

Time: 3 Hours

Max Marks: 70

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

UNIT-I

1. a) Find the values of $Z(\cos hn\theta)$ and $Z(\sin hn\theta)$ 7M
 b) Find $Z(2 \cdot 3^n + 5 \cdot n)$ and deduce $Z(2 \cdot 3^{n+3} + 5(n+3))$ using shifting theorem 7M
 (OR)
 2. If $Z(u_n) = \frac{2z^2+4z+12}{(z-1)^4}$ find the value of u_3 . 14 M

UNIT-II

3. Evaluate $Z^{-1}\left[\frac{z^3-20z}{(z-2)^3(z-4)}\right]$ 14 M
 (OR)
 4. a) Evaluate $Z^{-1}\left[\frac{z^2-3}{(z+2)(z^2+1)}\right]$ 7M
 b) Using Convolution Theorem Evaluate, $Z^{-1}\left[\frac{z^2}{(z-a)(z-b)}\right]$ 7M

UNIT-III

5. Find the Fourier sine and cosine transform of 14M

$$f(x) = \begin{cases} x & \text{for } 0 < x < 1 \\ 2-x & \text{for } 1 < x < 2 \\ 0 & \text{for } x > 2 \end{cases}$$

 (OR)
 6. Find the Fourier transform of $e^{-a|x|}$ ($a > 0$) and hence show that $F(xe^{-a|x|}) = \frac{i4ap}{(a^2+p^2)^2}$. 14M

UNIT-IV

7. Find the Fourier Sine and cosine transform of e^{-ax} , $a > 0$ and hence deduce the inversion formula 14M
 (OR)
 8. Evaluate the following by using Parseval's identity $\int_0^\infty \frac{x^2 dx}{(x^2+a^2)^2}$ ($a > 0$) 14M

UNIT-V

9. Solve the difference equation, using Z-transform $y(n+2) - 6y(n+1) + 8y(n) = 2^n$, Given $y(0) = 0, y(1) = 0$ 14M
 (OR)
 10. Solve the difference equation, using Z-transform 14M
 $u_{n+2} - 3u_{n+1} + 10u_n = 0$, given $u_0 = 1, u_1 = 0$
 1 of 1

AR16

CODE: 16OE2022

SET-1

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)**

II B.Tech II Semester Supplementary Examinations, October / November-2020

FUNDAMENTALS OF BUILDING PLANNING (OPEN ELECTIVE - II)

Time: 3 Hours

Max Marks: 70

INSTRUCTIONS:

- Question paper consists of Five Questions from respective units with internal choice.
- Each question carries 14 Marks **(5X14M=70M).**

Answer all five questions selecting **one question from each unit.**

UNIT-I

1. a) Explain structure of the timber with neat sketch? 8M
b) Explain the uses of some of the modern building materials? 6M

(OR)

2. a) Explain the characteristics of good timber? 8M
b) Explain the characteristics of good brick? 6M

UNIT-II

3. a) Explain the characteristics of various types of residential buildings? 8M
b) What are the minimum standards or requirements of a staircase? 6M

(OR)

4. a) What are the requirements of parts of a residential building? Explain them. 8M
b) What are the minimum standards or requirements a varandah? 6M

UNIT-III

5. a) Explain the significance of bonds for a brick wall with neat sketches? 6M
b) Explain different types of windows with neat sketches? 8M

(OR)

6. a) Explain different types of doors and its components with neat sketches? 8M
b) Explain advantages and disadvantages of flat roof? 6M

UNIT-IV

7. a) Explain the classification of buildings? 8M
b) Explain about floor area ratio and floor space index? 6M

(OR)

