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

Question Paper Code: 18HUM102

# MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS)

**B. Tech II Year II Semester (R18) Supplementary End Semester Examinations – JULY 2022**

## PRINCIPLES OF MANAGEMENT

(Common to CE, EEE, 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**

| | | | Marks | CO | Bl |
|---|---|---|---|---|---|
| Q.1 | i. | Define organization. | 1M | 1 | 1 |
| | ii. | What is strategy? | 1M | 1 | 1 |
| | iii. | What is meant by Goal? | 1M | 2 | 1 |
| | iv | Define leadership? | 1M | 2 | 1 |
| | v. | What is motivation? | 1M | 3 | 1 |
| | vi | What is meant by planning? | 1M | 3 | 1 |
| | vii. | Define controlling. | 1M | 4 | 1 |
| | viii. | Define social responsibility. | 1M | 4 | 1 |
| | ix. | What is formal communication? | 1M | 5 | 1 |
| | x. | Define operation. | 1M | 5 | 1 |
| Q.2(A) | How do managers differ from non-managerial employees? | | 10M | 1 | 2 |
| | OR | | | | |
| Q.2(B) | Contrast ethnocentric, polycentric, and geocentric attitudes toward global business. | | 10M | 1 | 6 |
| Q.3(A) | Why is decision making often described as the essence of a manager's job? | | 10M | 2 | 4 |
| | OR | | | | |
| Q.3(B) | Describe how managers can effectively plan in today's dynamic environment. | | 10M | 2 | 5 |
| Q.4(A) | Discuss the external environmental factors that most directly affect the HRM process. | | 10M | 3 | 4 |
| | OR | | | | |
| Q.4(B) | Classify types of organizational change. | | 10M | 3 | 3 |
| Q.5(A) | What is communication? Explain communication issues in today's organiz | | 10M | 4 | 4 |
| | OR | | | | |
| Q.5(B) | Explain any three Early leadership theories? | | 10M | 4 | 4 |
| Q.6(A) | What is controlling? Explain process of control. | | 10M | 5 | 3 |
| | OR | | | | |
| Q.6(B) | What is operation management? Explain Strategic Role of Operations Management | | 10M | 5 | 3 |

*** END***

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

Question Paper Code: 18MAT104

# MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS)

## B.Tech II Year II Semester (R18) Supplementary End Semester Examinations JULY 2022

## PROBABILITY & STATISTICS

(Common to CE, EEE )

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

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

| | | | Marks | CO | Bl |
|---|---|---|---|---|---|
| Q.1 | i. | Define Sample Space. | 1M | 1 | 1 |
| | ii. | What is the probability of getting at least one head if a coin is tossed 5 times? | 1M | 1 | 1 |
| | iii. | $f(x) = Kx^3; 0 < x < 1$ is a valid probability function when K = | 1M | 2 | 1 |
| | iv | What is the value of V[3X+9], when V(X)=5 | 1M | 2 | 1 |
| | v. | Define marginal density function for a continuous random variable X? | 1M | 3 | 1 |
| | vi | Write the formula for rank correlation coefficient? | 1M | 3 | 1 |
| | vii. | State Chebychev's inequality? | 1M | 4 | 1 |
| | viii. | Write the m.g.f of Gamma distribution. | 1M | 4 | 1 |
| | ix. | If $P$=0.5 and the sample size is 250 then the standard error of $P$ is | 1M | 5 | 1 |
| | x. | Define Type-I error? | 1M | 5 | 1 |
| Q.2(A) | i) State and Prove multiplication theorem of Probability. | | 5M | 1 | 3 |
| | ii) Assume that in a nuclear accident 30% of the workers are exposed to $LD_{50}$ and die; 40% of the workers die; and 68% are exposed to $LD_{50}$ or die. What is the probability that a randomly selected worker is exposed to the $LD_{50}$? Find the probability that a randomly selected worker is exposed to $LD_{50}$ but does not die. | | 5M | 1 | 3 |
| | OR | | | | |
| Q.2(B) | i) State and Prove Baye's theorem | | 5M | 1 | 4 |
| | ii) The blood type distributions in the United States are 41% of type A, 9% of type B, 4% of type AB and 46% of type O. It is estimated that during World War-II, 4% of inductees with type O blood were typed as A; 88% of those with type A were correctly typed; 4% with type B blood were typed as A; 10% with type AB were typed as A. A soldier was wounded and brought to surgery. He was typed as having type A blood. What is the probability that this is his true blood type? | | 5M | 1 | 4 |
| Q.3(A) | Let $X$ denote, the number of holes that for can be drilled per bit. The density for $X$ is given the following table: | | 10M | 2 | 3 |

| $x$ | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| $f(x)$ | 0.02 | 0.03 | 0.05 | 0.2 | 0.4 | 0.2 | 0.07 | $f(8)$ |

(a) Find $f(8)$
(b) Find the table for $F$
(c) Find Mean and Variance of X
(d) Using F, find P(2<X≤6)

OR

Q.3(B) Let $X$ denote the length of a long-distance conversation (in minutes).The density for $X$ is given by $f(x) = k\,x^2\,e^{-x}$ ; for $x \geq 0$ Find (i) k value (ii) Mean (iii) Variance — 10M — 2 — 3

Q.4(A) Given the following bivariate probability distribution, obtain (i) Mean of X and Mean of Y (ii) Covariance between X and Y (iii) V(X) — 10M — 3 — 3

| X\Y | 0 | 1 | 2 |
|---|---|---|---|
| -1 | 1/15 | 3/15 | 2/15 |
| 0 | 2/15 | 2/15 | 1/15 |
| 1 | 1/15 | 1/15 | 2/15 |

OR

Q.4(B) The joint density for $(X, Y)$ is given by $f(x, y) = xye^{-x}e^{-y} \quad x > 0, y > 0$ — 10M — 3 — 3

(i) Find the marginal densities for $X$ and $Y$.
(ii) Find Cov (X, Y)
(iii) Are $X$ and $Y$ independent?
(iv) Find $p(X \leq 1)$

Q.5(A) During one stage in the manufacture of IC chips, a coating must be applied. If 70% of chips receive a thick enough coating, find the probability that, among 8 chips, (i) at least 6 will have thick enough coatings, (ii) at most 3 will have thick enough coatings and (iii) exactly 5 will have thick enough coatings — 10M — 4 — 5

OR

Q.5(B) Assume that during seasons of normal rainfall the water level in feet at a particular lake follows normal distribution with mean 140 feet and standard deviation 10 feet. During such a season, find the probability that one can observe a water level (i) will exceeds 152 feet (ii) will be between 138 feet and — 10M — 4 — 4

Q.6(A) A random samples of 400 men and 600 women were asked whether they would like to have a flyover near their residence. 200 men and 325 women were in favour of the proposal. Test the hypothesis that proportions of men and women in favour of the proposalare same, at 5% l.o.s? — 10M — 5 — 3

OR

Q.6(B) A sample of 26 bulbs gives a mean life of 990 hours with a standard deviation of 20 hours. The manufacturer claims that the mean life of bulbs is 1000 hours. Is the sample not up to the standard? (value of t-statistic for 25 df at 5% l.o.s is 1.708) — 10M — 5 — 3

*** END***

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

Question Paper Code: 18CE104

# MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS)

**B.Tech II Year II Semester (R18) Supplementary End Semester Examinations – JULY 2022**

## ENGINEERING HYDROLOGY

(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**

| | | | Marks | CO | BL |
|---|---|---|---|---|---|
| Q.1 | i. | Define Isohyet | 1M | 1 | 1 |
| | ii. | What is orographic precipitation? | 1M | 1 | 1 |
| | iii. | What is W-index? | 1M | 2 | 1 |
| | iv | What is the main advantage of bubble gauge in measuring stream flow? | 1M | 3 | 1 |
| | v. | What is observation well? | 1M | 5 | 1 |
| | vi | What is Aquiclude? | 1M | 5 | 1 |
| | vii. | What is basin lag? | 1M | 3 | 1 |
| | viii. | What is time of concentration? | 1M | 4 | 1 |
| | ix. | Distinguish between Actual and Potential Evapotranspiration | 1M | 2 | 2 |
| | x. | What is the use of Pan Coefficient? | 1M | 2 | 1 |
| Q.2(A) | i) Discuss about different forms of precipitation. | | 5M | 1 | 2 |
| | ii) How do you estimate missing rainfall data? Explain in detail. | | 5M | 1 | 4 |
| | OR | | | | |
| Q.2(B) | i) Explain the inter relation between intensity, duration and frequency of rainfall using IDF curves. | | 5M | 1 | 2 |
| | ii) What are the various methods of finding mean rainfall over a catchment area? Discuss in brief. | | 5M | 1 | 2 |
| Q.3(A) | i) What is infiltration? | | 2M | 2 | 1 |
| | ii) What are the main factors that affect infiltration? | | 3M | 2 | 1 |
| | iii) How is the infiltration measured in the field? | | 5M | 2 | 2 |
| | OR | | | | |
| Q.3(B) | A storm with 10 cm rainfall resulted in 6 cm of runoff. The duration of rainfall was 16hrs and its time distribution is given below. Find the ø-index of the storm. | | 10M | 2 | 5 |

| Time (h) | 0 | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 |
|---|---|---|---|---|---|---|---|---|---|
| Cumulative rainfall (cm) | 0 | 0.5 | 1.3 | 2.7 | 5.1 | 6.9 | 8.6 | 9.2 | 10 |

| | | | | | |
|---|---|---|---|---|---|
| Q.4(A) | Using suitable example explain various methods of direct measurement of stream flow | | 10M | 3 | 2 |
| | OR | | | | |
| Q.4(B) | i) What is Unit Hydrograph? | | 2M | 3 | 1 |
| | ii) Explain the method of converting a 4h unit hydrograph to 2h unit hydrograph. | | 8M | 3 | 4 |

Q.5(A) A 160 ha watershed has the following characteristics: Maximum length of travel of water in the catchment=4000m, Difference in elevation between the most remote point on the catchment and the outlet=85m, Land use: 10M 4 6

| Land use/land cover | Area (ha) | Runoff coefficient |
|---|---|---|
| Forest | 50 | 0.21 |
| Pasture | 20 | 0.16 |
| Cultivated Land | 90 | 0.43 |

The maximum intensity-duration-frequency relationship for the watershed is given by

$$i = \frac{2.97T^{0.159}}{(D+0.18)^{0.815}}$$

Where, i= intensity in cm/h, T=Return period in years and D=duration of rainfall in hours. Estimate 30 year peak runoff from the watershed that can be expected.

OR

Q.5(B) i) Draw necessary hydrographs and explain how installation of a dam in a river changes the outgoing flood. Indicate what are the advantages of having a dam in a river using the inflow/outflow hydrographs. 6M 4 4

ii) What do you understand by prism and wedge storage used in channel routing? 4M 4 2

Q.6(A) i) What is Darcy's law? 2M 5 2

ii) Using suitable diagram derive the expression to estimate discharge from unconfined aquifer of width. 8M 5 5

Q.6(B) i) Two lakes A (surface elevation 24.2m) and B (surface elevation 19.2m), 1800m away are separated by a land mass (permeability 40m/day) lying on an impervious horizontal later (elevation 16m). Determine the flow between the lakes assuming no infiltration loss. 5M 5 5

ii) Draw and describe the Artesian Well. 3M 5 2

iii) What is parched water table? 2M 5 1

*** END***

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

Course Code: 18CE105

# MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS)

**B.Tech II Year II Semester (R18) Supplementary End Semester Examinations -JULY 2022**

## 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.
**In Q.no 1 to 5 answer either Part A or Part B only. Q.no 6 which is a case study is compulsory.**

| | | | Marks | CO | Bl |
|---|---|---|---|---|---|
| Q.1 | i. | Illustrate the grading of aggregates. | 1M | 1 | 1 |
| | ii. | What are Air Entraining Admixtures? | 1M | 1 | 1 |
| | iii. | How is the tension test on concrete performed? | 1M | 2 | 1 |
| | iv | Explain the Accelerated Curing Cycle. | 1M | 2 | 1 |
| | v. | Can we test concrete for direct tension? | 1M | 3 | 1 |
| | vi | How is the lateral expansion observed during testing of concrete? | 1M | 3 | 1 |
| | vii. | Define the term Durability. | 1M | 4 | 1 |
| | viii. | Mention the common terminologies used in the statistical quality control of concrete. | 1M | 4 | 1 |
| | ix. | What is Light Weight Concrete? | 1M | 5 | 1 |
| | x. | Describe No-fines Concrete | 1M | 5 | 1 |
| Q.2(A) | Illustrate the grading limits for fine aggregates as per IS:383-1970. | | 10M | 1 | 2 |
| | OR | | | | |
| Q.2(B) | Comment on the fineness modulus of aggregates. | | 10M | 1 | 3 |
| Q.3(A) | What do you understand by Segregation of Concrete? | | 10M | 2 | 2 |
| | OR | | | | |
| Q.3(B) | Comment on the relationship between rigidity and time for the interval between initial and final setting. | | 10M | 2 | 3 |
| Q.4(A) | Compare the cube strength and cylinder strength. | | 10M | 3 | 2 |
| | OR | | | | |
| Q.4(B) | Comment on determination of the Original Water / Cement ratio. | | 10M | 3 | 3 |
| Q.5(A) | Illustrate the impact of permeability, volume change and cracking on the durability of concrete. | | 10M | 4 | 2 |
| | OR | | | | |
| Q.5(B) | Discuss the significance of Durability of Concrete structures. | | 10M | 4 | 3 |
| Q.6(A) | What do you understand by Drying Shrinkage in No-fines Concrete. | | 10M | 5 | 2 |
| | OR | | | | |
| Q.6(B) | Comment on the shielding ability of concrete. | | 10M | 5 | 3 |

*** END***

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

Question Paper Code: 18CE106

# MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS)

**B.Tech II Year II Semester (R18) Supplementary End Semester Examinations: JULY 2022**

## ENVIRONMENTAL 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 Part-A or B only**

| | | | Marks | CO | BL |
|---|---|---|---|---|---|
| Q.1 | i. | Describe pH of water? | 1M | 1 | 1 |
| | ii. | What is back washing? | 1M | 1 | 1 |
| | iii. | Define sewage? | 1M | 2 | 1 |
| | iv | What is the expected BOD range for domestic wastewater ? | 1M | 2 | 1 |
| | v. | What is unit processes? | 1M | 3 | 1 |
| | vi | How sludge thickening occurs? | 1M | 3 | 4 |
| | vii. | What is air pollution? | 1M | 3 | 1 |
| | viii. | What is noise and name the unit used to express the noise? | 1M | 4 | 3 |
| | ix. | What is solid waste management? | 1M | 4 | 1 |
| | x. | What is a landfill site? | 1M | 5 | 1 |

