	ii.	Write the point function and its physical significance.	1M
	iii.	If $\vec{E}$ denotes the electrostatic fields, what is $\vec{\nabla} \times \vec{E}$?	1M
	iv	Give the relationship between potential gradient and electric field.	1M
	v.	Write the wave equation in a lossy, charge free medium.	1M
	vi	What is the condition for existing the magnetic scalar potential?	1M
	vii.	State in 'Biot-Savart' law	1M
	viii.	What is magnetic susceptibility?	1M
	ix.	What is permittivity?	1M
	x.	Define transformer and motional EMFs.	1M

Q.2(A) Explain the physical significance of gradient, divergence and curl. How much will be the   10M
energy conserved in the vector field rotating on (i) a circular path and (ii) helical path?

OR

Q.2(B) Describe different co-ordinate systems used to represent field vectors? Discuss about   10M
them in brief.

Q.3(A) Calculate the electric field due to the spherical charge distribution and draw the electric   10M
field profile.

OR

Q.3(B) What is dipole? Derive the expression for potential and electric field intensity due to a   10M
dipole.

Q.4(A) What is the difference in isotropic and non-isotropic dielectric media? Find the total   10M
charge on the surface and volume of the dielectric when it is kept in the influence of an
external electric field.

OR

Q.4(B) An air coaxial transmission line has a solid inner conductor of radius 'a' and very thin   10M
outer conductor of inner radius 'b'. Determine the capacitance per unit length of the
line.

Q.5(A) (i) Derive an expression for the force between two current carrying wires. Assume   10M
that the currents are in the same direction.
(ii) Define magnetic flux density.

OR

Q.5(B) a) Write the Lorentz force equation.   10M
b) A very long solenoid with 2 x 2 cm cross section has an iron core ($\mu_r = 1000$) and 4000
turns/meter. If it carries a current of 600 mA, find the energy per meter stored in its
field.

Q.6(A) State and explain the Faraday's law. Explain the transformer and motional   10M
electromotive forces.

OR

Q.6(B)   a) Define skin depth.   10M
b) Obtain the depth of penetration in copper at 2MHz, given the conductivity of copper
c 5.8 x 107 S/m and its permeability 1.26 p.H/m.

*** END***

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS)

B.Tech III Year I Semester (R14) Supplementary End Semester Examinations – March 2021
(Regulations: R14)

ANALOG ELECTRONICS

(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.	Draw the inverting amplifier circuit and name the terminals.	1M
	ii.	State the important features of an instrumentation amplifier.	1M
	iii.	What is zero crossing detector?	1M
	iv	Mention the applications of analog multipliers.	1M
	v.	Name some non sinusoidal oscillators.	1M
	vi	What is 79XX series IC?	1M
	vii.	What are the advantages of active filters over passive ones?	1M
	viii.	How are filters classified?	1M
	ix.	Define settling time of a D/A converter.	1M
	x.	Write classification of sensors.	1M

Q.2(A)	(i) Explain the following open loop configurations: (a) Inverting Amplifiers (b) Non-inverting amplifiers	5M
	(ii) Design an inverting amplifier with an input resistance of 10 KΩ and a gain of -5.	5M

OR

Q.2(B)	Discuss about isolation amplifier	10M

Q.3(A)	With the help of a neat diagram explain the working of (a) Logarithmic amplifier (b) Analog multipliers.	5M 5M

OR

Q.3(B)	Explain the sampling and hold circuit. Why it is needed?	10M

Q.4(A)	Sketch the functional schematic of 555 timer and explain how it can be used as a monostable multivibrator.	10M

OR

Q.4(B)	Discuss about PLL and mention its applications.	10M

Q.5(A)	(i) Derive the expression for the gain of a first order low pass Butterworth filter.	5M
	(ii) Design a first order high pass filter at a cut-off frequency of 400 Hz and a pass band gain of 1.	5M

OR

Q.5(B)	Explain briefly about CMOS power amplifiers and single tuned amplifier.	10M

Q.6(A)	(i) Define the terms Resolution, Linearity and Conversion time of an analog digital converter.	5M
	(ii) Describe the operation of dual slope ADC.	5M

OR

Q.6(B)	Explain evolution of sensors and MEMS briefly.	10M

*** END***

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

B.Tech III Year I Semester (R14) Supplementary End Semester Examinations – March 2021
(Regulations: R14)

COMPUTER ARCHITECTURE
(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.	Define response time of a computer.	1M
	ii.	What is MIPS instruction for bit-by-bit NOT operation?	1M
	iii.	Define server in one sentence.	1M
	iv	Does floating-point arithmetic support associativity?	1M
	v.	What is meant by branch prediction?	1M
	vi	What is Data path?	1M
	vii.	What is stall?	1M
	viii.	Write four floating-point Instructions in MIPS.	1M
	ix.	What do you mean by hardware multi-threading?	1M
	x.	Differentiate SRAM and DRAM.	1M

Q.2(A)	Explain about the CPU performance and its factors.	10M

OR

Q.2(B)	Consider a processor having four types of instruction classes, A, B, C and D, with the corresponding CPI values 1.5, 1, 2.5 and 3 respectively. The processor runs at a clock rate of 2.5 GHz. For a given program, the instruction counts for the four types of instructions are 50, 25, 15 and 10 million respectively. Calculate the MIPS rating of the processor for this program.	10M

Q.3(A)	Explain about Instruction Set Architecture (ISA) of MIPS - 32 with its architecture.	10M

OR

Q.3(B)	Explain various instruction formats and describe each of them with suitable example.	10M

Q.4(A)	Build a Datapath for branch instruction. Explain all the blocks with suitable example.	10M

OR

Q.4(B)	What do you mean by hazards and What are the pipelining hazards occurs? Describe each of them with suitable example (s).	10M

Q.5(A)	What are the types of Memory? Draw and explain about Memory Architecture in detail? Also explain about Memory hierarchy in detail?	10M

OR

Q.5(B)	How the division hardware is refined to speed up the division operation? Explain with diagrams.	10M

Q.6(A)	What is cache memory? Explain how to improve cache performance.	10M

OR

Q.6(B)	Discuss the similarities and differences between an MISD and SIMD machine. Answer this question in terms of data-level parallelism.	10M

*** END***

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

B.Tech III Year I Semester (R14) Supplementary End Semester Examinations – March 2021
(Regulations: R14)

COMMUNICATION SYSTEMS
(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.	Describe the elements of communication system	1M
	ii.	When do you call a random process a strictly stationary process?	1M
	iii.	What is the bandwidth required when amplitude modulated by several sine waves?	1M
	iv	What is the advantage of SSB over AM system?	1M
	v.	What is the meaning of threshold effect in modulated system?	1M
	vi	Define Noise figure of communication system.	1M
	vii.	What is companding technique?	1M
	viii.	What is Time Division Multiplexing?	1M
	ix.	What is information Entropy?	1M
	x.	What is the difference between source coding and channel coding?	1M

Q.2(A)	Describe External Noise in detail and how they are treated?	10M

OR

Q.2(B)	Calculate the noise equivalent bandwidth of a low pass filter and find the power spectrum with white noise at the input.	10M