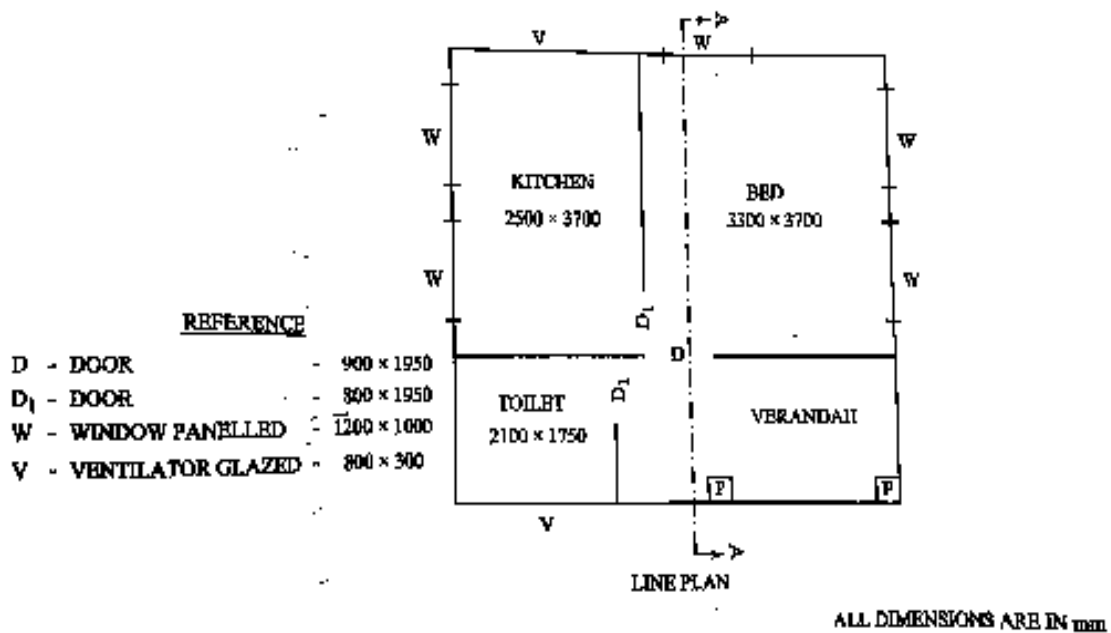
8. a) Explain height of the building 6M
b) What are building byelaws? Explain the objectives of building byelaws? 8M

UNIT-V

9. Explain plan and section of a residential building with neat diagram. 14M

(OR)

10. Draw the Section and elevation of a given line diagram of residential building. 14M



AR16

CODE: 16OE2024

SET-2

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)**

II B.Tech II Semester Regular & Supplementary Examinations, October / November-2020

PRINCIPLES OF MECHANICAL MEASUREMENTS

Time: 3 Hours

Max Marks: 70

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

UNIT-I

1. What are the different static and dynamic performance characteristics used in mechanical measurements? **14**
- (OR)
2. What do you mean by instrumentation? Write the objectives of instrumentation? **14**

UNIT-II

3. Explain, how an elastic diaphragm gauge is used to measure pressure with the help of relevant sketch. **14**
- (OR)
4. Explain the principle of operations of **14**
(i) Hot wire anemometer.
(ii) Turbine meter for the measurement of Fluid velocity.

UNIT-III

5. What is pyrometer? Briefly explain the working of optical pyrometer with suitable sketches. **14**
- (OR)
6. Explain working of liquid filled thermometer with relevant sketches? **14**

UNIT-IV

7. Explain the different principles of working of capacitive transducers. **14**
- (OR)
8. What is potentiometer? How it measures linear and angular displacements? **14**

UNIT-V

9. Working and construction of load cells and how it measure force? **14**
- (OR)
10. Describe the function of a stroboscope and explain how speed of a rotating shaft. **14**

AR16

CODE: 16OE2025

SET-1

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)**

II B.Tech II Semester Supplementary Examinations, October/November,2020

PRINCIPLES OF COMMUNICATIONS

Time: 3 Hours

Max Marks: 70

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

UNIT-I

1. a) Discuss power spectral density and give fourier transform of various signals. **10M**
b) Define a communication system and give its functions **4M**
(OR)
2. a) Draw the Block diagram of communication system and explain each block in detail. **10M**
b) Define auto correlation function and convolution. **4M**

UNIT-II

3. a) Explain the generation of amplitude modulation with neat diagram. **10M**
b) Discuss bandwidth consideration of Frequency Modulation. **4M**
(OR)
4. a) Explain one of the demodulation methods of Amplitude Modulation with neat diagram. **10M**
b) Compare Frequency Modulation & Phase Modulation **4M**

UNIT-III

5. a) What is nyquist rate of Sampling? Discuss types of sampling. **8M**
b) Define Frequency division multiplexing and mention its applications. **6M**
(OR)
6. a) Explain PAM,PWM and PPM Modulations with neat wave forms. **10M**
b) What is multiplexing? What are the types of multiplexing? **4M**

UNIT-IV

7. a) Define ASK and show its waveform. **4M**
b) What are the elements of PCM Modulation and explain the functions of it. **10M**
(OR)
8. a) Explain Delta Modulation and Adaptive Delta Modulation methods. **10M**
b) What is Frequency Shift Keying? **4M**

UNIT-V

9. Develop Huffman code with an example and find coding efficiency .Explain with steps **14M**
(OR)
10. a) Explain the amount of information and Average information and their properties **10M**
b) Define information Rate and give the formula. **4M**