Q.2(A) Explain the working principle of an efficient water treatment plant (WTP) with a neat flow diagram? 10M 1 5

OR

Q.2(B) Estimate the population of next 3 consecutive decades from the last known population for the given data, (Use incremental increase method only). Also find out the quantity of water required for domestic purpose? 10M 1 4

| Year | Population (in lakhs) |
|---|---|
| 1980 | 1.28 |
| 1990 | 2.2 |
| 2000 | 2.92 |
| 2010 | 4.33 |
| 2020 | 4.8 |

Q.3(A) What is wastewater? Explain the classification of wastewater based on the characteristics with suitable examples? 10M 2 5

OR

Q.3(B) What is wastewater treatment? Differentiate between biological and chemical wastewater treatment? Explain the aerobic and anaerobic type of wastewater treatment methods with examples? 10M 2 1

| | | | | |
|---|---|---|---|---|
| Q.4(A) | Name and explain any two different types of low cost wastewater treatment methods? | 10M | 3 | 2 |
| | OR | | | |
| Q.4(B) | How to remove water from sludge? Name some techniques? List the factors affecting on the sludge digestion? | 10M | 3 | 3 |
| Q.5(A) | How does the air pollution occur? Explain how air pollution can be controlled using process modification and using air pollution control equipment? | 10M | 4 | 1 |
| | OR | | | |
| Q.5(B) | What is the acceptable range of noise for human hearing? Explain the different methods of noise control? | 10M | 4 | 2 |
| Q.6(A) | Discuss about the process involved in municipal solid waste (MSW) management? | 10M | 5 | 6 |
| | OR | | | |
| Q.6(B) | What is waste segregation? Write a note on waste minimization and disposal of MSW? | 10M | 5 | 1 |

*** END***

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

Question Paper Code: 18CE107

# MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS)

**B.Tech. II Year II Semester (R18) Supplementary End Semester Examinations – JULY 2022**

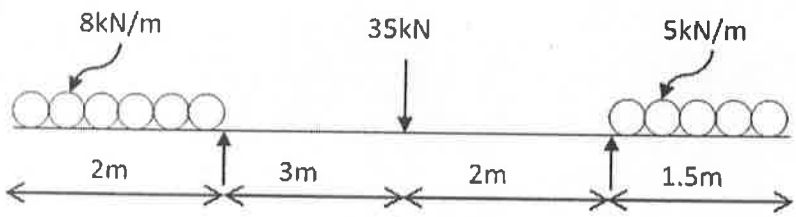
**STRENGTH OF MATERIALS**

(Civil Engineering)

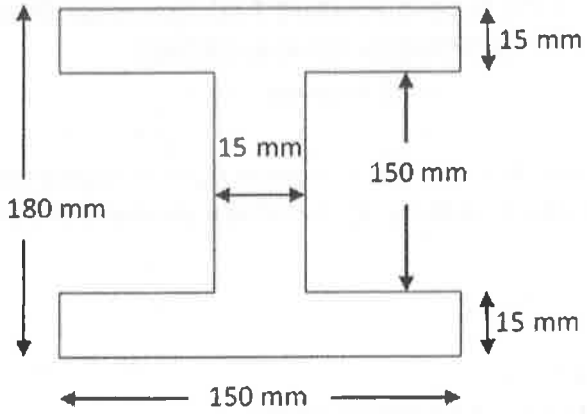
**Time: 3Hrs** **Max Marks: 60**

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**

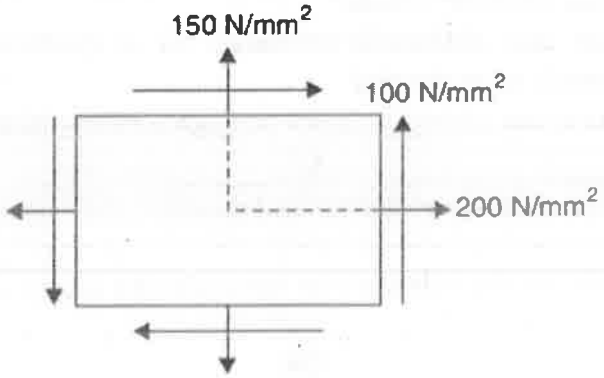
| | | | Marks | CO | BL |
|---|---|---|---|---|---|
| Q.1 | i. | Define Hook's law? | 1M | 1 | 1 |
| | ii. | Define working stress and Factor of safety. | 1M | 1 | 1 |
| | iii. | What is meant by point of contraflexure? | 1M | 2 | 1 |
| | iv | What are the assumptions have considered in the Euler's column buckling? | 1M | 2 | 2 |
| | v. | Define Neutral axis of the beam. | 1M | 3 | 1 |
| | vi | Draw the shear stress distribution for symmetric I-section? | 1M | 3 | 2 |
| | vii. | Write the Polar Modulus (i) for a solid shaft and (ii) for a hollow shaft. | 1M | 4 | 1 |
| | viii. | What is the radius of Mohr's circle? | 1M | 4 | 1 |
| | ix. | Write the slope and deflection formulae for a cantilever beam subjected to point load at the end. | 1M | 5 | 1 |
| | x. | Mention the situations where we need conjugate beam method. | 1M | 5 | 2 |
| Q.2(A) | i. Draw the stress-strain plot for mild steel and mention the types of stress and region. | | 4M | 1 | 2 |
| | ii. Derive the equation for the relationship between the elastic constants such as E, G, and K. | | 6M | 1 | 3 |
| | OR | | | | |
| Q.2(B) | A bar of 30 mm diameter is subjected to a pull of 60 kN. The measured extension on gauge length of 200 mm is 0.1 mm and change in diameter is 0.004 mm. Calculate Young's modulus, Poisson's ratio and Bulk modulus. | | 10M | 1 | 4 |
| Q.3(A) | i. Draw SFD and BMD for a cantilever beam subjected to UDL over the entire span. | | 5M | 2 | 4 |
| | ii. Draw SFD and BMD for a Simply supported beam subjected to Point load at center. | | 5M | 2 | 4 |
| | OR | | | | |
| Q.3(B) | Draw SFD and BMD for the beam shown in Figure. Find out salient features if any. | | 10M | 2 | 4 |



| | | | | |
|---|---|---|---|---|
| Q.4(A) | State the assumptions and derive the equation of pure bending equation. | 10M | 3 | 3 |
| | OR | | | |
| Q.4(B) | Draw the shear stress variation diagram for the I-section shown in Figure, if it is subjected to a shear force of 150 kN. | 10M | 3 | 4 |




| | | | | |
|---|---|---|---|---|
| Q.5(A) | State the assumptions and derive the equation of pure torsion. | 10M | 4 | 3 |
| | OR | | | |
| Q.5(B) | The state of stress at a point in a strained material is shown in Figure. To Determine (i) the direction of principal planes, (ii) the magnitude of principal stresses and (iii) the magnitude of maximum shear stress. | 10M | 4 | 4 |




| | | | | |
|---|---|---|---|---|
| Q.6(A) | Using Moment Area method find<br>(i) Slope and deflection of a cantilever beam subjected to UDL over the entire span<br>(ii) Slope and deflection of SSB subjected to point load at center. | 10M | 5 | 4 |
| | OR | | | |
| Q.6(B) | A simply supported beam of span 8 m is loaded with a point load of 100 kN at a point 3 m from left support. Determine the deflection under the load point and maximum deflection. Take $E=1 \times 10^8$ N/mm$^2$ and $I=10 \times 10^4$ mm$^4$. | 10M | 5 | 4 |

*** END***

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

Question Paper Code: 18EEE105

# MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS)

## B.Tech II Year II Semester (R18) Supplementary End Semester Examinations – JULY 2022

## ELECTROMAGNETIC FIELDS

(EEE)

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

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

| | | | Marks | CO | BL |
|---|---|---|---|---|---|
| Q.1 | i. | Given point **P** (-2,6,3) . Express P in Cylindrical coordinate system | 1M | 1 | 2 |
| | ii. | Give relationship between Cartesian and spherical coordinate system. | 1M | 1 | 1 |
| | iii. | Define electric field intensity | 1M | 2 | 1 |
| | iv | State Gauss law. | 1M | 2 | 1 |
| | v. | State ampere circuits law | 1M | 3 | 1 |
| | vi | What is expression for H due to infinite sheet of current? | 1M | 3 | 2 |
| | vii. | What is the significance of displacement current? | 1M | 4 | 1 |
| | viii. | What is motional electromagnetic force? | 1M | 4 | 1 |
| | ix. | What is uniform plane wave? | 1M | 5 | 1 |
| | x. | What is characteristics impedance? | 1M | 5 | 1 |
| Q.2(A) | i)Find the Gradient of the following scalar fields<br>1. $V=e^{-z}\sin 2x \cos hy$<br>2. $U=e^2 z \cos 2\phi$<br>3. $W=10r\sin^2\Theta\cos\phi$<br>4. $Z=x^2y^2+xyz$ | | 5M | 1 | 3 |
| | ii) Explain vector transformation from cylindrical to Cartesian coordinate system. | | 5M | 1 | 2 |
| | OR | | | | |
| Q.2(B) | i). Given Point P( -2,4,3) and Vector **A** =Y $\mathbf{a_x}$ + (x+z) $a_y$ Express point P and Vector **A** in cylindrical and spherical coordinate system | | 8M | 1 | 3 |
| | ii) Find the divergence of the vector field P= $x^2$ yz $\mathbf{a_x}$ +xz $\mathbf{a_z}$ | | 2M | 1 | 2 |
| Q.3(A) | State Gauss's Law and hence Obtain electric field due to finite straight line having line charge density using Gauss's Law | | 10M | 2 | 2 |
| | OR | | | | |
| Q.3(B) | i)Point charge 5 nc and -3 nc are located at ( 2,0,6)and (-3.0,4) respectively. Find the force on 1 n C point charge located at (1,-3 ,4) and hence find **E** at (1,-3,4) | | 6M | 2 | 3 |
| | ii)Derive Laplace and Poisson's Equations | | 4M | 2 | 2 |
| Q.4(A) | Find the magnetic field intensity due to current carrying finite conductor | | 10M | 3 | 2 |
| | OR | | | | |
| Q.4(B) | Derive the magnetic force between two parallel conductors carrying equal currents in 1.same direction 2, Opposite direction | | 10M | 3 | 2 |

| | | | | |
|---|---|---|---|---|
| Q.5(A) | Derive the general field relations for timing varying electric and magnetic fields using Maxwells Equations | 10M | 4 | 2 |
| | OR | | | |
| Q.5(B) | Differentiate conduction and displacement current and derive the same. Explain the need of displacement current in Maxwells equation | 10M | 4 | 2 |
| Q.6(A) | Derive the expression for wave equations for dielectric medium (Free space) | 10M | 5 | 2 |
| | OR | | | |
| Q.6(B) | Derive the suitable relations for integral and point forms of poynting theorem | 10M | 5 | 2 |

*** END***

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

Question Paper Code: 18EEE106

# MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS)

**B.Tech II Year II Semester (R18) Supplementary End Semester Examinations – JULY 2022**

## DIGITAL 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 Part-A or B only**

| | | | Marks | CO | BL |
|---|---|---|---|---|---|
| Q.1 | i. | Draw the logic diagram of an AND gate using NOR gates. | 1M | 1 | 2 |
| | ii. | Convert $(0.1975)_{10}$ to binary | 1M | 1 | 2 |
| | iii. | What is odd – parity? | 1M | 2 | 1 |
| | iv | Why is a multiplexer called as data selector? | 1M | 2 | 1 |
| | v. | What is level – triggering? | 1M | 3 | 1 |
| | vi | State any two applications of flip – flops. | 1M | 3 | 1 |
| | vii. | Explain the significance of propagation delay in various logic families. | 1M | 4 | 2 |
| | viii. | Explain Noise margin of digital circuits. | 1M | 4 | 2 |
| | ix. | Define static RAM. | 1M | 5 | 1 |
| | x. | What is the term used for half a byte? | 1M | 5 | 1 |
| Q.2(A) | (i) | Express the following numbers into decimal<br>a. $(10110.0101)_2$<br>b. $(16.5)_{16}$ | 5M | 1 | 3 |
| | (ii) | Perform the following using BCD arithmetic<br>a. $(7122)_{10} + (1713)_{10}$<br>b. $(9341)_{10} + (2551)_{10}$ | 5M | 1 | 3 |
| | | OR | | | |
| Q.2(B) | (i) | What are Universal gates? Use NAND gates to obtain OR, NOR and EX-NOR gates. | 5M | 1 | 2 |
| | (ii) | Convert the hexadecimal number 4CD6 to binary, and then convert it from binary to gray code. | 5M | 1 | 3 |
| Q.3(A) | | Simplify the following Boolean function using 4-variable K-map.<br>$F(A, B, C, D) = \Sigma (0,1,3,4,5,8,13,15) + \Sigma d(6,7,9,11)$ | 10M | 2 | 3 |
| | | OR | | | |
| Q.3(B) | (i) | Design an even parity generator for transmitting 3-bit message. | 5M | 2 | 6 |
| | (ii) | Design 4*1 MUX and 1*4 De-MUX and explain its operation. | 5M | 2 | 6 |
| Q.4(A) | | Design a universal shift register. | 10M | 3 | 2 |
| | | OR | | | |
| Q.4(B) | | Write the characteristic equation of a JK flip – flop. Draw its logic circuit, truth table, characteristic table and excitation table. | 10M | 3 | 3 |

| | | | | | |
|---|---|---|---|---|---|
| Q.5(A) | (i) | Explain how hamming codes are used in error detection and correction? | 5M | 4 | 2 |
| | (ii) | Represent the number $(1569)_{10}$ in | | | |
| | | a. 2 4 2 1 code | 5M | 4 | 3 |
| | | b. 8 4 -2 -1 code | | | |
| | | OR | | | |
| Q.5(B) | | Discuss Mealy and Moore Models of Finite State Machines | 10M | 4 | 3 |
| Q.6(A) | (i) | Differentiate between combinational and sequential switching circuits. | 5 M | 5 | 2 |
| | (ii) | Explain the concept of PLDs with an emphasis on FPGA. | 5 M | 5 | 2 |
| | | OR | | | |
| Q.6(B) | | Implement the following Boolean function using 8 x 4 ROM | 10M | 5 | 3 |