Q.3(A)	(i) Compare Narrowband FM and Wideband FM systems	5M
	(ii) What are the benefits of Radio Frequency Amplifier in AM receivers?	5M

OR

Q.3(B)	(i)Describe the concept of FDM	5M
	(ii) If a FM wave is represented by the equation $e=10\ sin(8x10^8t+4\ sin\ 1500t)$. Calculate the carrier frequency, modulating frequency, m_f, maximum δ. What power will this FM wave dissipate in a 8Ω resistor?	5M

Q.4(A)	With the help of necessary circuit diagrams explain the operation of Pre-Emphasis and De-Emphasis.	10M

OR

Q.4(B)	Why do you need FM threshold reduction? How it is implemented?	10M

Q.5(A)	Describe the methods of generating pulse time modulated signals with the help of necessary waveforms.	10M

OR

Q.5(B)	Describe the method of recovery of base band signal by conversion of PDM and PPM to PAM.	10M

Q.6(A)	Describe the operation of Convolution codes	10M

OR

Q.6(B)	Describe the bandwidth efficiency of different modulation schemes.	10M

*** END***

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)
B.Tech III Year I Semester (R14) Supplementary End Semester Examinations – March 2021
(Regulations: R14)
ANALOG AND DIGITAL VLSI DESIGN
(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 mean by scaling in VLSI design?	1M
	ii.	What is advantage of using CMOS over nMOS?	1M
	iii.	How current mirror is obtained?	1M
	iv	What are the ideal characteristics of Op-Amp?	1M
	v.	List the various types of noises in analog circuits.	1M
	vi	Why it is necessary to consider issues related to cross talk in integrated circuits?	1M
	vii.	What are the requirements for design verification?	1M
	viii.	List the different test methods used for IC testing.	1M
	ix.	What are the basic constrains of memory design?	1M
	x.	What is importance of sense amplifier?	1M

Q.2(A)	Derive the expression of relationship between current and voltage of MOS transistor in saturation and non-saturated region.	10M

OR

Q.2(B)	Explain the typical VLSI design flow steps with necessary diagrams.	10M
Q.3(A)	Explain the different topologies of Operational Amplifier with respective structures.	10M

OR

Q.3(B)	Elaborate on current sourcing and current sinking in circuits.	10M
Q.4(A)	How does noise shaping improves the signal to noise ratio?	10M

OR

Q.4(B)	What is quantization noise? Explain in detail.	10M
Q.5(A)	(i) Implement a 2 input AND gate using pass transistor logic	5M
	(ii) Describe the power dissipation parameters in CMOS Inverter	5M

OR

Q.5(B)	Draw and explain the static and dynamic switching characteristics of CMOS inverter.	10M
Q.6(A)	Write a short note on Built-in self-Test.	10M

OR

Q.6(B)	Explain the memory structure of SRAM with read and write circuitry. Draw necessary timing diagrams of read and write operation.	10M

*** END***

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS)

B. Tech. III Year I Semester Supplementary End Semester Examinations – Mar' 2021

(Regulations: R14)

ANALOG COMMUNICATION (MOOC)

(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.	Which property of delta function indicates the equality between the area under the product of function with shifted impulse and the value of function located at unit impulse instant?	1M
	ii.	Which condition determines the causality of the LTI system in terms of its impulse response?	1M
	iii.	Which type of system response to its input represents the zero value of its initial condition?	1M
	iv	In Amplitude Modulation, the instantaneous values of the carrier amplitude change in accordance with the amplitude and frequency variations of the modulating signal. a)True b) False.	1M
	v.	What is the effect of distortion?	1M
	vi	What is bandwidth of narrow band FM?	1M
	vii.	Define Nyquist rate.	1M
	viii.	The ratio between the modulating signal voltage and the carrier voltage is called?	1M
	ix.	What are the disadvantages of using balanced slope detector for demodulation of FM signal?	1M
	x.	What is figure of merit in analysing performance of modulation systems with noise?	1M

Q.2(A)	Determine whether the following signals are energy signals, power signals, or neither (a) $x(t) = u(t)$ (b) $x(t) = tu(t)$	10M

OR

Q.2(B)	Determine whether or not each of the following signals is periodic. If a signal is periodic, determine its fundamental period. $$x(t) = \cos(t) + \sin(\sqrt{t})$$	10M

Q.3(A)	A modulating signal $m(t) = 10\cos(2*pi*10^3*t)$ is amplitude modulated with a carrier signal $c(t) = 50\cos(2*pi*10^5*t)$. Find the modulation index, the carrier power, and the power required for transmitting AM wave.	10M

OR

Q.3(B)	The equation of amplitude wave is given by $s(t) = 20[1 + 0.80\cos(2*pi*10^3*t)]*\cos(4*pi*10^5*t)$. Find the carrier power, the total sideband power, and the band width of AM wave.	10M

Q.4(A)	An FM wave is given by $s(t) = 20\cos(8*pi*10^6*t + 9*\sin(2*pi*10^3*t))$. Calculate the frequency deviation, bandwidth, and power of FM wave.	5M+ 5M

Q.4(B) A sinusoidal modulating waveform of amplitude 5 V and a frequency of 2 KHz is applied to FM generator, which has a frequency sensitivity of 40 Hz/volt. Calculate the frequency deviation, modulation index, and bandwidth. 5M+ 5M

Q.5(A) Prove Sampling Theorem. Explain the interpolation formula used for signal reconstruction. 10M

OR

Q.5(B) Write Short notes on the following 10M
   (i)   Natural Sampling and Flattop Sampling
   (ii)   Pulse Code Modulation

Q.6(A) Let $X \sim Uniform\left(-\dfrac{\pi}{2}, \pi\right)$ and $Y = \sin(X)$. Find $f_y(y)$ 10M

OR

Q.6(B) Consider a WSS random process X(t) with 5M+ 5M
$$R_x(\tau) = \begin{cases} 1 - |\tau|, & 0 \leq \tau \leq 1 \\ 0, & \text{otherwise} \end{cases}$$
Find the PSD of X(t) and [E(X²(t))].

