

**MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE**

(UGC-AUTONOMOUS)

B.Tech III Year I Semester (R14) Regular &amp; Supplementary End Semester Examinations – Nov 2018

**PROFESSIONAL ETHICS**

(Common to ALL)

Time: 3Hrs

Max Marks: 60

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

Q.1	i) Role of moral theories	1M
	ii) Women and family issues	1M
	iii) Ethical codes	1M
	iv) Corporate social responsibility	1M
	v) Business Ethics	1M
	vi) Discrimination in the workplace	1M
	vii) Ethical codes	1M
	viii) Values for Engineers	1M
	ix) Impacts of Computerization	1M
	x) Employer- Employee relation	1M
<hr/>		
Q.2(I)	Define the unique status and issues of Professional Ethics.	10M
	OR	
Q.2(II)	Discuss a few issues of women in Professional career.	10M
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Q.3(I)	Explain the nature and value of Business Ethics.	10M
	OR	
Q.3(II)	Discuss the relevance of ethical practices in the modern world.	10M
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Q.4(I)	Discuss the need of ethics in the educational system.	10M
	OR	
Q.4(II)	Discuss the values of ethical approach by Management in corporate world.	10M
<hr/>		
Q.5(I)	Write in detail about the rise of ethics in Engineering.	10M
	OR	
Q.5(II)	What are the responsibilities of Engineers during experimentation?	10M
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Q.6(I)	Discuss the moral responsibility of engineers towards safety and risk	10M
	OR	
Q.6(II)	Discuss the safety problems while using internet. Explain your view with an example.	10M

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## MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS)

B.Tech III Year I Semester (R14) Regular & Supplementary End Semester Examinations – Nov / Dec 2018

### POWER PLANT ENGINEERING

(Open Elective 1 – Common to ALL)

Time: 3Hrs

Max Marks: 60

Attempt all the questions. All parts of the question must be answered in one place only.

All parts of Q.no 1 are compulsory. In Q.no 2 to 6 answer either A or B only

- |   |  |
|---|--|
| Q.1   | <ul style="list-style-type: none"> <li>i. Draw the T-S diagram of a simple Rankine cycle <span style="float: right;">1M</span></li> <li>ii. What is the purpose of moderator in a Nuclear reactor <span style="float: right;">1M</span></li> <li>iii. What is the purpose of a blow-off cock in a boiler <span style="float: right;">1M</span></li> <li>iv. Define water tube boiler <span style="float: right;">1M</span></li> <li>v. Why do we need lubrication inside a diesel engine power plant <span style="float: right;">1M</span></li> <li>vi. Define the purpose of control rods inside a nuclear reactor <span style="float: right;">1M</span></li> <li>vii. Write one difference between Impulse Turbine and Reaction Turbine <span style="float: right;">1M</span></li> <li>viii. What is the objective of the IC engine cooling system? <span style="float: right;">1M</span></li> <li>ix. What is the use of collector in solar power plant? <span style="float: right;">1M</span></li> <li>x. Define peak load and base load? <span style="float: right;">1M</span></li> </ul> |
| 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. <span style="float: right;">10M</span> |  |
| OR  |  |
| Q.2(B) With the help of a schematic and T-S diagram explain how Rankine cycle efficiency can be improved using reheating <span style="float: right;">10M</span>         |  |
| Q.3(A) Explain with a neat diagram, the main parts, working, advantages, and disadvantages of a Babcock or Wilcox Boiler. <span style="float: right;">10M</span>        |  |
| OR  |  |
| Q.3(B) Explain with a neat sketch, the working of a Cochran boiler. Mention its advantages and disadvantages. <span style="float: right;">10M</span>                    |  |
| Q.4(A) Draw a neat layout and explain the working of a hydro-electric power plant <span style="float: right;">10M</span>  |  |
| OR  |  |
| Q.4(B) Explain with a neat sketch the working of liquid metal fast breeder water reactor <span style="float: right;">10M</span>   |  |
| Q.5(A) Discuss with a neat sketch the effect of regeneration in a gas turbine power plant <span style="float: right;">10M</span>  |  |
| OR  |  |
| Q.5(B) Explain with a neat sketch the working principle of diesel power plant <span style="float: right;">10M</span>  |  |
| Q.6(A) Explain briefly about (1) wind power technology 2) solar power technology <span style="float: right;">10M</span>   |  |
| OR  |  |
| Q.6(B) Explain briefly the working principle involved in a) geothermal energy b) ocean thermal energy conversion. <span style="float: right;">10M</span>                |  |