$W(a,b,c) = \sum(0,1,3,5,7)$ $X(a,b,c) = \sum(0,2,4,5)$ $Y(a,b,c) = \sum(1,2,4,7)$
$Z(a,b,c) = \sum(0,3,5,6,7)$

*** END***

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

Question Paper Code: 18EEE107

# MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS)

**B.Tech. II Year II Semester (R18) Supplementary End Semester Examinations – JULY 2022**

## INDUCTION & SYNCHRONOUS MACHINES

(EEE)

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

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

| | | | Marks | CO | BL |
|---|---|---|---|---|---|
| Q.1 | i. | What is active part of a coil? | 1M | 1 | 1 |
| | ii. | The direction of revolving magnetic field can be reversed, how? | 1M | 1 | 2 |
| | iii. | In case of leading pf, the voltage regulation is<br>a) +ve<br>b) –ve<br>c) Voltage regulation independent of leading/lagging pf<br>d) Always zero | 1M | 2 | 1 |
| | iv | What is the reason for flowing the synchronizing current during parallel operation of alternator? | 1M | 2 | 2 |
| | v. | In synchronous machines, the armature effective resistance is usually _____ in comparison to synchronous reactance.<br>(a) Small<br>(b) Very small<br>(c) High<br>(d) Very high | 1M | 3 | 1 |
| | vi | Show the under-excitation and over-excitation region of synchronous motor by drawing the V-curve. | 1M | 3 | 2 |
| | vii. | Find out the full load speed of a 3-phase, 4-pole, 50 Hz Induction motor rotating at a slip speed of 40 rpm. | 1M | 4 | 2 |
| | viii. | What is crawling phenomenon? | 1M | 4 | 1 |
| | ix. | What is the purpose of capacitor in a single-phase induction motor? | 1M | 5 | 1 |
| | x. | Write the advantages of brushless motor over brushed motor. | 1M | 5 | 1 |
| Q.2(A) | | Derive the expression for the following:<br>i) Pitch factor ii) Distribution factor iii) Winding factor iv) emf per phase. | 10M | 1 | 2 |
| | | OR | | | |
| Q.2(B) | | A 1-ph winding, when excited by an alternating current, produces one pulsating m.m.f. wave which can be decomposed into two counter-rotating m.m.f. waves travelling at synchronous speed. Use this concept to prove that a rotating magnetic field of constant amplitude is produced when 3-ph balanced winding is excited by 3-ph balanced currents. | 10M | 1 | 3 |
| Q.3(A) | i. | Explain, how the armature reaction influences the field distribution of an alternator for varying power factor. | 6M | 2 | 2 |
| | ii. | What are the conditions to be satisfied before connecting an alternator to the infinite bus-bars? | 4M | 2 | 2 |

OR

| | | | | | |
|---|---|---|---|---|---|
| Q.3(B) | A 3-phase, Y-connected alternator is rated as a 500 KVA, 12 KV. The armature resistance and synchronous reactance are 2 Ω and 35 Ω respectively per phase. Calculate the percentage regulation for a load of 1200 kW at a pf of (a) 0.8 lagging (b) 0.8 leading. | 10M | 2 | 3 |

| | | | | | |
|---|---|---|---|---|---|
| Q.4(A) | i. | Explain why a synchronous motor will run at synchronous speed or not at all. How can the speed of such motor can be varied? | 5M | 3 | 2 |
| | ii. | Draw the equivalent circuit diagram and phasor diagram of a 3-ph synchronous motor for lagging, leading and unity power factor conditions. Name all the phasors. | 5M | 3 | 2 |

OR

| | | | | | |
|---|---|---|---|---|---|
| Q.4(B) | A 20-pole, 30 kw, 660 V, 50 Hz, 3-ph, Y-connected synchronous motor is operating with its generated voltage per phase exactly equal to the phase voltage applied to its armature. At loaded condition the motor is retarded by $5^0$ (mechanical) from its synchronous position. The synchronous reactance and armature resistance are 10 Ω and 1 Ω per phase. Calculate (a) armature current per phase (b) power per phase and total power drawn by the motor from the bus and (c) the developed power. | 10M | 3 | 3 |

| | | | | | |
|---|---|---|---|---|---|
| Q.5(A) | Explain the speed control methods of 3-phase induction motor? | 10M | 4 | 2 |

OR

| | | | | | |
|---|---|---|---|---|---|
| Q.5(B) | Explain the construction of circle diagram for 3-phase induction motor. | 10M | 4 | 2 |

| | | | | | |
|---|---|---|---|---|---|
| Q.6(A) | Explain double revolving field theory. Draw the equivalent circuit of 1-phase induction motor. | 10M | 5 | 2 |

OR

| | | | | | |
|---|---|---|---|---|---|
| Q.6(B) | i. | Explain construction and working principle of reluctance motor. | 5M | 5 | 2 |
| | ii. | Explain construction and working principle of BLDC motor. | 5M | 5 | 2 |

*** END***

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

Question Paper Code: 18EEE108

# MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS)

**B.Tech. II Year II Semester (R18) Supplementary End Semester Examinations – JULY 2022**

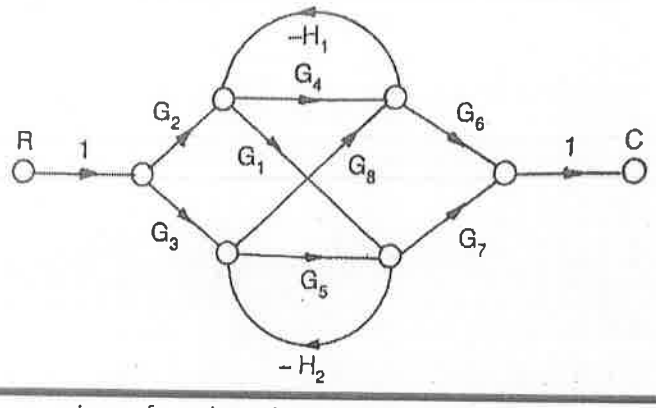
## CONTROL SYSTEMS

(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 Part-A or B only**

| Q. No. | | Question | Marks | CO | BL |
|---|---|---|---|---|---|
| Q.1 | i. | Automatic washing machine is an example of _____ control system. | 1M | 1 | 1 |
| | ii. | What are the basic components of block diagram? | 1M | 1 | 1 |
| | iii. | Define unit parabolic signal. | 1M | 2 | 1 |
| | iv | What is peak time $t_p$? | 1M | 2 | 1 |
| | v. | Define BIBO stability | 1M | 3 | 1 |
| | vi | What is root locus? | 1M | 3 | 1 |
| | vii. | Define gain margin? | 1M | 4 | 1 |
| | viii. | What is lead compensator? | 1M | 4 | 1 |
| | ix. | Define state model. | 1M | 5 | 1 |
| | x. | Write any two properties of state transition matrix? | 1M | 5 | 1 |
| Q.2(A) | | Obtain the transfer function C(s)/R(s) of an armature-controlled DC motor. Also draw the block diagram representation. | 10M | 1 | 3 |
| | | OR | | | |
| Q.2(B) | | Apply Mason's gain formula to obtain transfer function C(s)/R(s) | 10M | 1 | 3 |




| | | | | | |
|---|---|---|---|---|---|
| Q.3(A) | | Derive the expressions for rise time, peak time and peak overshoot for underdamped second order system. | 10M | 2 | 2 |
| | | OR | | | |
| Q.3(B) | | A unity feedback system is characterized by an open loop transfer function $G(s) = \frac{K}{s(s+6)}$ determine (a) the gain K so that the system will have a damping ratio of 0.832. (b) For this value of K, determine settling time, peak time, peak overshoot for a unit step input. | 10M | 2 | 3 |

| | | | | |
|---|---|---|---|---|
| Q.4(A) | Apply RH criterion to determine the range of 'K' for the stability of unity feedback system whose open-loop transfer function is $G(s) = \frac{K}{s(s+1)(s+2)}$ | 10M | 3 | 3 |
| | OR | | | |
| Q.4(B) | Sketch the root locus for unity feedback system with open loop transfer function $G(s) = \frac{K}{s(s^2+8s+32)}$ | 10M | 3 | 3 |
| Q.5(A) | Draw the Bode plot of the unity feedback system with forward gain as G(s)= $\frac{200}{s(s+2)(s+20)}$. Also determine the gain margin, phase margin and comment on the stability of the system. | 10M | 4 | 3 |
| | OR | | | |
| Q.5(B) | The open loop transfer function of a unity feedback system is given by G(s)= $\frac{1}{s(1+s)(1+2s)}$. Sketch the polar plot and determine the gain and phase margin. | 10M | 4 | 3 |
| Q.6(A) | The transfer function of a system is given by $\frac{Y(s)}{U(s)} = \frac{s^2+3s+9}{8s^4+24s^3+34s^2+23s+6}$. Determine State model. | 10M | 5 | 3 |
| | OR | | | |
| Q.6(B) | Obtain the state space representation of a field-controlled DC motor. | 10M | 5 | 3 |

*** END***

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

Question Paper Code: 18HUM101

# MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS)

**B. Tech II Year II Semester (R18) Supplementary End Semester Examinations – JULY 2022**

## ECONOMICS AND FINANCIAL ACCOUNTING FOR ENGINEERS

(Common to ME, CSE, CSIT, CST)

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

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

| | | | Marks | CO | BL |
|---|---|---|---|---|---|
| Q.1 | i. | What do you mean by Economics? | 1M | 1 | 2 |
| | ii. | Examine exceptions law of demand | 1M | 1 | 2 |
| | iii. | Write production function equation? | 1M | 2 | 1 |
| | iv | What is profit volume ratio? | 1M | 2 | 1 |
| | v. | How do you classify the markets? | 1M | 3 | 2 |
| | vi | Define duopoly | 1M | 3 | 1 |
| | vii. | What is accounting? | 1M | 4 | 2 |
| | viii. | Construct proforma of Journal entry | 1M | 4 | 3 |
| | ix. | What is gross profit ratio formula? | 1M | 5 | 1 |
| | x. | What is Net present value? | 1M | 5 | 1 |
| Q.2(A) | Explain the problems of scarcity and choice | | 10M | 1 | 2 |
| | OR | | | | |
| Q.2(B) | What is elasticity of demand? Illustrative different types of price elasticity of demand. | | 10M | 2 | 3 |
| Q.3(A) | What is production function? Explain production function with one variable input factor. | | 10M | 2 | 4 |
| | OR | | | | |
| Q.3(B) | Profit Rs 40000<br>Contribution Rs 60000<br>Sales Rs. 600000<br>Evaluate 1) P/V Ratio 2) Margin of safety and 3) BEP | | 10M | 2 | 5 |
| Q.4(A) | Elucidate features and price output determination under monopolistic. | | 10M | 3 | 2 |
| | OR | | | | |
| Q.4(B) | Explain features and price output determination under monopoly. | | 10M | 3 | 2 |
| Q.5(A) | Explain advantages and disadvantages of accounting. | | 10M | 4 | 2 |
| | OR | | | | |
| Q.5(B) | Explain accounting principles. | | 10M | 4 | 6 |
| Q.6(A) | How do you classify different types of capital budgeting techniques? | | 10M | 5 | 4 |
| | OR | | | | |
| Q.6(B) | Explain different types of ratios. | | 10M | 5 | 5 |

*** END***

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

Question Paper Code: 18BIO101

# MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS)

**B. Tech II Year II Semester (R18) Supplementary End Semester Examinations – JULY 2022**

## LIFE SCIENCE FOR ENGINEERS

(Common to ME, CSE, CST)

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

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

| | | | Marks | CO | BL |
|---|---|---|---|---|---|
| Q.1 | i. | Mitochondria of the cell is also known as the _____ of the cell. | 1M | 1 | 1 |
| | ii. | What are Photoautotrophs? Give an example. | 1M | 1 | 1 |
| | iii. | Haemoglobin binds Four oxygen molecules. True or False | 1M | 2 | 1 |
| | iv | Why are enzymes known as biocatalysts? | 1M | 2 | 1 |
| | v. | Metabolism is the sum of _____ and _____. | 1M | 3 | 1 |
| | vi | Name the three functional class of neurons | 1M | 3 | 1 |
| | vii. | What is an allele? | 1M | 4 | 1 |
| | viii. | Where can we find DNA inside the cell? | 1M | 4 | 1 |
| | ix. | How would you relate $K_{eq}$ to standard free energy? | 1M | 5 | 1 |
| | x. | Name the Energy Currency in cellular process? | 1M | 5 | 1 |
| Q.2(A) | | Draw and explain the animal cell structure. | 10M | 1 | 5 |
| | | **OR** | | | |
| Q.2(B) | | Compare the functioning of Bird and Aeroplane. | 10M | 1 | 5 |
| Q.3(A) | | What are proteins and discuss in detail their structure and function correlation | 10M | 2 | 6 |
| | | **OR** | | | |
| Q.3(B) | | Explain the formation and functions of Starch and Cellulose. | 10M | 2 | 5 |
| Q.4(A) | | Explain the TCA of cellular respiration with a neat diagram. | 10M | 3 | 5 |
| | | **OR** | | | |
| Q.4(B) | | Discuss the neuromuscular junction (NMJ) with a neat illustration. | 10M | 3 | 6 |
| Q.5(A) | | Explain the process of DNA Replication and Transcription in detail. | 10M | 4 | 5 |
| | | **OR** | | | |
| Q.5(B) | | (i) Elaborate the working principle of biosensor and biochip? | 5M | 4 | 6 |
| | | (ii) Distinguish the differences between Mitotic and Meiotic cell division. | 5M | 4 | 4 |
| Q.6(A) | | Discuss the mechanism of photosynthesis with neat diagram. | 10M | 5 | 6 |
| | | **OR** | | | |
| Q.6(B) | | (i) Why are ATPs called as the Energy currency of the cell? Justify | 6M | 5 | 4 |
| | | (ii) what are endergonic and exergonic reactions and give examples | 4M | 5 | 2 |