END

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

B.Tech III Year I Semester (R14) Supplementary End Semester Examinations – Mar' 2021
(Regulations: R14)

BUILD A MODERN COMPUTER FROM FIRST PRINCIPLES (MOOC)
(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 Part B only

Q.1			
	i.	Define Digital system.	1M
	ii.	What is meant by bit?	1M
	iii.	Subtract $(0\ 1\ 0\ 1)_2$ from $(1\ 0\ 1\ 1)_2$	1M
	iv.	Add $(1\ 0\ 1\ 0)_2$ and $(0\ 0\ 1\ 1)_2$	1M
	v.	Define ROM?	1M
	vi.	Define booting and what are the types of booting?	1M
	vii.	What are the key features of von Neumann architecture?	1M
	viii.	What is Hack Computer?	1M
	ix.	Define Assembler.	1M
	x.	Define Variables.	1M

Q.2(A)	Briefly discuss about Boolean algebra and its representation.	10M

OR

Q.2(B)	Explain how Gate logic used as Boolean function with suitable examples in detail.	10M

Q.3(A)	Discuss in detail about how binary addition holds the key to the implementation of numerous computer operations.	10M

OR

Q.3(B)	Explain in detail about different types of Adders with suitable truth table and diagrams.	10M

Q.4(A)	Discuss in detail about how machine language is used for Memory, Processor and Register.	10M

OR

Q.4(B)	Explain in detail about Machine Language program and its significance used in CPU with an example.	10M

Q.5(A)	Explain in detail about the Von Neumann Architecture	10M

OR

Q.5(B)	Discuss in detail about Central processing unit.	10M

Q.6(A)	Write a brief note symbol resolution used in assembler.	10M

OR

Q.6(B)	Discuss in detail about Hack assembly languages with suitable examples.	10M

*** END***

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS)

B.Tech III Year I Semester (R14) Supplementary End Semester Examinations – March 2021

(Regulations: R14)

PRINCIPLES OF PROGRAMMING LANGUAGES

(CSE)

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 are the objectives of principles of programming language?	1M
	ii.	What do you mean by Syntax and Semantics?	1M
	iii.	Distinguish between overloaded subprogram and a generic subprogram.	1M
	iv	What is the purpose of Generic Methods in Java?	1M
	v.	Write any two assumptions of subprograms	1M
	vi	List the areas where symbolic logic is be used.	1M
	vii.	What is meant by synchronization? List the types present in it.	1M
	viii.	What is preposition? Explain its association with Symbolic logic.	1M
	ix.	List the characteristics of imperative languages.	1M
	x.	Define lazy evaluation.	1M
Q.2(A)		(a)Discuss any two syntax description methods.	10M
		(b)Write possible approaches for building lexical analyzer.	
		OR	
Q.2(B)		(a)Explain attribute grammars with an example.	10M
		(b)Define denotational semantics. Give simple examples.	
Q.3(A)		(a)Describe about various control flow statements used in Java.	10M
		(b)Discuss the various approaches to evaluate the expressions.	
		OR	
Q.3(B)		(a)Explain the different forms of assignment statements in imperative languages.	10M
		(b)Give a brief notes on short-circuit evaluation with an example.	
Q.4(A)		(a)Explain about genetic subprograms.	10M
		(b)Demonstrate the call by reference with an example.	
		OR	
Q.4(B)		Explain in detail about conditional execution and iteration.	10M
Q.5(A)		(a)Explain the concept of exception handling in java with an example.	10M
		(b)Write short notes about monitors.	
		OR	
Q.5(B)		Analyze the working of Java threads with an example.	10M
Q.6(A)		(a)With respect of PYTHON explain the various constructs present for data abstraction.	10M
		(b)With the help of a suitable example explain the internal representation of two LISP lists.	
		OR	
Q.6(B)		Give the fundamentals of Functional Programming Language. Give the fundamentals of LISP.	10M

*** END***

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)
B.Tech III Year I Semester (R14) Supplementary End Semester Examinations – March 2021
(Regulations: R14)
THEORY OF COMPUTATION
(CSE)

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 the minimum number of states required to accept strings that end with 10.	1M
	ii.	Difference between Kleene closure and Positive closure.	1M
	iii.	List the applications of pumping lemma.	1M
	iv	Define Regular Grammar.	1M
	v.	What is the machine format of Context-Free Grammar?	1M
	vi	Let G be a grammar: S->AB|ε,A->a, B->b. Is the given grammar in CNF(Yes/No)?	1M
	vii.	Distinguish between finite automata and PDA.	1M
	viii.	What is two stack PDA?	1M
	ix.	What is Instantaneous description of a Turing Machine?	1M
	x.	Is Halting problem decidable or undecidable problem?	1M

Q.2(A) Design a finite automaton that reads strings made up of letters in the word "APPLE" and recognize those strings that contain the word "APP" as a substring   10M

OR

Q.2(B) i) Construct a DFA equivalent to the ε-NFA given below   5M
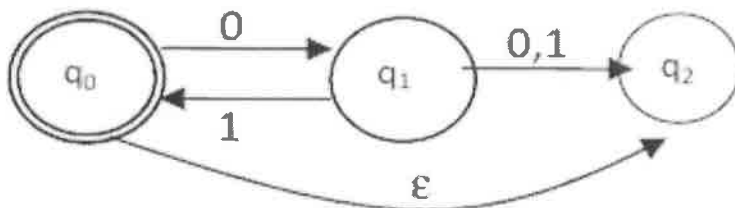
5M

ii) What is a grammar? Write in detail the Chomsky hierarchy of grammars.

Q.3(A) i) Construct a regular expression for the DFA given below. The state q1 is both the initial and final state.   5M

δ	0	1
q1	q1	q2
q2	q3	q2
q3	q1	q2

5M

ii) State pumping lemma for regular languages and prove that the language L = {ww | w ∈ {a,b}*} is not regular using pumping lemma.

OR

Q.3(B)	i)Find a regular grammar that generates the language L (aa* (ab+ a)*).	5M
	ii) Using pumping lemma, prove that L = {aibi/i> = 1} is not a regular language.	5M

Q.4(A)	Eliminate useless symbols and productions from G = (V,T,S,P), where V = {S, A, B, C} and T = {a,b}, with P consisting of	10M

$S \rightarrow aS \mid A \mid C$

$A \rightarrow a$

$B \rightarrow aa$

$C \rightarrow aCb$

OR

Q.4(B)	Convert the following grammar into GNF:	10M

$S \rightarrow AB \mid BC$

$A \rightarrow aB \mid bA \mid a$

$B \rightarrow bB \mid cC \mid b$

$C \rightarrow c$

Q.5(A)	Show that the set of all strings over {a, b} consisting of equal number of a's and b's is accepted by a deterministic PDA.	10M

OR

Q.5(B)	Construct PDA for L = { $a^i b^j c^j$/ i, j ≥ 1}. Show the moves of the PDA for the string.	10M

Q.6(A)	Design a Turing Machine "Parentheses Checker" that outputs 1 or 0 depending on whether the sequence is properly formed or not?	10M

OR

Q.6(B)	What are the modifications that can be done to the basic model of a TM? Describe any two in brief.	10M

*** END***

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
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B.Tech III Year I Semester (R14) Supplementary End Semester Examinations – March 2021
(Regulations: R14)

MICROPROCESSOR AND INTERFACING
(CSE)