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## MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS)

B. Tech III Year I Semester (R14) Regular & Supplementary End Semester Examinations – Nov / Dec 2018

### NUMERICAL ANALYSIS

(Open Elective 1 – Common to ALL)

Time: 3Hrs

Max Marks: 60

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

- Q.1
- i. Where the root of the equation  $x + x^2 = 1$  lies ? 1M
  - ii. Write the Regular –Falsi formula for finding real root. 1M
  - iii. Give the condition for Gauss-Seidel iteration method. 1M
  - iv. Power method is used for computing \_\_\_\_\_. 1M
  - v. Simpson's 1/3 rule is applicable for \_\_\_\_\_ number of intervals. 1M
  - vi. Write the formula for interpolation of the polynomial with  $x$ - values unevenly spaced. 1M
  - vii. Evaluate  $y(0.1)$  by Euler's method when  $\frac{dy}{dx} = -2x - y$ ,  $y(0) = -1$  1M
  - viii. Define initial value and boundary value problems 1M
  - ix. Write different types of partial differential equations. 1M
  - x. The below partial differential equation is classified as 1M
- $$5 \frac{\partial^2 z}{\partial x^2} + 6 \frac{\partial^2 z}{\partial y^2} = xy$$

- Q.2(A) Determine the root of the equation  $f(x) = \cos x - xe^x = 0$  using secant method. 10M

OR

- Q.2(B) Compute a root of the equation  $e^x = x^2$  to an accuracy of  $10^{-5}$  using Newton's method. 10M

- Q.3(A) Determine the largest Eigenvalue and corresponding vector of the matrix 10M
- $$\begin{bmatrix} 2 & -1 & 0 \\ -1 & 2 & -1 \\ 0 & -1 & 2 \end{bmatrix}$$

OR

- Q.3(B) Use LU-Decomposition method to solve the following system: 10M
- $$\begin{bmatrix} 5 & -2 & 1 \\ 7 & 1 & -5 \\ 3 & 7 & 4 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 4 \\ 8 \\ 10 \end{bmatrix}$$

- Q.4(A) Evaluate the integral  $\int_4^{5.2} \log_e x \, dx$  using 10M

- a) Simpson's  $\frac{1}{3}$  rule      b) Simpson's  $\frac{3}{8}$  rule      c) Trapezoidal rule .

OR

Q.4(B) The distance covered by an athlete for the 50 metre race is given in the following table: 10M

Time (sec.)	0	1	2	3	4	5	6
Distance(metre)	0	2.5	8.5	15.5	24.5	36.5	50

Determine the speed of athlete at t=5 secs. Correct to five decimals.

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Q.5(A) Employ Taylor's method to obtain approximate value of y at x=0.2 for the differential equation,  $\frac{dy}{dx} = 2y + 3e^x$  given  $y(0) = 0$  with step size h=0.1. 10M

OR

Q.5(B) Use fourth order Runge-Kutta method to solve  $\frac{dy}{dx} = \frac{2yx + e^x}{x^2 + xe^x}$ ,  $y(1) = 0$  at  $x = 1.2, 1.4$ . 10M

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Q.6(A) Solve the heat equation problem  $\frac{\partial u}{\partial t} = \frac{\partial^2 u}{\partial x^2}$  subject to the conditions  $u(x, 0) = 0$  and  $u(0, t) = 0; u(1, t) = t$ , find the value of  $u\left(\frac{1}{2}, \frac{1}{8}\right)$  by crank-Nicolson scheme taking  $h = 0.25$  and  $l = 0.125$  10M

OR

Q.6(B) Solve the equation  $u_{tt} = u_{xx}$  subject to the following conditions  $u(0, t) = 0$ ,  $u(1, t) = 0$ ,  $t > 0$  and  $\frac{\partial u}{\partial t}(x, 0) = 0$ ,  $u(x, 0) = \sin^3(\pi x)$ ,  $0 \leq x \leq 1$  with  $h = 0.25$  and  $l = 0.2$ . 10M

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**MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE**

(UGC-AUTONOMOUS)

B.Tech III Year I Semester (R14) Regular &amp; Supplementary End Semester Examinations – Nov / Dec 2018