***** END*****

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

Course Code: 18ME105

# MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS)

## B.Tech II Year II Semester (R18) Supplementary End Semester Examinations -JULY 2022

## MECHANICS OF SOLIDS

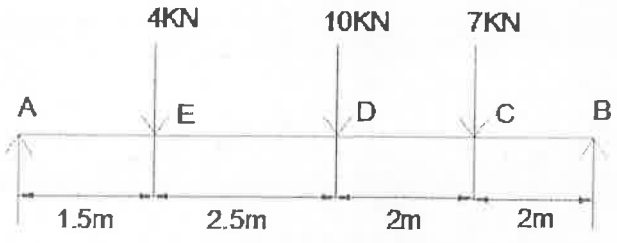
(Mechanical Engineering)

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.**

| | | | Marks | CO | BL |
|---|---|---|---|---|---|
| Q.1 | i. | Define Hooke's Law | 1M | 1 | 1 |
| | ii. | Differentiate the Principal stress & Principal strain | 1M | 1 | 1 |
| | iii. | Write any three different of loads | 1M | 2 | 1 |
| | iv. | Write relation between shear force and bending moment with sign convention. | 1M | 2 | 1 |
| | v. | Define bending moment diagram? | 1M | 3 | 1 |
| | vi. | Write the equation for section Modulus of rectangular beam | 1M | 3 | 1 |
| | vii. | What is pure torsion? | 1M | 4 | 1 |
| | viii. | Write the expression for maximum torque transmitted by a hallow circular shaft | 1M | 4 | 1 |
| | ix. | Define short & long column. | 1M | 5 | 1 |
| | x. | State the assumption made in Euler's formula. | 1M | 5 | 1 |
| Q.2(A) | Explain the following terms<br>i) Factor of safety ii) Poisson's ratio<br>iii) Volumetric strain iv) Modulus of Elasticity | | 10M | 1 | 2 |
| | **OR** | | | | |
| Q.2(B) | A circular rod of diameter 16 mm and 500 mm long is subjected to a tensile force 40 kN. The modulus of elasticity for steel may be taken as 200 kN/mm$^2$. Find stress, strain and elongation of the bar due to applied load. | | 10M | 1 | 3 |
| Q.3(A) | A cantilever beam of length 2 m carries a point load of 400N,300N,800N & 500N at a distance of 0.5m, 1m, 1.5m and 2m from the fixed end. Draw the shear force and B.M. diagrams for the cantilever beam. | | 10M | 2 | 3 |
| | **OR** | | | | |
| Q.3(B) | A simply supported beam carrying number of point loads as shown in figure. | | 10M | 2 | 3 |



| | | | | |
|---|---|---|---|---|
| Q.4(A) | Explain theory of simple Pure bending & write the assumptions in the theory of simple bending? | 10M | 3 | 3 |
| | **OR** | | | |
| Q.4(B) | A beam of length 6m is simply supported at ends and carries two points loads of 48 kN and 40 kN at distance of 1m and 3m respectively from the left support. Using Macauley's method find<br>(i)deflection under each load<br>(ii) maximum deflection<br>(iii) the point at which maximum deflection occurs<br>Given, $E = 2 \times 10^5$ N/mm2 & $I = 85 \times 10^6$ mm$^4$ | 10M | 3 | 3 |
| Q.5(A) | What do you mean by pure torsion? Derive the Torsional Equation $\frac{T}{J} = \frac{G\theta}{L} = \frac{\tau}{r}$. | 10M | 4 | 2 |
| | **OR** | | | |
| Q.5(B) | A hollow circular shaft of 6 m length and inner and outer diameters of 75 mm and 100 mm is subjected to a torque of 10 kN-m. If shear modulus is 80 GPa, determine:<br>(a) Maximum shear stress produced.<br>(b) Total angle of twist. | 10M | 4 | 3 |
| Q.6(A) | Calculate the critical load of a strut which is made of a bar which is circular in section 5 m long and is pin jointed at both ends. The same bar when used as a simply supported beam gives a mid-span deflection of 10 mm with a load of 10 N at the centre. | 10M | 5 | 3 |
| | **OR** | | | |
| Q.6(B) | Derive expression for buckling load for column with both the ends hinged. | 10M | 5 | 4 |

*** END***

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

Course Code: 18ME106

# MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS)

**B. Tech II Year II Semester (R18) Supplementary End Semester Examinations -JULY 2022**

## MANUFACTURING PROCESS

(Mechanical Engineering)

**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.**

| | | | Marks | CO | BL |
|---|---|---|---|---|---|
| Q.1 | i. | Define gating ratio. | 1M | 1 | 1 |
| | ii. | What are the casting defects? | 1M | 1 | 1 |
| | iii. | Draw the types of joints. | 1M | 2 | 2 |
| | iv | Why edge preparation is needed before welding? | 1M | 2 | 3 |
| | v. | What are the economic considerations in sheet metal? | 1M | 3 | 1 |
| | vi | What is spring back effect and why is a concern during bending? | 1M | 3 | 3 |
| | vii. | Differentiate hot forging with cold forging. | 1M | 4 | 2 |
| | viii. | Give some applications of extrusion process. | 1M | 4 | 2 |
| | ix. | Define electrolysis. | 1M | 5 | 1 |
| | x. | What are the applications of powder metallurgy? | 1M | 5 | 1 |
| Q.2(A) | | State the principle of gating system and explain the elements of gating system with neat sketch. | 10M | 1 | 3 |
| | | OR | | | |
| Q.2(B) | | With the help of neat sketch explain the process of investment casting. | 10M | 1 | 2 |
| Q.3(A) | | State the principle of arc welding and explain submerged arc welding with neat sketch. | 10M | 2 | 3 |
| | | OR | | | |
| Q.3(B) | | With the help of neat sketch, explain the working of laser beam welding. | 10M | 2 | 2 |
| Q.4(A) | | Mention the different forces and power requirements in sheet metal operations? | 10M | 3 | 3 |
| | | OR | | | |
| Q.4(B) | | Explain mechanical press and hydraulic press forming with proper sketches. | 10M | 3 | 2 |
| Q.5(A) | | Differentiate hot extrusion and cold extrusion with proper sketch and its applications. | 10M | 4 | 3 |
| | | OR | | | |
| Q.5(B) | | Classify the types rolling process and explain any three types with the necessary sketches. | 10M | 4 | 3 |
| Q.6(A) | | Explain the following a) Conventional pressing, b) atomization. | 10M | 5 | 2 |
| | | OR | | | |
| Q.6(B) | | What are the sintering techniques? Explain briefly. | 10M | 5 | 2 |

*** END***

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

Question Paper Code: 18ME107

# MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS)

**B.Tech II Year II Semester (R18) Supplementary End Semester Examinations – JULY 2022**

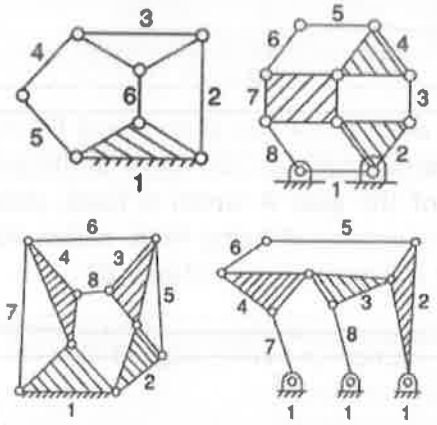
## THEORY OF MACHINES

(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 B only**

| | | | Marks | CO | BL |
|---|---|---|---|---|---|
| Q.1 | i. | What are the types of kinematic pairs? Give examples. | 1M | 1 | 2 |
| | ii. | List 2 examples for Higher pair connections. | 1M | 1 | 2 |
| | iii. | How many instantaneous centers are there for a 4-bar mechanism ? | 1M | 2 | 1 |
| | iv | In which mechanism type, Coriolis acceleration is present? | 1M | 2 | 2 |
| | v. | List out the applications of epicyclic gear train. | 1M | 3 | 1 |
| | vi | State an example where Gyroscopic effect occurs. | 1M | 3 | 3 |
| | vii. | List the classifications of cam followers based on shape. | 1M | 4 | 1 |
| | viii. | Why is balancing necessary for rotors of high speed? | 1M | 4 | 2 |
| | ix. | Specify any two industrial applications where the transmissibility effect of vibrations are important. | 1M | 5 | 1 |
| | x. | Sketch the different modes of the vibrations of a three rotor. | 1M | 5 | 3 |
| Q.2(A) | | Find the degrees of freedom for the given kinematic linkages. | 10M | 1 | 3 |

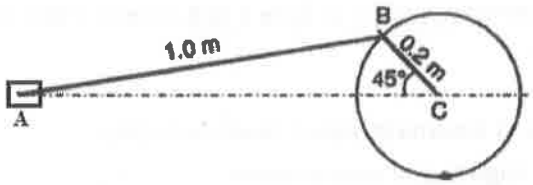



OR

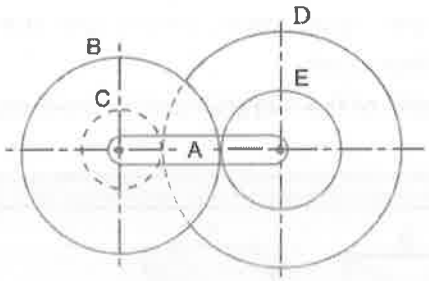
| | | | | | |
|---|---|---|---|---|---|
| Q.2(B) | | Explain the types of kinematic pairs with examples. | 10M | 1 | 2 |
| Q.3(A) | | PQRS is a four-bar chain with link PS fixed. The lengths of the links are PQ = 65 mm; QR = 180 mm; RS = 115 mm; and PS = 200 mm. The crank PQ rotates at 20 rad/s clockwise. Draw the velocity and acceleration diagram when angle QPS = 60° and Q and R lie on the same side of PS. Find the angular velocity and angular acceleration of links QR and RS. | 10M | 2 | 3 |

OR

| | | | | |
|---|---|---|---|---|
| Q.3(B) | The crank of a reciprocating engine is rotating at 210 rpm. The length of crank and connecting rod are 20 cm and 100 cm respectively. Locate all the instantaneous centers and find the velocity of slider A (velocity of piston) when crank has turned through an angle of 45° with horizontal as shown in Figure. | 10M | 2 | 3 |




| | | | | |
|---|---|---|---|---|
| Q.4(A) | In a reverted epicyclic gear train, the arm A carries two gears B and C and a compound gear D - E. The gear B meshes with gear E and the gear C meshes with gear D. The number of teeth on gears B, C and D are 75, 30 and 90 respectively. Find the speed and direction of gear C when gear B is fixed and the arm A makes 100 r.p.m. clockwise. | 10M | 3 | 3 |




OR

| | | | | |
|---|---|---|---|---|
| Q.4(B) | In an epicyclic gear train, an arm carries two gears A and B having 36 and 45 teeth respectively. If the arm rotates at 150 r.p.m. in the anticlockwise direction about the center of the gear A which is fixed, determine the speed of gear B. If the gear A instead of being fixed, makes 300 r.p.m. in the clockwise direction, what will be the speed of gear B? | 10M | 3 | 3 |

| | | | | |
|---|---|---|---|---|
| Q.5(A) | A cam is to give the following motion to a knife-edged follower:<br>1. Outstroke during 60° of cam rotation;<br>2. Dwell for the next 30° of cam rotation;<br>3. Return stroke during next 60° of cam rotation, and<br>4. Dwell for the remaining 210° of cam rotation.<br>The stroke of the follower is 40 mm and the minimum radius of the cam is 50 mm. The follower moves with uniform velocity during both the outstroke and return strokes. Draw the profile of the cam when the axis of the follower passes through the axis of the cam shaft | 10M | 4 | 3 |

OR

| | | | | |
|---|---|---|---|---|
| Q.5(B) | Four masses m1, m2, m3 and m4 are 200 kg, 300 kg, 240 kg and 260 kg respectively. The corresponding radii of rotation are 0.2 m, 0.15 m, 0.25 m and 0.3 m respectively and the angles between successive masses are 45°, 75° and 135°. Find the position and magnitude of the balance mass required, if its radius of rotation is 0.2 m. | 10M | 4 | 3 |

| | | | | |
|---|---|---|---|---|
| Q.6(A) | A machine of mass 75 kg is mounted on springs and is fitted with a dashpot to damp out vibrations. There are three springs each of stiffness 10 N/mm and it is found that the amplitude of vibration diminishes from 38.4 mm to 6.4 mm in two complete oscillations. Assuming that the damping force varies as the velocity, determine: 1.the resistance of the dash-pot at unit velocity; 2. the ratio of the frequency of the damped vibration to the frequency of the undamped vibration; and 3. the periodic time of the damped vibration. | 10M | 5 | 3 |

OR

| | | | | |
|---|---|---|---|---|
| Q.6(B) | A machine part of mass 2 kg vibrates in a viscous medium. Determine the damping coefficient when a harmonic exciting force of 25 N results in a resonant amplitude of 12.5 mm with a period of 0.2 second. If the system is excited by a harmonic force of frequency 4 Hz what will be the percentage increase in the amplitude of vibration when damper is removed as compared with that with damping. | 10M | 5 | 3 |

*** END***

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

Question Paper Code: 18ME108

# MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS)

**B.Tech. II Year II Semester (R18) Supplementary End Semester Examinations – JULY 2022**

## FLUID MECHANICS & HYDRAULIC MACHINERY

(Mechanical Engineering)