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.	Convert $(EBC.14)_{16}$ to Octal.	1M
	ii.	Distinguish between Latch and flip-flop.	1M
	iii.	Note the default segment when IP is in use.	1M
	iv	What is meant by 'ASSUME' in assembler directives?	1M
	v.	List the interrupt priority of 8086 microprocessor.	1M
	vi	State the necessity of $\overline{TEST}$ pin.	1M
	vii.	Write the function of BHE pin in 8086 microprocessor?	1M
	viii.	Provide the clock frequency of 8254?	1M
	ix.	What is an emulator?	1M
	x.	Describe the importance of DMA?	1M
Q.2(A)		What is microprocessor? Discuss about the historical development of Intel Microprocessors.	10M
		OR	
Q.2(B)		(a) Describe the block diagram of 8086 based microcomputer system.	10M
		(b) Define Bus. Discuss about the various bus types.	
Q.3(A)		Discuss about the addressing modes of 8086 with relevant examples.	10M
		OR	
Q.3(B)		Describe the architecture of 8086 with neat sketches.	10M
Q.4(A)		Draw the pin diagram of 8086 in minimum and maximum mode of operations.	10M
		OR	
Q.4(B)		Define an interrupt? Discuss about various types of interrupts.	10M
Q.5(A)		Explain the A-to-D conversion process with block diagram.	10M
		OR	
Q.5(B)		Outline the keyboard interfacing mechanism by using 8086 and 8255.	10M
Q.6(A)		Write short notes on	10M
		1. Logic analyzer as debugger 2. Emulator of 8086.	
		OR	
Q.6(B)		Explain Memory-to-Memory Transfer with the 8237.	10M

*** END***

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

B.Tech III Year I Semester (R14) Supplementary End Semester Examinations – March 2021
(Regulations: R14)

OPERATING SYSTEMS
(Common to CSE, CSIT)

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 meant by special purpose systems?	1M
	ii.	List out any four operating system services.	1M
	iii.	Differentiate user threads and kernel threads.	1M
	iv	What is context switching?	1M
	v.	What is Peterson's Solution?	1M
	vi	List any two deadlock prevention activities.	1M
	vii.	Define convoy effect?	1M
	viii.	List the allocation methods of a disk space.	1M
	ix.	What is thrashing?	1M
	x.	Mention the functions of virtual file system (VFS).	1M

Q.2(A)	Describe the system components of an Operating System and explain them briefly.	10M

OR

Q.2(B)	(i) Explain how protection is provided for the hardware resources by the operating system. (ii) Explain briefly system calls with examples.	10M

Q.3(A)	Consider the following set of process with the length of the CPU burst time given in milliseconds	10M

Process	Burst Time	Priority
P1	9	3
P2	11	1
P3	3	3

The processes are assumed to have arrived in the order P1, P2, P3 all at time 0.
a. Draw the Gantt chart for FCFS and PRIORITY scheduling algorithms.
b. Calculate the average waiting time and average turnaround time for FCFS & PRIORITY scheduling algorithms.

OR

Q.3(B)	List out benefits of multithreading. Explain multithreading models.	10M

Q.4(A)	Explain the concept of semaphores in detail. Illustrate the working principle of producer-consumer problem and determine the advantages of using semaphores in producer-consumer problem.	10M

OR

Q.4(B)	Define deadlock and explain Banker`s algorithm for deadlock avoidance?	10M
Q.5(A)	Explain how paging supports virtual memory. With neat diagram explain hoe logical address is translated into physical address	10M

OR

Q.5(B)	Draw and explain the structure of the page table in detail.	10M
Q.6(A)	(i) Discuss the criteria for choosing a file organization (ii) Describe indexed file and indexed sequential file organization	10M

OR

Q.6(B)	Suppose the head of a moving- head disk with 200 tracks, numbered 0 to 199, is Currently serving a request at track 143 and has just finished a request at track 125. If the queue of requests is kept in FIFO order: 86, 147, 91, 177, 94, 150, 102, 175, 130. What is the total head movement to satisfy these requests for the following Disk scheduling algorithms? (a)FCFS (b) Random (d) SCAN (e) SSTF (f) C- SCAN	10M

*** END***

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

B.Tech III Year I Semester (R14) Supplementary End Semester Examinations – March 2021
(Regulations: R14)

THEORY OF COMPUTATION
(CSIT)

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 Transition diagram.	1M
	ii.	Define DFA	1M
	iii.	State Arden's Theorem.	1M
	iv	What is Pumping Lemma?	1M
	v.	What is meant by Right Most Derivation (RMD)?	1M
	vi	What is unit production?	1M
	vii.	Define Parsing Tee	1M
	viii	List out the applications of Push Down Automata	1M
	ix.	What is post correspondence problem?	1M
	x.	Define universal Turing machine	1M

Q.2(A)	Convert the following regular expressions to NFA with epsilon transitions i) 0*+1101 ii) (0+1)*	10M

<div align="center">OR</div>

Q.2(B)	Consider a language L* , where L={ab,cd} with Σ={a,b,c,d}. (i) write all words in L* that have six or less letters/symbols (ii) What is the shortest string in Σ * that is not in the language L* ?	10M

Q.3(A)	i. Write a R.E. for the following DFA:	5M 5M

	a	b
→ P	Q	P
ⓠ	Q	P

ii. Check whether the following languages on Σ = {a} are regular or not. L = {a^n: n ≥ 2, is a prime number}.

<div align="center">OR</div>

Q.3(B)	Convert the following DFA to RE, The state **'p'** is both the initial and final state.	10M

	0	1
p	p	q
q	q	r
r	r	r

Q.4(A)	For the following grammar give the leftmost and rightmost derivation for the string '00101'. S → A1B A → 0A / ε B → 0B / 1B / ε	10M

<div align="center">OR</div>

Q.4(B)	i) Using pumping lemma, prove that $L = \{a^i b^i c^i / i \geq 1\}$ is not a CFL.	5M
	ii) Explain pumping lemma for context free languages.	5M
Q.5(A)	Show that the set of all strings over $\{a, b\}$ consisting of equal number of a's and b's is accepted by a deterministic PDA.	10M

OR

| Q.5(B) | Explain in detail about the properties of PDA. | 10M |

| Q.6(A) | Design a T.M for copying of information from one place to the other place. Make all the necessary assumptions and discuss its functioning, | 10M |

OR

| Q.6(B) | Discuss briefly about decidability and undecidability problems. | 10M |

*** END***

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS)

B.Tech III Year I Semester (R14) Supplementary End Semester Examinations – March 2021

(Regulations: R14)

INFORMATION THEORY AND CODING

(Common to CSIT, IT)

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.	How the efficiency and redundancy are computed? Justify your answer.	1M
	ii.	What do you mean by feature and parameter extraction?	1M
	iii.	Based on what principle or theory any information is measured?	1M
	iv	State and explain Shannon Hartley theorem.	1M
	v.	Give various methods for the generation of valid codeword in information theory.	1M
	vi	Define G and H matrix.	1M
	vii.	Give the text and mathematical expression for computing the efficiency and redundancy.	1M
	viii.	Write the pros and cons of cyclic codes	1M
	ix.	Define G and H matrix in coding.	1M
	x.	What do you mean by irreversible data output and its types?	1M
Q.2(A)		Prove that the entropy for a discrete source is maximum when the output symbols are equally probable. Hence find the discrete entropy for the source with symbol probabilities {0.5, 0.3, 0.2, 0.15, 0.1}	10M

OR

Q.2(B)		A voice grade channel of the telephone network has the bandwidth of 3.4 KHz. Calculate the following:- i) Channel capacity of the telephone channel for signal to noise ration of 40dB. ii)Calculate the minimum SNR required to support information transmission through the telephone channel at the rate of 4800 bits/sec.	10M
Q.3(A)		Illustrate the mathematical formulation for the computation of Channel capacity. Also illustrate the mathematical formulation for the same when the Bandwidth is infinite.	10M