AR16

CODE: 16OE2026

SET-2

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)**

II B.Tech II Semester Supplementary Examinations, October / November-2020

INTRODUCTION TO JAVA

Time: 3 Hours

Max Marks: 70

Answer ONE Question from each Unit

Each Questions Carry 14 Marks

All parts of the Question must be answered at one place

UNIT-I

1. a) List and explain Java buzzwords 8M
b) Discuss about array in java with simple example 6M
(OR)
2. a) Discuss the principles of object oriented languages in detail. 9M
b) What is type conversion and casting? Explain in detail 5M

UNIT-II

3. a) Define a class? What is the general form of a class? How objects are declared? explain with an example? 8M
b) Define constructor? Explain in detail with example. 6M
(OR)
4. a) With example explain the use of static keyword 6M
b) Explain method overloading with an example 8M

UNIT-III

5. a) What is method overriding? Illustrate the concepts of method overriding with example. 7M
b) With example, explain about abstract classes in java 7M
(OR)
6. a) Give a detail note on interfaces in java with example 7M
b) Explain java packages with example 7M

UNIT-IV

7. a) With example, explain the usage of try catch block in exception handling 7M
b) illustrate the use of multiple catch blocks for a try block with example 7M
(OR)
8. a) Explain throw in java with example. 7M
b) What is the role of 'finally' in exception handling? Explain with an example 7M

UNIT-V

9. a) What do you mean by Multithreading? Write a simple program to illustrate the use of multithreading 10M
b) What is Thread? What are the different priorities of Thread? 4M
(OR)
10. a) What is thread synchronization? Explain with a suitable program. 6M
b) Explain thread life cycle and thread creation in Java with example 8M

AR16

CODE: 16OE2027

SET-2

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)**

II B.Tech II Semester Supplementary Examinations, October / November-2020

INTRODUCTION TO PYTHON

Time: 3 Hours

Max Marks: 70

Answer ONE Question from each Unit

Each Questions Carry 14 Marks

All parts of the Question must be answered at one place

UNIT-I

1. a) Mention the features of PYTHON 7M
b) Write a PYTHON program with basic syntax rules using command interpreter. 7M
(OR)
2. a) Define variable. How PYTHON handle the variables with an example. 7M
b) Determine the Datatype of a variable in PYTHON with examples. 7M

UNIT-II

3. a) Describe control statements in PYTHON with syntax. 7M
b) Illustrate the use of 'else suite' with loops with an example 7M
(OR)
4. a) What is Boolean expression with a suitable PYTHON program? 7M
b) Write a PYTHON program to display numbers from 1 to 10. 7M

UNIT-III

5. a) Define the operation of **slicing or indexing** in PYTHON with an example. 7M
b) Define Dictionary? Explore the operations on Dictionaries in PYTHON. 7M
(OR)
6. a) Define string. Explore the string operations in PYTHON 7M
b) Define module. Illustrate the use of import statement with PYTHON program. 7M

UNIT-IV

7. a) Define Exception. Write some important built-in exceptions in PYTHON. 7M
b) Illustrate exception handling for try-except-else-finally blocks in PYTHON 7M
(OR)
8. a) Explore the text processing related file operations in PYTHON. 7M
b) Write a PYTHON program that copies content of one file to another file. 7M

UNIT-V

9. a) Summarize the OOP concepts in PYTHON. 7M
b) Write a PYTHON program to create class and object with an example. 7M
(OR)
10. a) Write a PYTHON program that illustrates the word Polymorphism. 7M
b) Write a PYTHON program that illustrates concept of Multiple Inheritance. 7M

AR16**CODE: 16OE2029****SET-1****ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)****II B.Tech II Semester Regular & Supplementary Examinations, October / November-2020****COMPUTATIONAL NUMBER THEORY****Time: 3 Hours****Max Marks: 70**

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

UNIT-I

1. a Obtain gcd of 285 and 355 7M
b Express 285 and 355 in the form of $ax+by$ 7M

(OR)
2. a. Prove that $n(n^2+20)$ is divisible by 48 7M
b. Find Number of divisor and sum of divisors of 900 7M

UNIT-II

3. Show that $3^{n+2} - 8n - 9 \equiv 0 \pmod{64}$ 14M

(OR)
4. a. Solve the congruence $342x \equiv 5 \pmod{13}$ 7M
b. Find the remainder in the division of 3^{10} by 23 7M

UNIT-III

5. a. Define Euler-Fermate theorem . Hence, Show that $n^{12} - a^{12}$ is divisible by 13 7M
b. Define Wilson theorem. Hence, show that $(12! + 1)$ is divisible by 13. 7M

(OR)
- 6 Find all integers that leave the remainders 1or 2 when they divided by each of 3,4 and 5 14M