**RURAL WATER SUPPLY AND SANITATION**

(Open Elective1 – Common to ALL)

Time: 3Hrs

Max Marks: 60

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

- Q.1
- i. Explain communicable diseases. 1M
  - ii. Define wells. 1M
  - iii. Define wholesome water. 1M
  - iv. Define disinfection of water 1M
  - v. List the main objectives of water supply scheme 1M
  - vi. Define polluted water. 1M
  - vii. Define infiltration gallery 1M
  - viii. Discuss the purpose of coagulation 1M
  - ix. Define the term pre-chlorination. 1M
  - x. Define incineration. 1M

- Q.2(A) List out the factors to be considered in planning of Water Supply Scheme in Rural areas 10M

OR

- Q.2(B) Define Intake and Types of Intake. With neat sketch explain any two types of Intake. 10M

- Q.3(A) Assuming geometric rate of growth of population of a town, calculate with the help of the following censuses records of the population of the town in 2031 10M

Year	1991	2001	2011
Population (in thousands)	250	500	720

OR

- Q.3(B) List the desirable and permissible drinking water standards IS-10500. 10M

- Q.4(A) List out the advantage and disadvantage of centrifugal pumps and reciprocating pumps. 10M

OR

- Q.4(B) Explain with flow diagram conventional water treatment plant. 10M

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

OR

- Q.5(B) Explain the following i) Plain chlorination ii) Breakpoint chlorination iii) Super chlorination iv) Pre-chlorination v) De-chlorination 10M

- Q.6(A) Explain with neat sketch biogas plant in detail. 10M

OR

- Q.6(B) Explain the septic tank with neat sketch. Also highlight the advantages and disadvantages 10M

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# MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS)

B.Tech III Year I Semester (R14) Regular &amp; Supplementary End Semester Examinations – Nov / Dec 2018

## GREEN BUILDING & ENERGY CONSERVATION

(Open Elective 1 – Common to ALL)

Time: 3Hrs

Max Marks: 60

Attempt all the questions. All parts of the question must be answered in one place only.

All parts of Q.no 1 are compulsory. In Q.no 2 to 6 answer either A or B only

- |        |   |     |
|--------|---|-----|
| Q.1    | i. How to make Green building?  | 1M  |
|        | ii. Sun path diagram – Define.  | 1M  |
|        | iii. What do you mean by aspect?  | 1M  |
|        | iv. Comment on S/V ratio?   | 1M  |
|        | v. Differentiate between grey water and black water.  | 1M  |
|        | vi. Define thermal conductance.   | 1M  |
|        | vii. What is ventilation?   | 1M  |
|        | viii. What factors are to be considered for energy efficiency in various materials?   | 1M  |
|        | ix. Write a note on Solar tiles.  | 1M  |
|        | x. Abbreviate LEED.   | 1M  |
| Q.2(A) | Compare and contrast traditional and vernacular architecture with examples.   | 10M |
|        | <b>OR</b>   |     |
| Q.2(B) | Appraise building orientation. Explain elements of sustainable building design.   | 10M |
| Q.3(A) | What is Climate Responsive Architecture? Explain Steps in Climate Responsive Architecture in detail.                                      | 10M |
|        | <b>OR</b>   |     |
| Q.3(B) | Write short notes on i) Passive solar architecture, ii) Design of fenestration and roof in the process of climate responsive architecture | 10M |
| Q.4(A) | Improving water sustainability can be achieved by adopting Reduce, Reuse and Recycle technology. Explain.                                 | 10M |
|        | <b>OR</b>   |     |
| Q.4(B) | Discuss the basic principles of effective daylight design.  | 10M |
| Q.5(A) | List at least five Green building materials and explain their properties in detail.   | 10M |
|        | <b>OR</b>   |     |
| Q.5(B) | Write short notes on i) Emerging new materials used in green buildings, ii) Techniques used for wall and foundation construction          | 10M |
| Q.6(A) | Elaborate the significance of operation and maintenance in a green building.  | 10M |
|        | <b>OR</b>   |     |
| Q.6(B) | Explain the parameters and processes on which Green building is rated by GRIHA.   | 10M |

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Hall Ticket No:

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Question Paper Code: 14CSU402

## MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS)

B.Tech III Year I Semester (R14) Regular & Supplementary End Semester Examinations – Dec 2018

(Regulations: R14)