OR

Q.3(B)		Derive the mathematical formulation for the computation of Channel capacity.	10M
Q.4(A)		A source emits one of five possible symbols during each signally interval. The symbol occur with the probabilities p1 = 0.14, p2 = 0.13, p3 = 0.11, p4 = 0.15, p5 = 0.20. Find the amount of information gained by observing the source emitting each of these symbols in all possible units.	10M

OR

Q.4(B)		A BSC has the error probability p = 0.2 and the input to the channel consists of four equiprobable messages xl = 000 ; x2 = 001 ; x3 = 011 ; x4 = 111. Calculate p(0) and p(1) at the input; Efficiency of the code; and the Channel capacity.	10M
Q.5(A)		Construct a symmetric (7,4) cyclic code using the generator polynomial g(x) = x3+x+1. What are the error correcting capabilities of this code? For the received word 1101100, determine the transmitted code word.	10M

Q.5(B)	Describe the H.261 and MPEG Video in detail.	10M

| Q.6(A) | i) Explain the Convolutional codes using Trellis Diagram with an example | 10M |
| | Ii) Discuss the Hadamard and Walsh transform using an example | |

OR

Q.6(B)	Write technical notes on the following:	10M
	i)BSC and BEC	
	ii)Lampel-Ziv and Lampel-Ziv-Welch compression technique	

****END****

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
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B.Tech III Year I Semester (R14) Supplementary End Semester Examinations – March 2021
(Regulations: R14)

OBJECT ORIENTED ANALYSIS & DESIGN PATTERNS
(Common to CSIT/IT)

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.	List out the building blocks of UML?	1M
	ii.	What is the role of deployment phase?	1M
	iii.	What are the relationships used in UML?	1M
	iv	What is meant by Interaction diagram?	1M
	v.	How a node symbol is rendered in a deployment diagram?	1M
	vi	What is a State chart diagram?	1M
	vii.	Define Observer design pattern.	1M
	viii.	Define Singleton Design pattern.	1M
	ix.	What is the use of a document structure?	1M
	x.	What is the use of a document editor?	1M

| Q.2(A) | Why do we need the object oriented modelling? Explain in detail. | 10M |

OR

| Q.2(B) | Why do we need the different views in UML architecture? Explain in detail. | 10M |

| Q.3(A) | Explain about different UML diagrams in detail with suitable examples. | 10M |

OR

| Q.3(B) | Draw class diagram for library management and explain in detail. | 10M |

| Q.4(A) | Explain about Use cases and Use case diagrams in detail with an example. | 10M |

OR

| Q.4(B) | Explain about activity diagram in detail with an example. | 10M |

| Q.5(A) | What is the purpose and scope of the design pattern? Explain in detail. | 10M |

OR

| Q.5(B) | How design patterns solve redesign issues? Explain in detail. | 10M |

| Q.6(A) | How to solve the spell check problem of document editor using design patterns? Explain in detail. | 10M |

OR

| Q.6(B) | How to solve the user interface problem of document editor using design patterns? Explain in detail. | 10M |

*** END***

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS)

B.Tech III Year I Semester (R14) Supplementary End Semester Examinations – March 2021

(Regulations: R14)

COMPUTER NETWORKS

(CSIT)

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.	List various types of Network Topology?	1M
	ii.	What is polling?	1M
	iii.	Differentiate between flow control and error control.	1M
	iv	What are sub layers of data link layer?	1M
	v.	What is routing?	1M
	vi	What are data grams?	1M
	vii.	What are the functions of transport layer?	1M
	viii.	What are the advantages of using UDP over TCP?	1M
	ix.	Differentiate application programs and application protocols.	1M
	x.	Mention the function of SMTP.	1M
Q.2(A)		Explain TCP/IP reference model in detail. Give brief description about various layers.	10M
		OR	
Q.2(B)		Explain various computer networks and topologies in detail.	10M
Q.3(A)		Discuss in detail about fast and switched Ethernet.	10M
		OR	
Q.3(B)		How Controlled access can be implemented in networks. (Hint: Reservation, Polling, Token Passing). Discuss any two methods.	10M
Q.4(A)		What are various network design issues? Discuss routing architecture in detail.	10M
		OR	
Q.4(B)		Explain the Binary Exponential Back off Algorithm with necessary illustrations.	10M
Q.5(A)		Illustrate and explain UDP and its packet format in detail.	10M
		OR	
Q.5(B)		Explain the working of TCP using the state diagram.	10M
Q.6(A)		Describe how SMTP protocol is used in E-mail applications.	10M
		OR	
Q.6(B)		Explain the Server side and Client side Web page generation in detail.	10M

*** END***

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS)

B.Tech III Year I Semester (R14) Supplementary End Semester Examinations – March 2021

(Regulations: R14)

COMPUTER NETWORKS

(IT)

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 are layers in OSI model?	1M
	ii.	What do you mean by Network Topology?	1M
	iii.	Write the need of Ethernet.	1M
	iv	Where MAC layer located in the layer architecture?	1M
	v.	Write the role of network layer.	1M
	vi	Define Hub.	1M
	vii.	What is Congestion control?	1M
	viii.	What are the advantages of transport layer?	1M
	ix.	What is DNS?	1M
	x.	Define WWW.	1M

Q.2(A)	Explain in detail about OSI layer architecture with neat diagram.	10M

OR

Q.2(B)	In CRC checksum method, assume that given frame for transmission is 1101011011 and the generator polynomial is $G(x) = x^4 + x + 1$. Give the code word transmitted by the sender in bits.	10M

Q.3(A)	Illustrate the functionality of Ethernet cabling and Manchester encoding mechanism in the data link layer.	10M

OR

Q.3(B)	Explain in detail on fast & switched Ethernet	10M

Q.4(A)	Explain in detail congestion control in network layer.	10M

OR

Q.4(B)	Explain about Integrated Services and Differentiated Services for Quality of Service	10M

Q.5(A)	Draw the header format of TCP protocol and explain the fields present in the header.	10M

OR

Q.5(B)	Illustrate how Congestion Control is handled by TCP through Slow start method.	10M

Q.6(A)	How SMTP protocol is used in E-mail applications? Explain in detail	10M

OR

Q.6(B)	Discuss about the fundamentals of Electronic Mail and the architecture of Email System.	10M

*** END***

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

B. Tech. III Year I Semester (R14) Supplementary End Semester Examinations – March 2021
(Regulations: R14)

SOFTWARE TESTING
(Information Technology)

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.	The _____, who design for and is accountable to.	1M
	ii.	Define predicate.	1M
	iii.	Transaction flowgraphs are a kind of _____ graphs.	1M
	iv	A ___ is a path segment for which every node is visited at most once.	1M
	v.	How many types of domain in domain testing?	1M
	vi	What is Absorption rule in path expression?	1M
	vii.	KV stands for.	1M
	viii.	_____ a state that no input sequence can reach.	1M
	ix.	The LoadRunner component _____ create the load by running virtual users.	1M
	x.	How many types of run modes are available in WinRunner?	1M