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

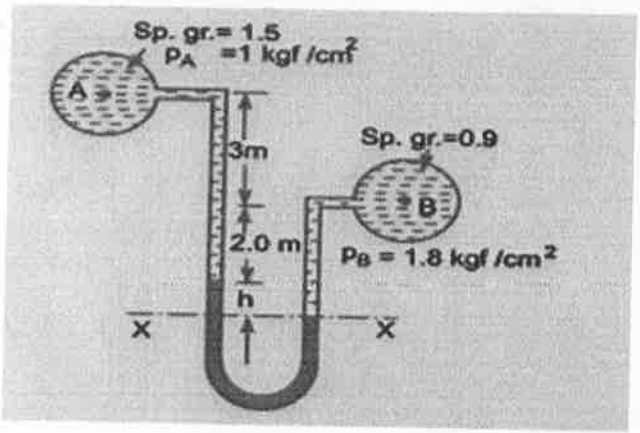
Attempt all the questions. All parts of the question must be answered in one place only.
**All parts of Q.no 1 are compulsory. In Q.no 2 to 6 answer either Part-A or B only**

| | | | Marks | CO | BL |
|---|---|---|---|---|---|
| Q.1 | i. | What is viscosity? What is the cause of it in liquids and in gases? | 1M | 1 | 2 |
| | ii. | What is a Newtonian fluid? Is water a Newtonian fluid? | 1M | 1 | 2 |
| | iii. | What is Bernoulli's energy equation per unit weight of a fluid. | 1M | 2 | 1 |
| | iv | State the assumption made to derive the Bernoulli equations | 1M | 2 | 1 |
| | v. | What is the critical value of Reynolds number for transition from Laminar to Turbulent flow over a flat plate? | 1M | 3 | 1 |
| | vi | Define Energy thickness | 1M | 3 | 1 |
| | vii. | Define unit discharge of a hydraulic turbine. | 1M | 4 | 1 |
| | viii. | What is head race in a hydroelectric power plant? | 1M | 4 | 1 |
| | ix. | Define Mechanical Efficiency of a centrifugal pump | 1M | 5 | 1 |
| | x. | Define slip of a reciprocating pump | 1M | 5 | 1 |

Q.2(A) A fluid flow is given by $V=x^2yi+y^2zj-(2xyz+yz^2)k$. Prove that it is a case of possible steady incompressible fluid flow. Calculate the velocity and acceleration at the point (2,1,3) — 10M, CO 1, BL 3

OR

Q.2(B) A differential manometer is connected at two points A & B of two pipes as shown in Fig. The pipe A contains a liquid of sp.gr.=1.5 while pipe B contains a liquid of sp.gr.=0.9. The pressures at A & B are 1kgf/cm$^2$ and 1.80 kgf/cm$^2$ respectively. Find the difference in mercury level in the differential manometer — 4M, CO 1, BL 3; 6M, CO 1, BL 3



| | | | | |
|---|---|---|---|---|
| Q.3(A) | Derive Bernoulli equation from Euler's equation | 10M | 2 | 3 |
| | OR | | | |
| Q.3(B) | A pipeline carrying oil of specific gravity 0.87, changes in diameter from 200 mm diameter at a position A to 500 mm diameter at a position B which is 4 meters at a higher level. If the pressures at A and B are 9.81 $N/cm^2$ and 5.886 $N/cm^2$ respectively and the discharge is 200 liters/sec. Determine the loss of head and direction of flow. | 10M | 2 | 3 |
| Q.4(A) | Derive Von Karman integral equation for boundary layer. | 10M | 3 | 3 |
| | OR | | | |
| Q.4(B) | The flow rate of water at 20°C ($\rho$ = 998 $kg/m^3$ and $\mu = 1.002\times10^{-3}$ kg/m·s) through a 60-cm-diameter pipe is measured with an orifice meter with a 30-cm-diameter opening to be 400 L/s. Determine the pressure difference indicated by the orifice meter and the head loss. | 10M | 3 | 3 |
| Q.5(A) | Design a Pelton wheel for a head of 80m. and speed of 300 RPM. The Pelton wheel develops 110 kW. Take co-efficient of velocity= 0.98, speed ratio= 0.48 and overall efficiency = 80%. | 10M | 4 | 3 |
| | OR | | | |
| Q.5(B) | Classify the turbines based on head, specific speed and hydraulic actions. Give examples for each. | 10M | 4 | 3 |
| Q.6(A) | What is a centrifugal pump.? Describe the principle and working of a centrifugal pump. with a neat sketch. | 10M | 5 | 3 |
| | OR | | | |
| Q.6(B) | A single-acting reciprocating pump, running at 50 rpm, delivers 0.01 $m^3/s$ of water. The diameter of the piston is 200 mm and stroke length 400 mm.<br>Determine:<br>(i) The theoretical discharge of the pump,<br>(ii) Co-efficient of discharge, and<br>(iii) Slip and the percentage slip of the pump. | 10M | 5 | 3 |

*** END***

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

Question Paper Code: 18MAT109

# MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS)

## B.Tech II Year II Semester (R18) Supplementary End Semester Examinations – JULY2022

## PROBABILITY THEORY AND STOCHASTIC PROCESSES

(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**

| | | | Marks | CO | Bl |
|---|---|---|---|---|---|
| Q.1 | i. | If two fair dice are tossed, what is the probability that the sum is 7? | 1M | 1 | 1 |
| | ii. | Define independence of two events? | 1M | 1 | 1 |
| | iii. | A continuous random variable X having probability distribution function $F_X(x) = (1 - e^{-x^2})$. Find its density function. | 1M | 2 | 1 |
| | iv | Express the density function for Gaussian random variable? | 1M | 2 | 1 |
| | v. | Define joint distribution function? | 1M | 3 | 1 |
| | vi | Define Covariance between two random variables? | 1M | 3 | 1 |
| | vii. | State the Central limit theorem? | 1M | 4 | 1 |
| | viii. | State the Strong Law Large Numbers (SLLN)? | 1M | 4 | 1 |
| | ix. | State the Ergodic theorem? | 1M | 5 | 1 |
| | x. | Define the power spectral density? | 1M | 5 | 1 |
| Q.2(A) | | In a binary communication system transmitted symbols 1 and 0. Define appropriate events $A_i$ and $B_i$, $i = 1, 2$ to represent symbols after and before channel respectively. Assume channel transition probabilities are all equal at $P(A_i \mid B_j) = 0.1$, $i \neq j$ and are $P(A_i \mid B_j) = 0.9$ for $i = j = 1, 2$, while symbol transmission probabilities are $P(B_1) = 0.6$ and $P(B_2) = 0.4$. (a) Compute the received symbol probabilities $P(A_1)$ and $P(A_2)$? (b) Compute the posterior probabilities for the system? | 10M | 1 | 3 |
| | | OR | | | |
| Q.2(B) | | A rifleman can achieve a "marksman" award if he passes a test. He is allowed to fire six shots at a target's bull's eye. If he hits the bull's eye with at least five of his six shots he wins a set. He becomes a marksman only if he can repeat the feat three times straight. i.e. if he can win three straight sets. If his probability is 0.8 of hitting a bull's eye on any one shot, find the probabilities of his (a) winning a set and (b) becoming a marksman. | 10M | 1 | 3 |
| Q.3(A) | | In a certain Junior Olympics, a contestant throw distances are well approximated by a Gaussian distribution for which $a_X = 30m$. In a qualifying round, contestants must throw farther than $26m$ to qualify. In the main event the record throw is $42m$.<br>(i) What is the probability of being disqualified in the qualifying round?<br>(ii) In the main event what is the probability the record will be broken? | 10M | 2 | 3 |
| | | OR | | | |
| Q.3(B) | | For the Poisson random variable show that $\overline{X} = E(X) = \lambda$ and $\sigma_X^2 = \lambda$. | 10M | 2 | 3 |

| | | | | |
|---|---|---|---|---|
| Q.4(A) | Discrete random variables $X$ and $Y$ have a joint distribution function<br>$F_{XY}(x,y) = 0.10u(x+4)u(y-1) + 0.15u(x+3)u(y+5)$<br>$+0.17u(x+1)u(y-3) + 0.05u(x)u(y-1) + 0.18u(x-2)u(y+2)$<br>$+0.23u(x-3)u(y-4) + 0.12u(x-4)u(y+3)$<br>Find (a) the marginal distribution functions $F_X(x)$ and $F_Y(y)$ (b) $\overline{X}$ and $\overline{Y}$ (c) $P\{-1 < X \le 4, -3 < Y \le 3\}$. | 10M | 3 | 4 |
| | OR | | | |
| Q.4(B) | For two random variables $X$ and $Y$ have the joint density function<br>$f_{XY}(x,y) = \frac{xy}{9} : 0 < x < 2 \text{ and } 0 < y < 3$.<br>Find: The first and second order moments, (b) The Covariance and (c) Are $X$ and $Y$ uncorrelated? | 10M | 3 | 4 |
| Q.5(A) | A random variable $X$ is uniformly distributed on $(0,6)$. If $X$ is transformed to the new random variable $Y = 2(X-3)^2 - 4$.<br>Find the (a) the density of $Y$ (b) $\overline{Y}$ | 10M | 4 | 3 |
| | OR | | | |
| Q.5(B) | State and prove central limit theorem? | 10M | 4 | 3 |
| Q.6(A) | Show that the random process $X(t) = A\cos(w_0 t + \Theta)$ is wide sense stationary if it is assumed that $A$ and $w_0$ and $\Theta$ is a uniformly distributed random variable on the interval $(0, 2\pi)$ | 10M | 5 | 3 |
| | OR | | | |
| Q.6(B) | Consider the random process $X(t) = A\cos(\omega_0 t + \Theta)$ where $\Theta$ a random variable is over the ensemble and is uniformly distributed over the interval $(0, \frac{\pi}{2})$. Find the average power by use of mean squared value? | 10M | 5 | 3 |

*** END***

Hall Ticket No: | | | | | | | | | | |  Question Paper Code: 18ECE104

# MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS)

## B.Tech II Year II Semester Supplementary End Semester Examinations – July 2022

(Regulations: R18)

## PRINCIPLES OF SIGNALS AND SYSTEMS

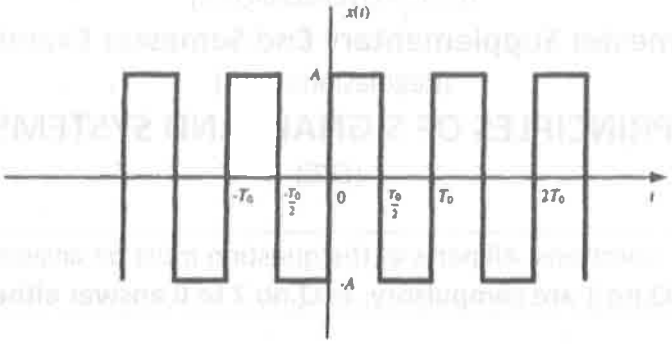
(ECE)

**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.No | | Question | Marks | CO | BL |
|---|---|---|---|---|---|
| Q.1 | i. | Sketch the discrete time signal $x(n)=4\delta(n+4)+\delta(n)+2\delta(n-1)$. | 1M | 1 | 1 |
| | ii. | Test the signal $x(n)= e^{j2n}$ is periodic or not. | 1M | 1 | 2 |
| | iii. | What is step response? | 1M | 2 | 2 |
| | iv | How to find out the impulse response of a CT-LTI system? | 1M | 2 | 2 |
| | v. | What is the Fourier transformation of unit impulse signal? | 1M | 3 | 2 |
| | vi | Write the difference between DFT and DTFT? | 1M | 3 | 1 |
| | vii. | What is the Laplace transform of $t^3u(t)$ ? | 1M | 4 | 2 |
| | viii. | Define the ROC for Z transformation. | 1M | 4 | 2 |
| | ix. | What is under sampling? | 1M | 5 | 1 |
| | x. | What is aliasing effect? | 1M | 5 | 1 |
| Q.2(A) | | (i) Check whether the system $y(n)=x(n)+\frac{1}{x(n-1)}$ is<br>a) Static or dynamic<br>b) Linear or nonlinear<br>c) Causal or non-causal<br>d) Time-invariant or time-varying | 8M | 1 | 2 |
| | | (ii) Check if the signal is periodic or not. If periodic find its fundamental time period. $x(n)=e^{j\frac{2n}{3}}+e^{j\frac{8\pi n}{4}}$ | 2M | | 3 |
| | | **OR** | | | |
| Q.2(B) | | (i) Define the following signals with suitable example.<br>a) Periodic and aperiodic signals.<br>b) Energy and power signals.<br>c) Causal and non-causal signals. | 6M | 1 | 2 |
| | | (ii) Find the even and odd parts of the following signal $x(t)=\cos(t)+\sin(t)+\cos(t)\sin(t)$ | 4M | | 3 |
| Q.3(A) | | Compute the output y(t) for a continuous time LTI system whose impulse response $h(t)$ and the input $x(t)$ are given by $x(t)=u(t-1)-u(t-5)$ and $h(t)=u(t-2)-u(t-6)$ | 10M | 2 | 3 |
| | | **OR** | | | |

| | | | | |
|---|---|---|---|---|
| Q.3(B) | Use graphical method to find out the convolution of two sequences $x_1(n)$ ={2,**-1** ,3,4} and $x_2(n)$ = {1,**2**,1,2} | 10M | 2 | 3 |
| Q.4(A) | Consider the periodic square wave $x(t)$ shown in the following figure. | 10M | 3 | 3 |




Determine the trigonometric Fourier series of $x(t)$.