### ARTIFICIAL INTELLIGENCE

(Open Elective – Common to CE, EEE, ME, 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 is Knowledge Representation (KR)?                                      | 1M |
|     | ii.   | State the fundamental goal of KR.   | 1M |
|     | iii.  | Give short note on Entailment.  | 1M |
|     | iv.   | List the differences and similarities between problem solving and planning. | 1M |
|     | v.    | What is ontological engineering?  | 1M |
|     | vi.   | List any four property that KR system should possess.                       | 1M |
|     | vii.  | How is uncertainty knowledge represented? Give an example.                  | 1M |
|     | viii. | List any two advantage of knowledge represented as logic.                   | 1M |
|     | ix.   | Define atomic event.  | 1M |
|     | x.    | State any one application where procedural knowledge is used.               | 1M |

- Q.2(A) Explain the following uninformed search strategies with examples.
- |     |                       |    |
|-----|-----------------------|----|
| i.  | Breadth First Search. | 5M |
| ii. | Uniform Cost Search.  | 5M |

OR

- Q.2(B) Draw a semantic network representing the following knowledge:
- |     |  |    |
|-----|--|----|
| i.  | Every vehicle is a physical object. Every car is a vehicle. Every car has four wheels. Electrical system is a part of car. Battery is a part of electrical system. Pollution system is a part of every vehicle. Vehicle is used in transportation. Swift is a car. | 5M |
| ii. | Every living thing needs oxygen to live. Every human is a living thing. Jay is human. Answer the query Jay is a living thing and needs oxygen to live using inheritance.   | 5M |

- Q.3(A) Perform the following:
- |     |   |    |
|-----|---|----|
| i.  | Use the truth tables method to determine whether $(p \Rightarrow q) \vee (p \Rightarrow \neg q)$ is valid.    | 5M |
| ii. | Let $\alpha = p \wedge \neg q \Rightarrow p \wedge q$ and $KB = \neg p$ . Check whether $KB \models \alpha$ . | 5M |

OR

- Q.3(B) Formalize the following sentences using First-Order Logic.
- |      |  |      |
|------|--|------|
| i.   | All Students are smart.                    | 2.5M |
| ii.  | Bill takes Analysis and Geometry.          | 2.5M |
| iii. | No students love Bill.                     | 2.5M |
| iv.  | A grandparent is a parent of one's parent. | 2.5M |

Q.4(A) "Soft computing plays an important role in science and engineering". Justify. 10M

OR

Q.4(B) With the help of an example explain partial order planning. 10M

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Q.5(A) Explain the exact inference in Bayesian network. 10M

OR

Q.5(B) State Baye's rule and its uses. 10M

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Q.6(A) Compare and contrast active reinforcement learning and passive reinforcement learning. 10M

OR

Q.6(B) Illustrate decision tree learning with algorithm and example. 10M

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# MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS)

B.Tech III Year I Semester (R14) Regular &amp; Supplementary End Semester Examinations – Dec 2018

## MODERN CONTROL SYSTEMS

(Open Elective 1 – Common to ALL)

Time: 3Hrs

Max Marks: 60

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

- Q.1
- |       |   |    |
|-------|---|----|
| i.    | Define what is the Eigen value of a system                  | 1M |
| ii.   | Draw the phase portrait for a critically damped system      | 1M |
| iii.  | Write the canonical form of state model of nth order system | 1M |
| iv.   | Write the properties of state transition matrix.            | 1M |
| v.    | What is the difference between hysteresis and backlash?     | 1M |
| vi.   | What are the advantages of the state space analysis?        | 1M |
| vii.  | Define what is state variable and state vector              | 1M |
| viii. | How do you choose the Lyapunov function?                    | 1M |
| ix.   | Define optimal control problem.                             | 1M |
| x.    | Define stability of a LTI system.                           | 1M |

Q.2(A) Derive the state space representation of armature controlled DC motor. 10M

OR

Q.2(B) i. What is state transition matrix? Write down the properties of state transition Matrix. 6M

ii. Find state transition matrix for the system matrix 4M

$$A = \begin{bmatrix} 0 & -2 \\ 1 & -3 \end{bmatrix}$$

Q.3(A) Define controllability and observability. Explain both of them with the help of Kalman's Test. 10M

OR

Q.3(B) A Linear dynamical time invariant system represented by  $\dot{x} = Ax + Bu$  10M

$$\begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \\ \dot{x}_3 \end{bmatrix} = \begin{bmatrix} 0 & 0 & 1 \\ -2 & -3 & 0 \\ 0 & 2 & -3 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} + \begin{bmatrix} 0 \\ 2 \\ 0 \end{bmatrix} u$$

$$y = \begin{bmatrix} 1 & 0 & 0 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix}$$

Check controllability and observability of the given system by using both gilbert and Kaman test methods.