Q.2(A)	Compare and contrast the following.	
	i. Testing versus Debugging	6 M
	ii. The builder versus the buyer	4 M

OR

Q.2(B)	i. List the control flowgraph element.	6 M
	ii. Define predicate and explain it with example.	4 M

|		
Q.3(A)	i. Define transaction. Explain births and merge in brief.	5 M
	ii. Explain sensitization in transaction flow testing.	5 M

OR

Q.3(B)	Explain Data-flow anomalies and its state graph.	10M

|		
Q.4(A)	i. Briefly explain closure and span compatibility in domain and interface testing.	4 M
	ii. What are the domain bugs? How to test one-dimensional domain bugs?	6 M

OR

Q.4(B)	Choose relevant reduction procedure for converting a flowgraph whose links are labeled with names into a path expression for the following example.	10M
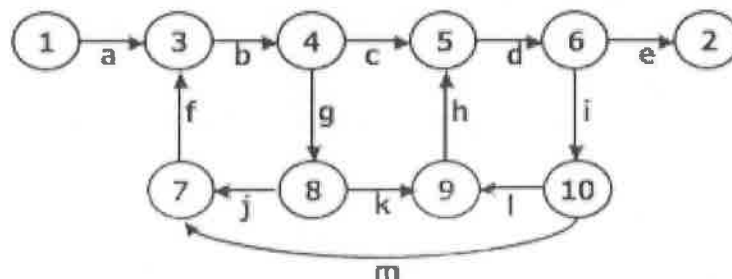
Q.5(A)   i. What are the principles of state graphs?   4 M

          ii. With suitable example explain equivalent states in state graph.   6 M

                                          OR

Q.5(B)   Write partition algorithm. Apply partition algorithm for the following arbitrary   10M
          graph.
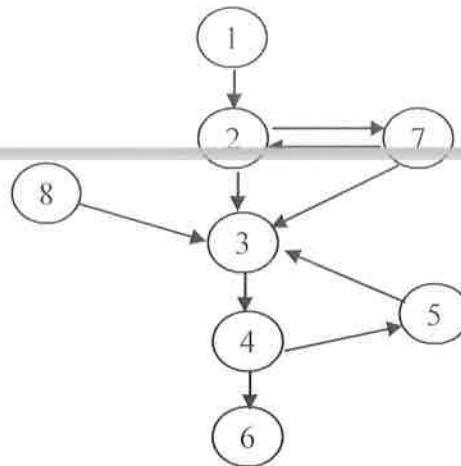
Q.6(A)   Explain taxonomy of testing tools.   10M

                                          OR

Q.6(B)   Explain Rapid test script wizard in WinRunner.   10M

                                     *** END***

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS)

B.Tech III Year I Semester (R14) Supplementary End Semester Examinations – March 2021

(Regulations: R14)

ARTIFICIAL INTELLIGENCE

(OE-I – 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.	State the applications of AI.	1M
	ii.	How heuristic search techniques can be implemented.	1M
	iii.	Define propositional logic.	1M
	iv	Define backward reasoning inference.	1M
	v.	List the differences and similarities between problem solving and planning.	1M
	vi	Define partial order planner.	1M
	vii.	What is MYCIN expert system?	1M
	viii.	What is Uncertainty measure?	1M
	ix.	Discuss components of learning system.	1M
	x.	What are the features of recurrent networks?	1M

Q.2(A)	Discuss the tic – tac – toe problem in detail and explain how it can be solved using AI techniques.	10M

OR

Q.2(B)	Explain Bounded Look-ahead strategy.	10M

Q.3(A)	Explain in detail about Natural deduction system.	10M

OR

Q.3(B)	Define Semantic network. How do you represent knowledge using semantic network and frames?	10M

Q.4(A)	With the help of an example provide discussion on conditional planning.	10M

OR

Q.4(B)	Discuss on Action Description Language (ADL) with an example.	10M

Q.5(A)	Describe about different phases in building expert systems.	10M

OR

Q.5(B)	Explain Dempster – Shafer theory.	10M

Q.6(A)	Differentiate supervised and unsupervised learning.	10M

OR

Q.6(B)	Describe about design issues of artificial neural networks.	10M

*** END***

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS)

B.Tech III Year I Semester Regular & Supplementary End Semester Examinations – March 2021

(Regulations: R14)

DIGITAL IMAGE PROCESSING

(OE-I – 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 image quantization?	1M
	ii.	Write any two applications of image processing.	1M
	iii.	What is histogram matching?	1M
	iv	Define spatial correlation.	1M
	v.	What frequency components are attenuated in order to achieve image sharpening?	1M
	vi	Write the Transfer function of Butterworth high pass filter of order n.	1M
	vii.	Write the expression for PDF of Erlang noise	1M
	viii.	Give the relation between relative data redundancy and compression ratio.	1M
	ix.	Why chain codes are used.	1M
	x.	What is pattern and pattern class?	1M
Q.2(A)		List and explain in detail the basic functional elements of an image processing systems.	10M
		OR	
Q.2(B)		Distinguish between gray scale image, binary image and digital image.	10M
Q.3(A)		i) What is meant by histogram of an image? Discuss the significance of histogram equalization.	6M
		ii) Discuss about image subtraction.	4M
		OR	
Q.3(B)		Explain histogram specification with simple example.	10M
Q.4(A)		Discuss various steps in homomorphic filtering.	10M
		OR	
Q.4(B)		Give the expression for 2-D Butterworth filter transfer function and sketch it. Explain its usefulness in image enhancement.	10M
Q.5(A)		Discuss about image restoration-degradation model in detail.	10M
		OR	
Q.5(B)		Explain the concept of dilation and erosion with your own set of image of 5x5 and with a structuring element of 2x2. Explain gray level dilation and erosion also	10M
Q.6(A)		Explain optimum global thresholding using Otsu's method.	10M
		OR	
Q.6(B)		Explain regional descriptors.	10M

END

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

B.Tech III Year I Semester (R14) Supplementary End Semester Examinations – Mar' 2021

(Regulations: R14)

MULTIMEDIA COMPUTING
(OE-I – 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.	List the terminology in Multimedia system.	1M
	ii.	Write short notes on multimedia authoring tools.	1M
	iii.	Write the file format in Multimedia system.	1M
	iv	What do you mean by Isochronous Transmission Mode?	1M
	v.	List the modes of MIDI devices.	1M
	vi	What do you mean by Bitmap image?	1M
	vii.	What do you mean by RTP and RTCP?	1M
	viii.	Define the centralized architecture for sharing application.	1M
	ix.	What do you mean by clock offset in distributed environment?	1M
	x.	Define the specification layer in synchronization reference model.	1M

Q.2(A) List and explain the various properties of Multimedia systems.   10M

OR

Q.2(B) Explain the classification of media with respect to various criteria.   10M

Q.3(A) Define the terms digital audio & MIDI. List the differences between digital audio & MIDI.   10M

OR

Q.3(B) List and explain the components of Speech Recognition System.   10M

Q.4(A) i) Explain about run-length coding.
ii) Explain about dictionary based coding.   10M