**OR**

| | | | | |
|---|---|---|---|---|
| Q.4(B) | State and prove the following properties of continuous time Fourier transformation<br>(i) Linearity<br>(ii) Time shifting<br>(iii) Frequency shifting<br>(iv) Time scaling | 10M | 3 | 3 |
| Q.5(A) | (i) Discuss the properties of ROC for Laplace transform. | 5M | 4 | 2 |
| | (ii) Find the inverse Laplace transformation of the following function $X(s)=\frac{2s+1}{(s+2)^3}$ | 5M | | 3 |

**OR**

| | | | | |
|---|---|---|---|---|
| Q.5(B) | (i) Find the z-transform of $x[n]=b^n u[n]-a^n u[-n-1]$ | 6M | 4 | 3 |
| | (ii) State and prove any two properties of Z- transformation. | 4M | | 3 |
| Q.6(A) | State and explain sampling theorem both in time and frequency domain with necessary quantitative analysis and illustration | 10M | 5 | 3 |

**OR**

| | | | | |
|---|---|---|---|---|
| Q.6(B) | (i) Write a short note on zero order hold? | 4M | 5 | 2 |
| | (ii) If the continuous time signal $x(t)$ = cos(1250 $\pi t$) is sampled at sampling frequency $f_s$=10 Hz, then find the discrete time sequence $x(n)$. | 6M | | 3 |

***** END*****

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

Question Paper Code: 18ECE105

# MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS)

## B.Tech II Year II Semester Supplementary End Semester Examinations – July 2022

(Regulations: R18)

## ANALOG CIRCUITS

(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.No | | Question | Marks | CO | BL |
|---|---|---|---|---|---|
| Q.1 | i. | Find the operating frequency of a Hartley oscillator if L1=1mH, L2=0.1mH and C=20pF | 1M | 1 | 3 |
| | ii. | Calculate the frequency of Colpitts Oscillator. Given $C_1$ = 0.01 µF, $C_2$= 0.1 µF and L= 1 mH. | 1M | 1 | 2 |
| | iii. | What is cross-over distortion in class-B push-pull amplifier? | 1M | 2 | 1 |
| | iv | The frequency response curve of a tuned amplifier is given to you. Based on it, write the expression for Q-factor of the amplifier and describe each parameter. | 1M | 2 | 2 |
| | v. | Why differential amplifier is necessary? | 1M | 3 | 2 |
| | vi | Define input offset voltage of an op-amp | 1M | 3 | 1 |
| | vii. | What is a precision rectifier? | 1M | 4 | 1 |
| | viii. | Draw the frequency response of an active high-pass filter and mark the cut-off frequency. | 1M | 4 | 1 |
| | ix. | Is Hartley oscillator a voltage-controlled oscillator? Why? | 1M | 5 | 2 |
| | x. | What are the advantages of R/2R ladder DAC compared to binary weighted resistor DAC? | 1M | 5 | 2 |
| Q.2(A) | | (i) What are the different types of feedback topologies used in amplifiers? Describe with neat block diagrams. | 6M | 1 | 2 |
| | | (ii) Consider a series–shunt feedback amplifier in which the open-loop gain is Av = $10^5$ and the closed-loop gain is Avf = 50. Assume the input and output resistances of the basic amplifier are Ri = 10 kΩ and Ro = 20 kΩ, respectively. Determine the input resistance and output resistance. | 4M | | 3 |
| | | **OR** | | | |
| Q.2(B) | | Sketch the circuit of a Wein-bridge oscillator. Briefly explain how the circuit operates and how it fulfills the Barkhausen criteria. | 10M | 1 | 3 |
| Q.3(A) | | (i) Explain in detail difference between voltage amplifier and power amplifier. | 3M | 2 | 2 |
| | | (ii)With neat characteristics, explain the classification of power amplifiers based on the Q-point location. | 7M | | 2 |
| | | **OR** | | | |
| Q.3(B) | | (i) Draw the circuit of a double-tuned amplifier and explain its operation. | 8M | 2 | 2 |
| | | (ii) What is the drawback of this amplifier? How it can be eliminated? | 2M | | 3 |
| Q.4(A) | | Explain the operation of MOSFET differential amplifier. Derive the differential gain ($A_D$), common mode gain ($A_C$) and CMRR | 10M | 3 | 3 |

**OR**

| | | | | |
|---|---|---|---|---|
| Q.4(B) | (a) Draw the circuit of a summing amplifier and difference amplifier using an op-amp and derive an expression for output voltage in each case. | 10M | 3 | 3 |
| Q.5(A) | Explain the working of a Schmitt trigger. Draw its hysteresis curve. What parameters determine the hysteresis. | 10M | 4 | 2 |
| | **OR** | | | |
| Q.5(B) | (a)Draw the circuit of precision rectifier and explain the operation with necessary waveform | 5M | 4 | 2 |
| | (b) Explain the working of anti-logarithmic amplifier using op-amp | 5M | | 2 |
| Q.6(A) | Draw the functional block diagram of a mono-stable multivibrator using 555 timer and explain its working. Derive the expression for output frequency. | 10M | 5 | 3 |
| | **OR** | | | |
| Q.6(B) | (a) Draw the circuit of a flash-type A/D converter and explain its operation.<br>(b) What is the disadvantage of a flash-type A/D converter, even though it is the fastest one? | 8M<br>2M | 5 | 3 |

***** END*****

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

Question Paper Code: 18ECE106

# MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS)

## B.Tech II Year II Semester Supplementary End Semester Examinations – July 2022

(Regulations: R18)

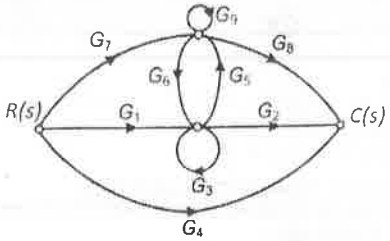
## CONTROL SYSTEM ENGINEERING

(ECE)

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

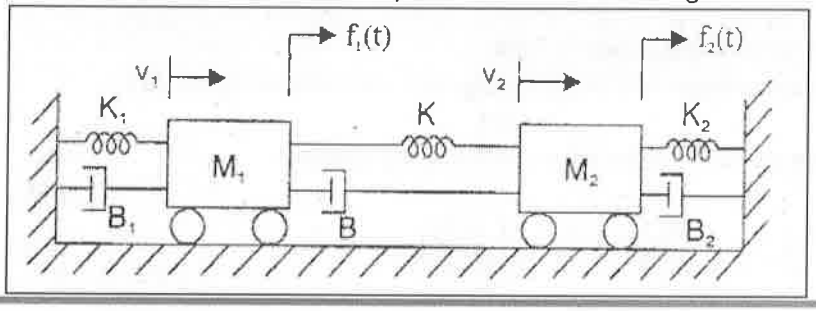
Attempt all the questions. All parts of the question must be answered in one place only.
**All parts of Q.no 1 are compulsory. In Q.no 2 to 6 answer either Part-A or B only**

| Q.No | | Question | Marks | CO | BL |
|---|---|---|---|---|---|
| Q.1 | i. | What is the block diagram reduction rule for elimination of negative feedback loop? | 1M | 1 | 1 |
| | ii. | Write the analogous electrical elements in force-voltage analogy for the elements of mechanical translational system. | 1M | 1 | 1 |
| | iii. | What will be the pole location in s-plane for critically damped second order system? | 1M | 2 | 1 |
| | iv | Draw the PID controller using the passive networks. | 1M | 2 | 1 |
| | v. | What is the requirement for BIBO stability? | 1M | 3 | 1 |
| | vi | How to find the angle of centroid in root locus plot? | 1M | 3 | 1 |
| | vii. | Define phase crossover frequency and gain crossover frequency? | 1M | 4 | 1 |
| | viii. | State the Nyquist stability criteria. | 1M | 4 | 1 |
| | ix. | Define controllability. | 1M | 5 | 1 |
| | x. | What is the significance of state transition matrix? | 1M | 5 | 1 |
| Q.2(A) | | Obtain the transfer function, $C(s)/R(s)$ of the system represented by signal flow graph shown in below figure. | 10M | 1 | 3 |



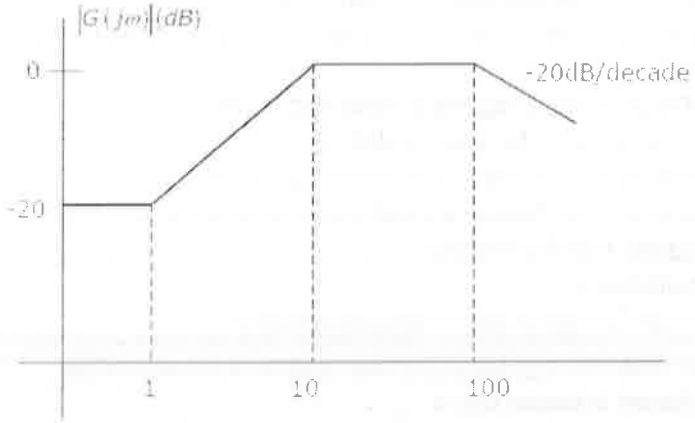

**OR**

| | | | | | |
|---|---|---|---|---|---|
| Q.2(B) | | Sketch the free body diagram and draw the force-voltage and force-current analogous electrical circuits of the system shown in below figure. | 10M | 1 | 3 |




| | | | | | |
|---|---|---|---|---|---|
| Q.3(A) | | Derive the expressions for steady state errors and error constants for various types of systems subjected to step, ramp and parabolic inputs. | 10M | 2 | 2 |

**OR**

| | | | | |
|---|---|---|---|---|
| Q.3(B) | Derive the time response of the underdamped second order system for step input of step value 5. Draw the step response of underdamped second order system. Also, compare the response with critically damped system. | 10M | 2 | 3 |
| Q.4(A) | Draw the root locus for open loop transfer function define as $$H(s)G(s) = \frac{K}{s(s+1)(s+2)}$$ Also comment on stability with respect to value of K. | 10M | 3 | 3 |
| | **OR** | | | |
| Q.4(B) | (i) Determine the value of K and M so that the system oscillates with frequency of 4 rad/sec. $s^3 + Ms^2 + 2Ks + 4 = 0$. (ii) Construct the Routh array and determine the stability of the system whose CE is $s^7 + 2s^6 + 4s^5 + 8s^4 + 12s^3 + 20s^2 + 16s + 16 = 0$. Also comments on roots locations of characteristics equation. | 4+6 = 10M | 3 | 3 |
| Q.5(A) | (i) Explain the lag compensator and derive the expression for maximum phase and corresponding frequency. (ii) Consider the given asymptotic magnitude Bode diagram shown below. Estimate the transfer function of the system.   | 5+5 = 10M | 4 | 3 |
| | **OR** | | | |
| Q.5(B) | A unit feedback control system has $$G(s) = \frac{10}{s(s+1)(s+2)}$$ Draw the Nyquist plot and comment on closed loop stability. | 10M | 4 | 3 |
| Q.6(A) | (i) The state model of a system is given as $$\dot{X} = \begin{bmatrix} 0 & 1 \\ -2 & -3 \end{bmatrix} X + \begin{bmatrix} 0 \\ 1 \end{bmatrix} U$$ $$Y = \begin{bmatrix} 1 & 1 \end{bmatrix} X$$ Check if the system is observable or not. (ii) What are the advantages and disadvantages of state space approach? | 5+5 = 10M | 5 | 3 |
| | **OR** | | | |
| Q.6(B) | (i) Obtain the state transition matrix for the following system $$\begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \end{bmatrix} = \begin{bmatrix} 0 & 1 \\ -2 & -3 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}$$ (ii) Obtain the time response of the following system $$\begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \end{bmatrix} = \begin{bmatrix} 0 & 1 \\ -2 & -3 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u$$ Where u(t) is the unit step function. | 5+5 = 10M | 5 | 3 |

***** END*****

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

Question Paper Code: 18ECE107

# MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS)

**B.Tech II Year II Semester Supplementary End Semester Examinations – July 2022**

(Regulations: R18)

## MICROPROCESSOR AND MICROCONTROLLER

(ECE)

**Time: 3:00 Hrs** 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.No | | Question | Marks | CO | BL |
|---|---|---|---|---|---|
| Q.1 | i. | The given instruction, MOV AX, 0005H belongs to which type of address mode? | 1M | 1 | 1 |
| | ii. | Write the difference between microprocessor and microcontroller? | 1M | 4 | 1 |
| | iii. | How many ports in 8255 architecture? | 1M | 3 | 1 |
| | iv | What is the function of the interrupt INT 03h? | 1M | 2 | 1 |
| | v. | Write the Full form of PPI? | 1M | 3 | 1 |
| | vi | What is RS-232? | 1M | 5 | 1 |
| | vii. | Define LCD Addressing? | 1M | 5 | 1 |
| | viii. | What is the function of assembler directives ORG? | 1M | 2 | 1 |
| | ix. | How many bits 8051 microcontroller? | 1M | 4 | 1 |
| | x. | Which Registers in 8051 can be used for operands? | 1M | 1 | 1 |
| Q.2(A) | | Explain the architecture of 8086. | 10M | 1 | 2 |
| | | **OR** | | | |
| Q.2(B) | | Define addressing modes of 8086 and explain its types in detail with examples and physical address generation. | 10M | 1 | 2 |
| Q.3(A) | | What is Interrupt? Describe type of interrupts in 8086 and explain the function of interrupt service routine in detail. | 10M | 2 | 2 |
| | | **OR** | | | |
| Q.3(B) | | Explain the minimum mode and maximum mode operation of 8086 with neat diagram. Also explain memory write cycle in the minimum mode. | 10M | 2 | 2 |
| Q.4(A) | | Explain the detailed architecture of 8255 PPI. | 10M | 3 | 2 |
| | | **OR** | | | |
| Q.4(B) | | Explain the detailed architecture of Programmable Interval Timer (8254) with a neat block diagram. | 10M | 3 | 2 |
| Q.5(A) | | Explain special function registers (SFRs) in the 8051. | 10M | 4 | 2 |
| | | **OR** | | | |
| Q.5(B) | | Explain 8051 instruction set with an example. | 10M | 4 | 3 |
| Q.6(A) | | Neatly draw circuit diagram of interfacing a stepper motor with 8051. Also write assembly language program in support of connection with stepper motor. | 10M | 5 | 4 |
| | | **OR** | | | |
| Q.6(B) | | Briefly discuss about interfacing of Stepper motor with 8051 microcontroller. Also write the program based on the interfacing. | 10M | 5 | 3 |

***** END*****

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

Question Paper Code: 18MAT112

# MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS)

**B.Tech II Year II Semester (R18) Supplementary End Semester Examinations – July 2022**

## Discrete Mathematical Structures

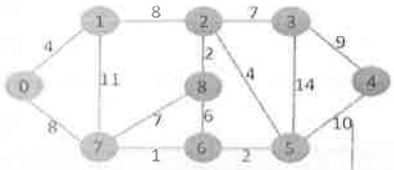
(Common to All)