Q.4(A) Derive the describing function for a system which consists of both saturation and dead zone nonlinearity together. 10M

OR

Q.4(B)

10M

Compute the singular points of the following and comments its type of singularity and also draw the phase portrait.

$$(a) \ddot{e} + 2\xi\omega_n\dot{e} + \omega_n^2 e = 0$$

$$(b) 1.5\ddot{y} - 7.2\dot{y} + 1.9y = 0$$

Q.5(A) Define Lyapunov stability. Explain Lyapunov's direct method.

10M

OR

Q.5(B) For the system represented by  $\dot{x} = Ax$  with  $A = \begin{bmatrix} 0 & 1 \\ -2 & -3 \end{bmatrix}$ . Investigate the stability of this system by using Lyapunov's theorem.

10M

Q.6(A) Derive matrix ricatii equation and With suitable examples explain different types optimal control problems.

10M

OR

Q.6(B) Determine the optimal integral curves when the performance index is expressed as  $J = \int_{t_1}^{t_2} \sqrt{1 + \dot{x}^2} dt$  with boundary condition  $x(t_2) = m$  and  $x(t_1) = n$ .

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Hall Ticket No: 

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Question Paper Code: 14CHE401

**MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE**

(UGC-AUTONOMOUS)

B.Tech III Year I Semester (R14) Regular &amp; Supplementary End Semester Examinations – Nov / Dec 2018

**INTRODUCTION TO NANO SCIENCE AND TECHNOLOGY**

(Open Elective 1 – Common to ALL)

Time: 3Hrs

Max Marks: 60

Attempt all the questions. All parts of the question must be answered in one place only.

All parts of Q.no 1 are compulsory. In Q.no 2 to 6 answer either A or B only

- |        |  |     |
|--------|--|-----|
| Q.1    | i. Compare the electrical properties of diamond and graphene.  | 1M  |
|        | ii. Write the allotropes of carbon.  | 1M  |
|        | iii. What are quantum dots?  | 1M  |
|        | iv. Define lithography. Mention its merits.  | 1M  |
|        | v. How will you justify good electrical conductance exhibited by graphite?   | 1M  |
|        | vi. What are transition metal dichalcogenides? Give an example.  | 1M  |
|        | vii. Define eutectic point.  | 1M  |
|        | viii. Write the role of a dye in dye-sensitized solar cells.   | 1M  |
|        | ix. What is reverse osmosis? Mention its use.  | 1M  |
|        | x. Mention any two advantages of sustained release of drugs.   | 1M  |
| <hr/>  |  |     |
| Q.2(A) | (i) Discuss hybridization of carbon in acetylene.  | 3M  |
|        | (ii) Elaborate on different sized and shaped carbon nanotubes with a special mention to their physical properties.   | 7M  |
| OR     |  |     |
| Q.2(B) | (i) How are quantum numbers assigned to atomic orbitals?   | 5M  |
|        | (ii) Explain Bohr's model of an atomic structure.  | 5M  |
| <hr/>  |  |     |
| Q.3(A) | (i) Discuss about the green method preparation of silver nanoparticles.  | 5M  |
|        | (ii) Elaborate on body centered cubic (BCC) crystals and their atomic packing factors.                               | 5M  |
| OR     |  |     |
| Q.3(B) | (i) Describe the analysis of crystal structure by powder-XRD method.   | 5M  |
|        | (ii) Discuss the synthesis of gold nanoparticles by chemical reduction method.                                       | 5M  |
| <hr/>  |  |     |
| Q.4(A) | (i) Illustrate the various steps involved in crystal growth.   | 5M  |
|        | (ii) Discuss the applications of boron nitride nanomaterials.  | 5M  |
| OR     |  |     |
| Q.4(B) | Discuss the chemical vapour deposition method of preparation of CNT and its application in the field of electronics. | 10M |
| <hr/>  |  |     |
| Q.5(A) | (i) Discuss the functioning of a dye sensitized solar cell with schematic diagram.                                   | 5M  |
|        | (ii) How does Iron oxide nanoparticles used to separate proteins?  | 5M  |
| OR     |  |     |
| Q.5(B) | (i) Describe the phase diagram of Au-Ag binary systems.  | 5M  |
|        | (ii) Elaborate on sol-gel method of preparation of metal oxide nanomaterials.  | 5M  |
| <hr/>  |  |     |
| Q.6(A) | (i) Explain in detail the application of CNT in transistor and field emission display.                               | 10M |
| OR     |  |     |
| Q.6(B) | (i) Discuss about nano carriers for drug delivery.   | 5M  |
|        | (ii) Enlighten the application of quantum dots in electronic devices.  | 5M  |