OR

Q.4(B) Explain in detail about Huffman Encoding with example. Write stages of JPEG image compression. Illustrate.   10M

Q.5(A) Illustrate the Transport Subsystem.   10M

OR

Q.5(B) Explain in detail about various video compression techniques.   10M

Q.6(A) Draw and explain reference model of multimedia synchronization.   10M

OR

Q.6(B) i) List and explain synchronization specifications.
ii) Write various multimedia applications.   10M

*** END***

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)
B.Tech III Year I Semester (R14) Supplementary End Semester Examinations – March 2021
PROFESSIONAL ETHICS
(OE-I: Common to CE, EEE, ME, ECE, CSE, CSIT, IT)

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.	Morality	1M
	ii.	Culture	1M
	iii.	Efficiency	1M
	iv.	Advertising	1M
	v.	Stakeholders	1M
	vi.	Discrimination	1M
	vii.	Glass ceiling	1M
	viii.	Deontological theory	1M
	ix.	Occupational Health	1M
	x.	Philanthropy	1M

Q.2(A)	What is meant by whistle-blowing? Mention few examples	10M

OR

Q.2(B)	Define "Code of Ethics". How does it help Organizational progress?	10M

Q.3(A)	Who is a whistleblower? Discuss any whistle blowing case/s.	10M

OR

Q.3(B)	Discuss gender equality? Also explain work life balance and ethics?	10M

Q.4(A)	Explain the role of Engineers in promoting ethical climate.	10M

OR

Q.4(B)	Define Corporate Social Responsibility (CSR). Discuss in what ways CSR can help contribute to the society and sustainable initiatives.	10M

Q.5(A)	Explain the role of ethics in field of engineering education.	10M

OR

Q.5(B)	Give an analysis of 'Kohlberg's theory'.	10M

Q.6(A)	ꓵ the issues of cyber security. Discuss cybercrimes that you have come across in the recent past.	10M

OR

Q.6(B)	Explain the issues related to computer ethics an interest with your personal experience.	10M

*** END***

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS)

B.Tech III Year I Semester (R14) Supplementary End Semester Examinations – March 2021

POWER PLANT ENGINEERING

(OE-I: Common to CE, EEE, ECE, CSE, CSIT, IT)

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.	Why is it not possible to realize Carnot cycle practically?	1M
	ii.	Define the thermal efficiency of a simple Rankine cycle.	1M
	iii.	What is the use of penstock in hydroelectric power plant?	1M
	iv	What is the purpose of a fusible plug in a boiler?	1M
	v.	Define draught in a boiler.	1M
	vi	What is the use of moderator in nuclear power plant?	1M
	vii.	Distinguish between four stroke and two stroke engine.	1M
	viii.	List out different types of non- conventional power generations.	1M
	ix.	What is the use of collector in solar power plant?	1M
	x.	What is the difference between closed and open cycle gas turbine plant?	1M

Q.2(A)	Draw a neat sketch of a thermal power plant indicating all the major components and also explain the working of the same.	10M
	OR	
Q.2(B)	Discuss methods of increasing thermal plant efficiency by increasing Boiler pressure, reducing condenser pressure and superheating of steam. Indicate the effects on T-S diagram	10M
Q.3(A)	Draw a neat sketch and explain the working principle of Babcock and Wilcox boiler?	10M
	OR	
Q.3(B)	i. How do you classify steam boilers? Briefly describe each of the classification	5M
	ii. Explain the use of any 5 various mountings/accessories used in a steam boiler	5M
Q.4(A)	Explain the need for a condenser in a power plant and explain the working of any one condenser with a neat sketch	10M
	OR	
Q.4(B)	Explain the working of Pressurized water reactor with a neat sketch	10M
Q.5(A)	Explain with a neat sketch the working principle of diesel power plant	10M
	OR	
Q.5(B)	Describe the working of an open cycle MHD system with a neat sketch.	10M
Q.6(A)	The peak load on a power plant is 60 MW. The loads having maximum demands of 30 MW, 20MW, 10 MW and 14MW are connected to the power plant. The capacity of the power plant is 80MWand the annual load factor is 0.50. Estimate a) the average load on the power plant b) the energy supplied per year c) the demand factor d) the diversity factor	10M
	OR	
Q.6(B)	i. Describe the main considerations in selecting a site for wind power generators.	5M
	ii. Describe the working of a wind energy system and its main components with a neat sketch	5M

END

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

B.Tech III Year I Semester (R14) Supplementary End Semester Examinations – March 2021

INTRODUCTION TO NANOSCIENCE AND TECHNOLOGY
(OE-I: Common to CE, EEE, ME, ECE, CSE, CSIT, IT)

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.	How many hexagons and pentagons are there in C_{60} fullerene?	1 M
	ii.	Name any one demerit of Bohr's atomic model	1 M
	iii.	Say true or false: In a cubic crystal system, a = b = c?	1 M
	iv	Give any one example for point defects.	1 M
	v.	A strong reducing agent favors the formation of smaller NPs, true or false.	1 M
	vi	Fill in the blanks: In liquid exfoliation method, _____ solvent is used, in general.	1 M
	vii.	Write the formula for phase rule.	1 M
	viii.	Which characterization technique is used to study the surface of a nanomaterial?	1 M
	ix.	Nanomaterials are used in manufacturing the sports devices, true or false.	1 M
	x.	Name any one application of nanomaterial in the medicinal field.	1 M

Q.2(A)	Discuss the history and the emergence of the nano.	10 M
	OR	
Q.2(B)	(i) Calculate the wavelength (in nm) corresponds to the transition of an electron in a hydrogen atom from n = 3 to n = 1?	7 M
	(ii) List out the applications of graphene.	3 M
Q.3(A)	(i) Plot the planes with following miller indices (i) (101) and (ii) (210)	6 M
	(ii) How many atoms are there in the following unit cell structures. BCC and FCC	4 M
	OR	
Q.3(B)	Discuss the types of defects in crystals.	10 M
Q.4(A)	Define Chemical Vapor Deposition process and explain how it is useful on preparing Carbon Nano Tubes along with the growth mechanism?	10 M
	OR	
Q.4(B)	(i) Discuss any one method for the preparation of core-shell nanoparticle.	5 M
	(ii) Explain the atomic layer deposition method with a neat diagram	5 M
Q.5(A)	Define Gibb's Phase rule and Explain the phase diagram of a binary system with a neat diagram.	10 M
	OR	
Q.5(B)	(i) Explain the working principle of Atomic Force Microscope (AFM) with a neat diagram	5 M
	(ii) Write a short note on the electrical properties of nanomaterials.	5 M
Q.6(A)	(i) Write a short note on NEMS and MEMS	5 M
	(ii) Discuss the role of nanomaterials on water purification	5 M
	OR	
Q.6(B)	Elaborately discuss the medicinal applications of nanomaterials	10 M

END

Hall Ticket No:

Question Paper Code: 14MAT401

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)
B.Tech III Year I Semester (R14) Supplementary End Semester Examinations – March 2021
NUMERICAL ANALYSIS
(OE-I: Common to CE, EEE, ME, ECE, CSE, CSIT, IT)