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

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

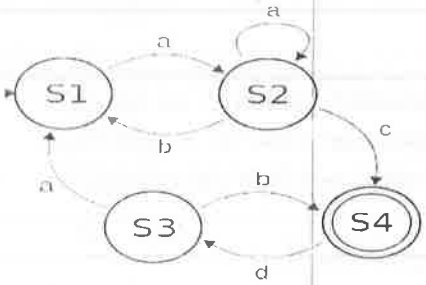
| Q.No | | Question | Marks | CO | Bl |
|---|---|---|---|---|---|
| Q.1 | i. | Define the Tautology. | 1M | 1 | 1 |
| | ii. | Write the following statements in symbolic form "Any integer is either positive or negative". | 1M | 1 | 1 |
| | iii. | How many different bit strings of length seven are there? | 1M | 2 | 1 |
| | iv | How many into functions are there forms a set with m elements to one with n elements? | 1M | 2 | 1 |
| | v. | Define a Semi group? | 1M | 3 | 1 |
| | vi | State Lagrange's theorem of groups. | 1M | 3 | 1 |
| | vii. | Write any two properties of lattices. | 1M | 4 | 1 |
| | viii. | What is POSET? | 1M | 4 | 1 |
| | ix. | How do you obtain a sub graph from a given graph? | 1M | 5 | 1 |
| | x. | What is cyclic graph? | 1M | 5 | 1 |
| Q.2(A) | | Discuss the types of connectives with truth table for suitable example? | 10M | 1 | 3 |
| | | OR | | | |
| Q.2(B) | | (i) Show that $\neg(P \wedge Q)$ follows form $\neg P \wedge \neg Q$. | 5M | 1 | 3 |
| | | (ii)Show that $(x)(P(x) \vee Q(x)) \Rightarrow (x)P(x) \vee (\exists x)Q(x)$. | 5M | 1 | 3 |
| Q.3(A) | | (i) Each user on a computer system has a password, which is six to eight characters long, where each character is an uppercase letter or a digit. Each password must contain at least one digit. How many possible passwords are there? | 5M | 2 | 2 |
| | | (ii) Let n and k be positive integers with n≥k. Then show that $\binom{n+1}{k} = \binom{n}{k-1} + \binom{n}{k}$. | 5M | 2 | 3 |
| | | OR | | | |
| Q.3(B) | | (i) What is the coefficient of $x^9$ in the expression $(2-x)^{19}$ ? | 5M | 2 | 2 |
| | | (ii) How many bit strings of length eight either start with a 1 bit or end with the two bits 00? | 5M | 2 | 3 |
| Q.4(A) | | (i) Consider a binary code consisting of sequences of 3 digits. Derive the parity cheek matrix for single-error correcting codes with m=3 and n=6. | 5M | 3 | 4 |
| | | (ii) Define homomorphism of two semi-groups. Let (S1, $*1$), (S2, $*2$) and (S3,$*3$) be semi-groups and f:S1→S2 and g:S2→S3 be homomorphism's. Prove that the mapping of $g \circ f$ : S1→S3 is a semi-group homomorphism. | 5M | 3 | 3 |
| | | OR | | | |

| | | | | |
|---|---|---|---|---|
| Q.4(B) | (i) Derive the language $L(G) = a^2b^2c^2$ is generated by the following grammar. G = <{S, B, C}, {a, b, c}, S, ϕ> Where ϕ consists of the productions S→ aSBC, S→aBC, CB→BC, aB→ ab, bB→ bb, bC→ bc, cC→ cc. | 5M | 3 | 4 |
| | (ii) Prove that set of integer a group under additive binary operation. | 5M | 3 | 3 |
| Q.5(A) | (i) If n = 30, S30 = {1, 2, 3, 5, 6, 10, 15, 30}. Let R denote the relation division. Then show by drawing the Hasse diagram that (S30, R) is a Lattice. | 5M | 4 | 3 |
| | (ii) In any Boolean algebra, show that $a = b \Leftrightarrow ab' + a'b = b$ | 5M | 4 | 3 |
| | OR | | | |
| Q.5(B) | (i) Obtain the sum-of-product canonical forms of the Boolean expression $(x_1 \oplus x_2) \oplus (x_1' * x_3)$. | 5M | 4 | 3 |
| | (ii) Use the Karnaugh map representation to find a minimal sum-of-product expression of $f(a, b, c) = \sum(0, 2, 3, 7)$ | 5M | 4 | 3 |
| Q.6(A) | Use Dijkstra's algorithm to find shortest paths from source '0' to all vertices in the given graph. | 10M | 5 | 4 |




OR

| | | | | |
|---|---|---|---|---|
| Q.6(B) | What is deterministic finite automaton (DFA)? Find allstring can be generated by the finite state machine below. | 10M | 5 | 4 |




*** END***

Hall Ticket No: | | | | | | | | | | |  Question Paper Code: 18CSE106

# MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS)

**B.Tech II Year II Semester (R18) Supplementary End Semester Examinations – July 2022**

## DIGITAL LOGIC DESIGN

(Computer Science & 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.No. | | Question | Marks | CO | BL |
|---|---|---|---|---|---|
| Q.1 | i. | Convert (777)10 to Gray Code | 1M | 1 | 1 |
| | ii. | Find the complement of F = xy'+x'y | 1M | 1 | 1 |
| | iii. | Simplify Y (A, B, C) = ∑m (1, 3, 5, 7) | 1M | 2 | 3 |
| | iv | Implement Inverter using Ex-OR Function | 1M | 2 | 1 |
| | v. | Define Half Adder and Full Adder | 1M | 3 | 1 |
| | vi | Write the HDL model for Half Adder | 1M | 3 | 1 |
| | vii. | What is a ripple counter? | 1M | 4 | 1 |
| | viii. | Write the difference between Latch and Flip-Flop. | 1M | 4 | 1 |
| | ix. | Define Mealy and Moore Models of Finite State Machines. | 1M | 5 | 1 |
| | x. | Draw the internal logic of a 32×8 ROM. | 1M | 5 | 4 |
| Q.2(A) | | (i) Convert the following numbers as required in each cases:<br>(a) $(25.625)_{10}$ = ( )$_2$ (b). $(ABCD)_{16}$ = ( )$_2$<br>(c) $(A6)_{16}$ = ( )$_8$ (d).$(1264)_8$ = ( )$_{10}$<br><br>(ii) Perform the following operations by using 2's and 10's Complement method:<br>(a). 21- 42 (b). 46-25 | 10M | 1 | 2 |
| | | **OR** | | | |
| Q.2(B) | | (i) Perform the following using BCD arithmetic:<br>(a) $(7122)_{10} + (7715)_{10}$ (b) $(8177)_{10} + (7915)_{10}$<br><br>(ii) Convert the following to Gray-Code:<br>(a) (2349)8 (b) (1249)16 | 10M | 1 | 2 |
| Q.3(A) | | Using 4-variable K'Map simplify the Boolean function given by F (w, x, y, z) = Σm (7, 9, 10, 11, 12, 13, 14, 15) and Also Realize the simplified expression using (a) AND-OR and (b). NAND-NAND | 10M | 2 | 3 |
| | | **OR** | | | |
| Q.3(B) | | Using K'Map simplify in the product-of-sum form the function given by F (A, B, C, D} = ΠM (0, 6, 10, 12) and implement the neither optimized Boolean equation by NOR Gate. | 10M | 2 | 3 |
| Q.4(A) | | (i) Design a Four-bit adder-subtractor unit and explain its working?<br><br>(ii) Design a Full-adder circuit using 3×8 decoder and logic gates? | 10M | 3 | 5 |
| | | **OR** | | | |

| | | | | |
|---|---|---|---|---|
| Q.4(B) | (i) Implement a Boolean Function F (x, y, z) = Σm (1, 2, 6, 7) with a 4×1 Multiplexer | 5M | 3 | 5 |
| | (ii) Design a circuit with four inputs and one output where the output is '1' if the input is divisible by 3 or 7. | 5M | | |
| Q.5(A) | (i) Design a module-8 binary counter using T flip-flop in your realization? | 5M | 4 | 5 |
| | (ii) Discuss the characteristic equation and excitation tables of JK and D type flip-flop? | 5M | 4 | 5 |
| | **OR** | | | |
| Q.5(B) | (i)Design a sequence detector which detects a sequence of 0101 in a stream of data? | 5M | 4 | 5 |
| | (ii) Distinguishbetween Mealy and Moore model? | 5M | 4 | 4 |
| Q.6(A) | Implement the following output function using suitable PLA<br>F1 (A, B, C, D) = Σm (3, 7, 8, 9, 11, 15)<br>F1 (A, B, C, D) = Σm (3, 4, 5, 7, 10, 14, 15)<br>F1 (A, B, C, D) = Σm (1, 5, 7, 11, 15) | 10M | 5 | 3 |
| | **OR** | | | |
| Q.6(B) | (i) Explain the Block Diagram of a 4×4 RAM ? | 5M | 5 | 2 |
| | (ii) What is ASM chart? Compare conventional flowchart with ASM Chart? | 5M | 5 | 2 |

***** END*****

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

Question Paper Code: 18CSE107

# MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS)

**B.Tech II Year II Semester (R18) Supplementary End Semester Examinations – July 2022**

## DESIGN AND ANALYSIS OF ALGORITHMS

(Computer Science & Engineering)

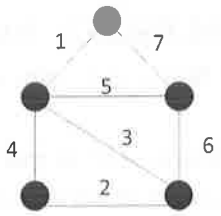
**Time: 3Hrs** **Max Marks: 60**

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

| Q.No | | Question | Marks | CO | BL |
|---|---|---|---|---|---|
| Q.1 | i. | Define Algorithm. | 1M | 1 | 1 |
| | ii. | What is the worst case time complexity of Quick sort? | 1M | 1 | 1 |
| | iii. | Define Minimum Spanning tree | 1M | 2 | 1 |
| | iv | What is greedy method? | 1M | 2 | 1 |
| | v. | What are connected components? | 1M | 3 | 1 |
| | vi | What are the data structures used in BFT and DFT? | 1M | 3 | 1 |
| | vii. | Define backtracking design method. | 1M | 4 | 1 |
| | viii. | What is state space tree? | 1M | 4 | 1 |
| | ix. | Define maximum flow in a graph | 1M | 5 | 1 |
| | x. | What is the relationship between the classes P, NP, NP-complete and NP-hard? | 1M | 5 | 1 |
| Q.2(A) | | Solve the following recurrence relation using Master's method: | 10M | 1 | 3 |
| | | i) $T(n) = n^2 + T(n/2)$, for n>1<br>1, for n=1 | | | |
| | | ii) $T(n) = n^2 \log n + 6T(n/3)$, for n>1<br>1, for n=1 | | | |
| | | iii) $T(n) = 2T\left(\frac{n}{4}\right) + n^{0.51}$ | | | |
| | | **OR** | | | |
| Q.2(B) | | Construct an algorithm for Merger sort. Trace the algorithm for the following values:<br>5, 7, 6, 1, 3, 2, 4. Analyze the algorithm? | 10M | 1 | 5 |
| Q.3(A) | | Discuss about Huffman coding with suitable example? | 10M | 2 | 5 |
| | | **OR** | | | |
| Q.3(B) | | Solve the following knapsack problem with given capacity W=5 using dynamic programming. | 10M | 2 | 3 |

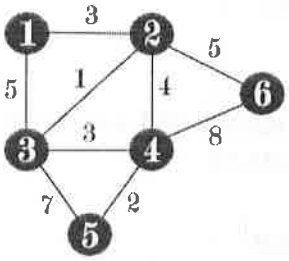
| Item | Weight | Value |
|---|---|---|
| 1 | 2 | 12 |
| 2 | 1 | 10 |
| 3 | 3 | 20 |
| 4 | 2 | 15 |

| | | | | |
|---|---|---|---|---|
| Q.4(A) | Develop to find the minimum cost spanning tree for the following problem using Krushkal's Algorithm? | 10M | 3 | 2 |




**OR**

| | | | | |
|---|---|---|---|---|
| Q.4(B) | Develop to Find the shortest path using Dijstra's algorithm. | 10M | 3 | 2 |




| | | | | |
|---|---|---|---|---|
| Q.5(A) | Examine about 8-Queens problem and how it can be solved? | 10M | 4 | 4 |
| | **OR** | | | |
| Q.5(B) | Discuss about Travelling salesperson problem using Branch and Bound method. | 10M | 4 | 5 |
| Q.6(A) | Compare between NP Hard and NP Complete problem? | 10M | 5 | 5 |
| | **OR** | | | |
| Q.6(B) | Discuss about Ford-Fulkerson Algorithm with suitable example? | 10M | 5 | 5 |

***** END*****

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

Question Paper Code: 18CSE108

# MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS)

**B.Tech II Year II Semester (R18) Supplementary End Semester Examinations – July 2022**

## OPERATING SYSTEMS

(Computer Science & Engineering)

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

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

| Q.No. | | Question | Marks | CO | BL |
|---|---|---|---|---|---|
| Q.1 | i. | List any four functions of operating system | 1M | 1 | 1 |
| | ii. | Define system call. | 1M | 1 | 1 |
| | iii. | What are the benefits of threads? | 1M | 2 | 1 |
| | iv | Draw neat diagram of Process control block | 1M | 2 | 1 |
| | v. | What are the conditions for occurrence of deadlock? | 1M | 3 | 1 |
| | vi | Compare the Safe and unsafe state | 1M | 3 | 2 |
| | vii. | Define swapping | 1M | 4 | 1 |
| | viii. | Define paging | 1M | 4 | 1 |
| | ix. | List any four common file types | 1M | 5 | 1 |
| | x. | List the various File Attribute | 1M | 5 | 1 |
| Q.2(A) | | Discuss the following structures of OS | 3M | 1 | 6 |
| | | i) Simple structures | 3M | | |
| | | ii) Layered approach | 4M | | |
| | | iii) Micro kernels | | | |
| | | **OR** | | | |
| Q.2(B) | | Define system calls. Explain about various system calls? | 10M | 1 | 5 |
| Q.3(A) | | Define Process. Explain various steps involved in change of a process state with process state neat transition diagram? | 10M | 2 | 5 |
| | | **OR** | | | |
| Q.3(B) | | Explain the FCFS, preemptive and non-preemptive versions of Shortest Job First and Round Robin (time-slice2) scheduling algorithms with Gantt Chart for the four processes given. Compare their average turn around and waiting time | 10M | 2 | 5 |

| Process | Arrival Time | Burst Time |
|---|---|---|
| P1 | 0 | 10 |
| P2 | 1 | 6 |
| P3 | 2 | 12 |
| P4 | 3 | 15 |

| | | | | | |
|---|---|---|---|---|---|
| Q.4(A) | | (i) Write Peterson Algorithm for 2-process synchronization to critical section problem and discuss briefly. | 5M | 3 | 6 |
| | | (ii) State semaphores. How do they implement mutual exclusion? | 5M | 3 | 2 |
| | | **OR** | | | |

| | | | | |
|---|---|---|---|---|
| Q.4(B) | Consider the dining philosopher's problem when the chopsticks are placed at the center of the table and any two of them could be used by philosopher. Assume that the requests for chopsticks are made one at a time. Discuss a simple rule for determining whether a particular request could be satisfied without causing deadlock given the current allocation of chopsticks to philosophers? | 10M | 3 | 6 |
| Q.5(A) | Discuss about fragmentation and various types in it? | 10M | 4 | 6 |
| | **OR** | | | |
| Q.5(B) | Discuss paging and implementation of a page table with an example? | 10M | 4 | 6 |
| Q.6(A) | Explain the File System Structure in detail? | 10M | 5 | 5 |
| | **OR** | | | |
| Q.6(B) | Discuss the different file allocation methods with neat diagram. Mention the advantages and disadvantages? | 10M | 5 | 6 |