\*\*\* END\*\*\*

**MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE**

(UGC-AUTONOMOUS)

B.Tech III Year I Semester (R14) Regular &amp; Supplementary End Semester Examinations – Nov / Dec 2018

**PHYSICS OF LASER AND APPLICATIONS**

(Open Elective 1 – Common to ALL)

Time: 3Hrs

Max Marks: 60

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

- Q.1
- i. List the characteristics of Laser. 1M
  - ii. Give expression for gaussian intensity distribution of a laser beam. 1M
  - iii. In He-Ne laser lasing in through neon gas. What is then the role of helium gas? 1M
  - iv. What is the typical percentage of  $\text{Cr}_2\text{O}_3$  can be doped in ruby laser rod? 1M
  - v. State the principle of free electron laser? 1M
  - vi. What is the excitation process in chemical laser? 1M
  - vii. The energy of a 7 ns pulse duration laser beam is 3mJ. Calculate peak power. 1M
  - viii. Write any two applications of laser which is useful in medical field. 1M
  - ix. Define total internal reflection. 1M
  - x. Mention the important parts of optical fiber. 1M
- 
- Q.2(A) i) Explain with neat diagram, the processes of stimulated absorption of light, spontaneous emission and stimulated emission of light. 4M  
ii) Derive the relation between the various Einstein's coefficients. 6M
- OR
- Q.2(B) i) What is population inversion in lasers? How is it achieved? Also explain the role of metastable state. 8M  
ii) Why two-level pumping is not possible in practical? 2M
- 
- Q.3(A) Describe the construction and working of Ruby Laser. What are the drawbacks of Ruby laser. 10M
- OR
- Q.3(B) Explain with an energy level diagram, the working of  $\text{CO}_2$  laser? Explain how the vibrational energy levels of  $\text{CO}_2$  molecule involves in the lasing action? 10M
- 
- Q.4(A) Describe the construction and working of a semiconductor laser? List out the applications of semiconductor laser. 10M
- OR
- Q.4(B) Explain the working principle of dye laser. How tunability could be achieved using dye laser? 10M
- 
- Q.5(A) Explain raman scattering process? How lasers were used in the Raman spectroscopy? Write any two applications using raman spectroscopy? 10M
- OR
- Q.5(B) What are the Q-Switching methods used to produce high power pulsed laser? Describe Electro-optic method to produce high power laser? 10M

- Q.6(A) i) Describe the construction and working principle of optical fiber. 6M  
ii) State any four engineering applications in which lasers have immense importance. 4M
- OR
- Q.6(B) i) Write an essay about the working of fiber optic communication system. 8M  
ii) In a long optical fiber 1W input laser intensity is decreased to 10 mW after traveling 200 Kms. Then calculate the loss of fiber in dB? 2M
- \*\*\* END\*\*\*

**MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE**

(UGC-AUTONOMOUS)

**B.Tech III Year I Semester (R14) Regular & Supplementary End Semester Examinations – Dec 2018**

(Regulations: R14)