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. Explain the examples for algebraic and transcendental equations.	1M
	ii. Illustrate the Newton's method iterative formula.	1M
	iii. Find the 1- and ∞- norms of the vector $(1.25, -7.7, 5.5, -3.2)$	1M
	iv. Explain the diagonally dominate property.	1M
	v. Express the first divided difference function formula between unevenly spaced x_0 and x_1.	1M
	vi. Find the number of sub intervals when $f(x) = e^x$ with $[1.4, 7.4]$ with $h = 0.5$	1M
	vii. Define the second order Runge-Kutta method formula.	1M
	viii. Define a two point boundary value problem and state any two methods of solving it.	1M
	ix. When the general second order linear partial differential equation is said to parabolic.	1M
	x. Define Poisson equation.	1M

Q.2(A)	Use bisection method to find a root of $f(x) = 2\sin x - \dfrac{e^x}{4} - 1$ starting from -5 and -3	10M

OR

Q.2(B)	Determine a root of $f(x) = xe^x - 1$ by method of false position method.	10M

Q.3(A)	Solve the tridiagonal system $4x_1 - x_2 = 100$, $-x_1 + 4x_2 - x_3 = 200$, $-x_2 + 4x_3 - x_4 = 200$, $-x_3 + 4x_4 = 200$.	10M

OR

Q.3(B)	Solve the system of simultaneous algebraic linear equations $10x_1 + 2x_2 + x_3 = 9$; $2x_1 + 20x_2 - 2x_3 = -44$; $-2x_1 + 3x_2 + 10x_3 = 22$ by Gauss Seidol method.	10M

Q.4(A)	Find $y(2)$ from the following data using Lagrange's formula	10M

x	0	1	3	4	5
y	0	1	81	256	625

OR

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

B.Tech III Year I Semester (R14) Supplementary End Semester Examinations – March 2021

RURAL WATER SUPPLY AND SANITATION
(OE-I: Common to EE, ME, ECE, CSE, CSIT, IT)

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 Rural water supply.	1M
	ii.	Define polluted water.	1M
	iii.	What do you mean by communicable diseases?	1M
	iv	Define wholesome water.	1M
	v.	How is chlorine applied in water?	1M
	vi	Define runoff.	1M
	vii.	Define wholesome water.	1M
	viii.	How is chlorine applied in water?	1M
	ix.	Define wastewater.	1M
	x.	Define composting.	1M

Q.2(A) What are the factors to be considered in planning of Water Supply Scheme in Rural areas?   10M

OR

Q.2(B) What do you understand by per capita demand? List and explain factors affecting the water demand.   10M

Q.3(A) Forecast the population by means of incremental increase method   10M

Year	Population
1940	8000
1950	12000
1960	17000
1970	22500

Calculate the probable population in the year 1980, 1990 and 2000.

OR

Q.3(B) List the desirable and permissible drinking water standards as per IS-10500 and discuss the effects of parameters if they exceed the limit.   10M

Q.4(A) What are the advantages and disadvantages of centrifugal pumps and reciprocating pumps?   10 M

OR

Q.4(B) Define sedimentation. Types of sedimentation. Explain any one process with neat sketch.   10M

Q.5(A) Explain slow sand filter with neat sketch.   10M

OR

Q.5(B) Explain different methods used for refuse collection in rural community.   10M

Q.6(A) Describe the following methods of disposal with advantages and disadvantages i) Dumping ii) Incineration   10M

OR

Q.6(B) With neat sketch explain soak pit.   10M

END

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)
B.Tech III Year I Semester (R14) Supplementary End Semester Examinations – March 2021
GREEN BUILDINGS & ENERGY CONSERVATION
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 Part B only. Q.no 6 which is a case study is compulsory.

Q.1			
	i.	List out the Climate zones in India.	1M
	ii.	What is building orientation? List out factors affecting building orientation.	1M
	iii.	What is Building envelope?	1M
	iv.	What is Trombe wall?	1M
	v.	Define thermal conductance.	1M
	vi.	What is Water Sustainability?	1M
	vii.	What are Solar tiles?	1M
	viii.	List out the techniques associated with the `Green Building'.	1M
	ix.	Define TERI.	1M
	x.	Mention any 2 green buildings in Hot & Dry type of climate in India.	1M

Q.2(A)   What is Sun path diagram? What are the factors affecting Sun Path diagram? Explain   10M

OR

Q.2(B)   Explain the principles of building planning in detail.   10M

Q.3(A)   What is Active solar architecture & Passive solar architecture? Explain   10M

OR

Q.3(B)   What are the various steps involved in Site Planning with respect to Climate   10M
Responsive Architecture? Explain

Q.4(A)   Discuss about the basic principles of effective daylight design.   10M

OR

Q.4(B)   Explain water management techniques in buildings in detail.   10M

Q.5(A)   List out the techniques for roof and wall construction in a green building. Explain.   10M

OR

Q.5(B)   List out a few green building materials. Discuss any six green material's properties.   10M

Q.6(A)   What are the economic, social and environmental factors to be considered at the time   10M
of Green Building construction? Explain

OR

Q.6(B)   Explain Green Building concept in INDIA and government agencies for implementing   10M
green building concept.

*** END***

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)
B.Tech III Year I Semester (R14) (MOOCs) Supplementary End Semester Examinations – March 2021
NUMERICAL ANALYSIS
(Common to ME, CSE)

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.   Form the difference table for the following table   1M

x	1	2	3	4	5
$y = f(x)$	2	-0.5	0	0.5	2

       ii. Write the Newton's Forward difference formula   1M
       iii. Define Simpson's 3/8 rule.   1M
       iv. Find n, if [a,b]=[1,4] and h=0.1   1M
       v.   Illustrate Euler's method $y(0.1)$ for $y' = y$ with condition $y(0)=1$ and $h = 0.05$ 1M
       vi. Define second order Runge-Kutta formula.   1M
       vii. Define algebraic and transcendental equations.   1M
       viii. Illustrate the formula for Regula-falsi method   1M
       ix. Find the eigenvalues of the matrix $A = \begin{bmatrix} 1 & 0 \\ 3 & 2 \end{bmatrix}$ 1M
       x.   Define a diagonal matrix   1M

Q.2(A) Obtain $f(4)$ from the following data using Lagrange's interpolation formula   10M

x	0	2	3	6
$f(x)$	-4	2	14	158

OR

Q.2(B) Consider the following data   10M

x	0	1	2	3	4	5
$f(x)$	6.9897	7.4036	7.7815	8.1291	8.4510	8.7506

       Find the first and second order derivatives at $x=1$ and $x=6$

Q.3(A) Use the data in the table to find the integral between $x=1.0$ and $x=1.8$ using the   10M
        trapezoidal rule with (a) $h = 0.1$ (b) $h = 0.2$

x	1.0	1.1	1.2	1.3	1.4	1.5	1.6
$f(x)$	1.543	1.669	1.811	1.971	2.151	2.352	2.577

OR

Q.3(B) Evaluate $\int_{0.2}^{2.6} e^{-x} dx$ by four term Gaussian formula   10M