***** END*****

Hall Ticket No: | | | | | | | | | | | Question Paper Code: 18CST105/18CSIT105

# MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS)

## B.Tech II Year II Semester (R18) Supplementary End Semester Examinations – July 2022

## DESIGN AND ANALYSIS ALGORITHMS

(Common to CST and 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.No. | | Question | Marks | CO | BL |
|---|---|---|---|---|---|
| Q.1 | i. | State Master's theorem? | 1M | 1 | 1 |
| | ii. | Write a short note on Algorithm Design and Analysis of Process. | 1M | 1 | 1 |
| | iii. | What are the features of dynamic programming? | 1M | 2 | 1 |
| | iv | Contrast Greedy algorithm and Dynamic programming. | 1M | 2 | 2 |
| | v. | Define the single source shortest path problem? | 1M | 3 | 1 |
| | vi | Distinguish prim's and kruskal's algorithm? | 1M | 3 | 2 |
| | vii. | Define feasible and optimal solution? | 1M | 4 | 1 |
| | viii. | List some applications of traveling salesperson problem. | 1M | 4 | 1 |
| | ix. | Compare class P and class NP? | 1M | 5 | 2 |
| | x. | When is a problem said to be NP Hard? | 1M | 5 | 1 |
| Q.2(A) | | Design a Quick sort algorithm and derive Best and worst case analysis? | 10M | 1 | 1 |
| | | OR | | | |
| Q.2(B) | | Analyze and Write an algorithm to sort a given list of elements using merge sort .Show the operation of the algorithm, on the list 38, 27, 43, 3, 9, 82, 10. | 10M | 1 | 3 |
| Q.3(A) | | Explain 0/1 knapsack problem with example? | 10M | 2 | 1 |
| | | OR | | | |
| Q.3(B) | | Write Huffman code algorithm and derive its complexity? | 10M | 2 | 1 |
| Q.4(A) | | Discuss about the algorithm and pseudo code to find the minimum spanning tree using prim's algorithm? | 10M | 3 | 1 |
| | | OR | | | |
| Q.4(B) | | Examine Dijkstra's algorithm with a suitable example? | 10M | 3 | 2 |
| Q.5(A) | | Apply Branch and Bound to solve Travelling salesperson Problem? | 10M | 4 | 3 |
| | | OR | | | |
| Q.5(B) | | Describe the Backtracking solution to solve 8 queens problem? | 10M | 4 | 3 |
| Q.6(A) | | Explain P, NP and NP complete problems? | 10M | 5 | 1 |
| | | OR | | | |
| Q.6(B) | | What does NP-hard mean? Demonstrate approximation algorithm for NP hard problem? | 10M | 5 | 1 |

*** END***

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

Question Paper Code: 18CST104

# MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS)

## B.Tech II Year II Semester (R18) Supplementary End Semester Examinations – July 2022

## DIGITAL LOGIC DESIGN

(Computer Science & 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.No. | | Question | Marks | CO | BL |
|---|---|---|---|---|---|
| Q.1 | i. | Convert $(368)_{10}$ in to Octal number system | 1M | 1 | 2 |
| | ii. | State De-Morgan's Theorem. | 1M | 2 | 2 |
| | iii. | Write the advantages of Tabulation method over K-Map method | 1M | 3 | 2 |
| | iv | Write the maxterms corresponding to the logical expressionY = (A + B + C') (A + B' + C') (A' + B' + C) | 1M | 3 | 2 |
| | v. | Write SUM and CARRY expressions of Full Adder. | 1M | 2 | 2 |
| | vi | Define combinational circuits. Give an example. | 1M | 4 | 1 |
| | vii. | Define Latch and Flip flops. | 1M | 5 | 1 |
| | viii. | How many flip flops are required to implement Decade counter. | 1M | 5 | 2 |
| | ix. | Write the full form of PLD,PAL PLA, | 1M | 4 | 1 |
| | x. | Define : i) RAM ii) ROM | 1M | 4 | 1 |
| Q.2(A) | | Convert the given decimal number $(234)_{10}$ to Binary, Octal, Hexadecimal and BCD Equivalent? | 10M | 1 | 3 |
| | | OR | | | |
| Q.2(B) | | Simplify the following functions to minimum number of literals:<br>(a) XY+X'Z+YZ (b) (X+Y)'(X'+Y') (c) (BC'+A'D)(AB'+CD')<br>(d) X'Y'Z+X'YZ+XY' (e) XY+XY'+X'Y | 10M | 1 | 3 |
| Q.3(A) | | Find the minimum SOP expression using K-map for the function f= ∑m (7, 9, 10, 11, 12, 13, 14, 15) and realize the minimized function using only NAND gates? | 10M | 2 | 3 |
| | | OR | | | |
| Q.3(B) | | Minimize the expression using Quine – Mc-Cluskey method.<br>Y= A'BC'D' + A'BC'D + ABC'D' + ABC'D + AB'C'D + A'B'CD' | 10M | 2 | 3 |
| Q.4(A) | | Why NAND and NOR is Universal Gate? Design all gates using NAND & NOR itself. | 6M<br>4M | 3 | 2 |
| | | OR | | | |
| Q.4(B) | | Design (8x1) Multiplexer and also implement (16x1) Multiplexer by using (4x1) MUX. | 10M | 3 | 2 |
| Q.5(A) | | Write the characteristic table and excitation table of SR, JK, D T flip flops. Design T Flip-flop using JK flip-flop. | 10M | 4 | 2 |
| | | OR | | | |

| | | | | |
|---|---|---|---|---|
| Q.5(B) | Differentiate Asynchronous &synchronous also Designsynchronous 4-bit Upcounter using T flip-flop. | 10M | 4 | 2 |
| Q.6(A) | What is programmable array logic (PAL)? Discuss the design of a combinationalcircuit using PAL with suitable example? | 10M | 5 | 2 |
| | OR | | | |
| Q.6(B) | a) Give the classification of semiconductor memory.<br>b) Write short notes on PROM, EPROM. | 10M | 5 | 2 |

*** END***

Hall Ticket No: | | | | | | | | | | | Question Paper Code: 18CST106/18CSIT107

# MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS)

## B.Tech II Year II Semester (R18) Supplementary End Semester Examinations – July 2022

## OPERATING SYSTEMS

(Common to CST and 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.No. | | Question | Marks | CO | Bl. |
|---|---|---|---|---|---|
| Q.1 | i. | Define Operating System. | 1M | 1 | 1 |
| | ii. | Represent the shell command used to rename a file. | 1M | 1 | 2 |
| | iii. | List the different states of process | 1M | 2 | 1 |
| | iv | What is Preemptive Scheduling? | 1M | 2 | 1 |
| | v. | State the term mutual exclusion. | 1M | 3 | 1 |
| | vi | When a process is said to be in safe state? | 1M | 3 | 2 |
| | vii. | Differentiate Physical memory with logical memory | 1M | 4 | 2 |
| | viii. | Why a page is said as dirty page? | 1M | 4 | 1 |
| | ix. | Give the use of files. | 1M | 5 | 1 |
| | x. | What are tracks? | 1M | 5 | 1 |
| Q.2(A) | | Classify the different types of Operating Systems? | 10M | 1 | 2 |
| | | OR | | | |
| Q.2(B) | | Write a shell program to do all the arithmetic operations with examples? | 10M | 1 | 4 |
| Q.3(A) | | Elaborate the various states of process? | 10M | 2 | 2 |
| | | OR | | | |
| Q.3(B) | | Find out the average waiting time and through put time for the following process execution using SJF method:<br>Process : P1 P2 P3 P4 P5<br>Burst Time: 7 12 2 6 5 | 10M | 2 | 4 |
| Q.4(A) | | Enumerate the producer – consumer problem with suitable example? | 10M | 3 | 3 |
| | | OR | | | |
| Q.4(B) | | Explicate how deadlock can be prevented? | 10M | 3 | 3 |
| Q.5(A) | | Compare and contrast External fragmentation with Internal Fragmentation? | 10M | 4 | 4 |
| | | OR | | | |
| Q.5(B) | | Discuss on Demand Paging with suitable example? | 10M | 4 | 3 |
| Q.6(A) | | Discuss the various file access methods? | 10M | 5 | 3 |
| | | OR | | | |
| Q.6(B) | | Explain with suitable example the concept of SCAN scheduling? | 10M | 5 | 3 |

*** END***

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

Question Paper Code: 18CSIT104

# MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS)

## B.Tech II Year II Semester (R18) Supplementary End Semester Examinations – July 2022

## Computer Organization and Architecture

(Computer Science & 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.No | | Question | Marks | CO | BL |
|---|---|---|---|---|---|
| Q.1 | i. | If a computer A runs a program in 15 second & B runs the same Problem in 25 seconds how much faster is A than B? | 1M | 1 | 2 |
| | ii. | State Moore's law. | 1M | 1 | 1 |
| | iii. | Convert 2.33 to binary. | 1M | 2 | 1 |
| | iv | Represent - $(7.127)_{10}$ in single precision format | 1M | 2 | 1 |
| | v. | Mention the purpose of write back registers. | 1M | 3 | 1 |
| | vi | Give an example for RAW hazard? | 1M | 3 | 1 |
| | vii. | Define Instruction Level Parallelism (ILP)? | 1M | 4 | 1 |
| | viii | List drawback of executing multi threads? | 1M | 4 | 1 |
| | ix. | What is meant by Temporal locality and Spatial locality? | 1M | 5 | 1 |
| | x. | Why CPU often Communicates with Cache memory? Why? | 1M | 5 | 1 |
| Q.2(A) | | Explain briefly about Arithmetic type instructions used in RISC processor with necessary examples? | 10M | 1 | 2 |
| | | OR | | | |
| Q.2(B) | | i) Discuss any four types of Addressing modes of any latest CISC Processor with suitable examples? | 10 M | 1 | 2 |
| | | ii) Draw the flow chart to find the Fibonacci series of a given number? | 4 M | 1 | 3 |
| Q.3(A) | | Illustrate the 2's complement and booth's multiplication algorithms with a Suitable flow chart and example. | 10M | 2 | 3 |
| | | OR | | | |
| Q.3(B) | | Convert the following fixed point numbers into Normalized floating point numbers: i) 79.139 ii) 0.00257 | 10M | 2 | 3 |
| Q.4(A) | | Draw the Data path diagram for the given arithmetic instruction Add $Rs, $Rt, $Rd And also Explain the Operation of data path for above instruction? | 10M | 3 | 2 |
| | | OR | | | |
| Q.4(B) | | Discuss about different stages in Processor? And also Explain about instruction fetch stage with neat block diagram? | 10M | 3 | 3 |
| Q.5(A) | | Explain about SMT micro architecture block diagram in detailed? | 10M | 4 | 4 |
| | | OR | | | |

| | | | | |
|---|---|---|---|---|
| Q.5(B) | Discuss about the various challenges of parallel processing. | 10M | 4 | 2 |
| Q.6(A) | Explain briefly about functions of Cache Memory? And also Discuss about One.Set mapping technique with neat block diagram? | 10M | 5 | 3 |
| | OR | | | |
| Q.6(B) | What is Virtual Memory? Explain steps involved in mapping of a Virtual address into physical address with a neat diagram. | 10M | 5 | 2 |

*** END***

Hall Ticket No: | | | | | | | | | | | Question Paper Code: 18CSIT106

# MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS)

**B.Tech II Year II Semester (R18) Supplementary End Semester Examinations –July 2022**

## DATABASE MANAGEMENT SYSTEMS

(Computer Science & 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.No | | Question | Marks | CO | BL |
|---|---|---|---|---|---|
| Q.1 | i. | Define Natural Join with Example. | 1M | 1 | 1 |
| | ii. | What is a schema? | 1M | 1 | 1 |
| | iii. | What is TRC, give an example? | 1M | 2 | 2 |
| | iv | Write the syntax for SET operations in SQL? | 1M | 2 | 4 |
| | v. | What is the need of Normalization? | 1M | 3 | 3 |
| | vi | Define 2NF? | 1M | 3 | 2 |
| | vii. | Differentiate the shared and exclusive lock? | 1M | 4 | 4 |
| | viii. | Define hashing? | 1M | 4 | 2 |
| | ix. | State the Limitation in sql authorization. | 1M | 5 | 4 |
| | x. | State the need of database recovery. | 1M | 5 | 4 |
| Q.2(A) | | Design the E-R diagram which models an online bookstore with following entity set (author, publisher, customer, book, shopping_card, wareshouse) and relationship (writtenby, publishedby, etc.) | 10M | 1 | 6 |
| | | OR | | | |
| Q.2(B) | | Classify the terms generalization and specialization in details with an suitable example? | 10M | 1 | 3 |
| Q.3(A) | | Construct the SQL queries for the following:<br>(i). Retrieve all data from employee, jobs and deposit.<br>(ii). Give details of account no. and deposited rupees of customers having account opened between dates 01-01-06 and 25-07-06.<br>(iii). Display all jobs with minimum salary is greater than 4000.<br>(iv). Display name and salary of employee whose department no is 20. Give alias name to name of employee. | 10M | 2 | 3 |
| | | OR | | | |
| Q.3(B) | | Describe about different SQL operators and aggregate functions? | 10M | 2 | 3 |
| Q.4(A) | | States the Procedure to find minimal set of FD's and solve the following: A→B, C→B, D→AB C, A C→C using the same? | 10M | 3 | 3 |
| | | OR | | | |

| | | | | |
|---|---|---|---|---|
| Q.4(B) | Explain 3NF & BCNF. What is the difference between them? | 10M | 3 | 4 |
| Q.5(A) | Explain view Serializability with an example? How it is different from Conflict Serializability? | 10M | 4 | 4 |
| | OR | | | |
| Q.5(B) | Define view serializability with example and state the comparison between conflict and view serializability? | 10M | 4 | 4 |
| Q.6(A) | Explain the different types of recovery facilities in detail? | 10M | 5 | 2 |
| | OR | | | |
| Q.6(B) | Explain in detail about various types of SQL injection prevention techniques? | 10M | 5 | 2 |

***** END*****