**MULTIMEDIA COMPUTING**

(Open Elective – Common to CE, EEE, ME, 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 is sampling rate?  | 1M  |
|           | ii.   | What are the components of MIDI interface?  | 1M  |
|           | iii.  | What are the types of video signals?  | 1M  |
|           | iv.   | Name the various dithering algorithms.  | 1M  |
|           | v.    | What is modeling and coding in data compression?  | 1M  |
|           | vi.   | Name the compression scheme which uses hybrid coding.   | 1M  |
|           | vii.  | List seven layers of OSI reference model.   | 1M  |
|           | viii. | What is a multi-domain relation?  | 1M  |
|           | ix.   | Define Hypermedia.  | 1M  |
|           | x.    | Describe the usage of MIME briefly.   | 1M  |
| <hr/>     |       |   |     |
| Q.2(A)    |       | List down the various Multimedia authoring tools. Give short note on each.                                    | 10M |
| <b>OR</b> |       |   |     |
| Q.2(B)    |       | Write short note on the following:  |     |
|           | a)    | Representation values   | 10M |
|           | b)    | Representation spaces   |     |
|           | c)    | Representation dimensions   |     |
| <hr/>     |       |   |     |
| Q.3(A)    |       | Explain in detail about the graphics/Image data types.  | 10M |
| <b>OR</b> |       |   |     |
| Q.3(B)    |       | Write about the hardware aspects of MIDI in detail.   | 10M |
| <hr/>     |       |   |     |
| Q.4(A)    |       | Write short note on Run Length Coding (RLC) scheme. Code the following data using RLC scheme: ABCCCCCCCCDEFGG | 10M |
| <b>OR</b> |       |   |     |
| Q.4(B)    |       | Write about the major steps of data compression with the help of a flow diagram.                              | 10M |
| <hr/>     |       |   |     |
| Q.5(A)    |       | Draw the conceptual architecture of a multimedia presentation system. Explain its Modules in detail.          | 10M |
| <b>OR</b> |       |   |     |
| Q.5(B)    |       | Design a User Interface for video application control. Explain its components.                                | 10M |
| <hr/>     |       |   |     |
| Q.6(A)    |       | Explain in detail about the four-layer reference model for multimedia synchronization.                        | 10M |
| <b>OR</b> |       |   |     |
| Q.6(B)    |       | Explain in detail about Live and Synthetic synchronization in detail.   | 10M |

\*\*\* END\*\*\*

**MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE**

(UGC-AUTONOMOUS)

**B.Tech III Year I Semester (R14) Regular & Supplementary End Semester Examinations – Dec 2018**

(Regulations: R14)

**DIGITAL IMAGE PROCESSING**

(Open Elective – Common to CE, EEE, 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 Part-A or B only**

- |           |       |   |     |
|-----------|-------|---|-----|
| Q.1       | i.    | What is meant by pixel?   | 1M  |
|           | ii.   | Define 4-connectivity, 8-connectivity, m-connectivity?  | 1M  |
|           | iii.  | Give the formula for negative and log transformation.   | 1M  |
|           | iv    | Define Histogram?   | 1M  |
|           | v.    | Name the different types of derivative filters?   | 1M  |
|           | vi    | What is meant by histogram equalization?  | 1M  |
|           | vii.  | Give the formula for transform function of a Butterworth high pass filter.                                      | 1M  |
|           | viii. | Give the difference between Enhancement and Restoration?  | 1M  |
|           | ix.   | Define region growing?  | 1M  |
|           | x.    | What are the demerits of chain code?  | 1M  |
| <hr/>     |       |   |     |
| Q.2(A)    |       | Obtain the Haar Transform Matrix for N=8.   | 10M |
| <b>OR</b> |       |   |     |
| Q.2(B)    |       | Discuss the properties of 2D DFT.   | 10M |
| <hr/>     |       |   |     |
| Q.3(A)    |       | Draw the block diagram of Homomorphic filtering and explain.  | 10M |
| <b>OR</b> |       |   |     |
| Q.3(B)    |       | Explain the smoothing spatial filters used in Image enhancement process.  | 10M |
| <hr/>     |       |   |     |
| Q.4(A)    |       | Explain how the motion information is useful in segmentation process in the spatial domain and spectral domain. | 10M |
| <b>OR</b> |       |   |     |
| Q.4(B)    |       | Explain the edge linking and boundary detection using Hough transform   | 10M |
| <hr/>     |       |   |     |
| Q.5(A)    |       | Explain the binary image compression standards.   | 10M |
| <b>OR</b> |       |   |     |
| Q.5(B)    |       | Explain the following blocks in the image compression model   |     |
|           | (a)   | Source encoder and decoder.   | 10M |
|           | (b)   | Channel encoder and decoder   |     |
| <hr/>     |       |   |     |
| Q.6(A)    |       | Explain Thresholding Methods  | 10M |
| <b>OR</b> |       |   |     |
| Q.6(B)    |       | Draw the block diagram of Homomorphic filtering and explain.  | 10M |

**\*\*\* END\*\*\***