UNIT-IV

7. Define Mobius function μ . Determine $\mu(n)$ for $n= 1, 2, \dots, 9, 10$. 14M

(OR)
8. Define Euler Totient Function Φ . 14M
Determine $\Phi(n)$ for $n = 17, 35, 81, 180, 920, 1600$

UNIT-V

9. Find residue class for $p=19$ and classify NRP and $\bar{N}RP$ 7M
Evaluate $(5/9)$ and $(7/15)$ 7M

(OR)
10. Determine whether 85 is quadratic residue of 223 or not 14M

AR16

CODE: 16OE202A

SET-2

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)**

II B.Tech II Semester Regular & Supplementary Examinations, October / November-2020

REMOTE SENSING

Time: 3 Hours

Max Marks: 70

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

UNIT-I

1. a) Explain characteristics EMR interaction with soil particle? 7M
b) How EMR does interact with ozone and water vapour? 7M
(OR)
2. a) What do you understand by scattering of electromagnetic radiation? 7M
b) Write about Raman's scattering? 7M

UNIT-II

3. a) Give the spectral ranges, bands and resolutions of MSS/PAN/WiFS in LandSat 4 7M
b) Write about TM, panchromatic camera? 7M
(OR)
4. a) Explain the operations of A long-Track and Across-Track scanners 7M
b) Write note on thermal detectors? 7M

UNIT-III

5. a) Explain the platforms used in Remote sensing 7M
b) Explain about Geostationary and polar orbiting satellite 7M
(OR)
6. a) Explain about Carto satellite 7M
b) Write about Landsat series of satellites 7M

UNIT-IV

7. a) What are the requirements and methods of Image processing? 7M
b) Explain geometric correction and spatial filtering technique 7M
(OR)
8. a) Explain the use of remote sensing data in water resources studies? 7M
b) What is ground truth? Explain its role 7M

UNIT-V

9. a) Explain about Maximum likelihood classification of an image 7M
b) Write about parallelepiped classification 7M
(OR)
10. a) Write about accuracy assessment of classified image 7M
b) Write the advantages and limitations of unsupervised classification 7M

**CONCRETE TECHNOLOGY
(Civil Engineering)****Time: 3 Hours****Max Marks: 70****PART-A****ANSWER ALL QUESTIONS****[1 x 10 = 10 M]**

1. a) What is the influence of tri and di-calcium silicates and tri-calcium aluminates on the properties of cement?
- b) Name two important effects of admixtures in concrete making.
- c) List out the factors that affect the workability of concrete?
- d) Why curing is required in the process of manufacturing of concrete?
- e) What is the maturity of concrete cured at 18°C for 7 days and 35°C for 14 days?
- f) Write the relation between cube and cylinder strength.
- g) What is Shrinkage of concrete?
- h) What are pozzolanic materials?
- i) Give the classification of Aggregates.
- j) Mention various tests for concrete.

PART-B**Answer one question from each unit****[5x12=60M]****UNIT-I**

2. a) What are the properties of cement? Explain. 6 M
 - b) Write a short note on (i) Portland Pozzolana cement 6 M
(ii) Sulphate Resisting cement
- (OR)**

3. a) Write short notes on chemical admixtures in concrete? 6 M
- b) Discuss the role of mineral admixtures in concrete? 6 M

UNIT-II

4. Explain the physical and mechanical properties of aggregate based in concrete. 12 M
- (OR)**
5. a) Discuss in detail about segregation and bleeding. 6 M
 - b) Write the specifications for quality of mixing water and curing water. 6 M

UNIT-III

6. a) What is gel/space ratio and its significance on the strength of concrete. 6 M
- b) Define workability and tests available for the measurement of workability of concrete. 6 M

(OR)

7. a) How is the ultrasonic pulse velocity of concrete determined? 6 M
- b) What is the influence of the moisture content of concrete on its ultrasonic pulse velocity. 6 M

UNIT-IV

8. Write a note on: i) Creep ii) Shrinkage of Concrete. 12 M

(OR)

9. a) Draw the stress strain curve of concrete? Locate initial tangent modulus, tangent modulus and secant modulus on the curve? 6 M
- b) Define modulus of elasticity and shrinkage? Write types of shrinkage? 6 M

UNIT-V

10. What is meant by concrete mix design? Write the steps involved in the method of Mix design. 12 M

(OR)

11. What are the proportioning of concreting mixes by various methods? 12 M

**DESIGN OF MACHINE MEMBERS - I
(Mechanical Engineering)****Time: 3 Hours****Max Marks: 70****PART-A****ANSWER ALL QUESTIONS****[1 x 10 = 10 M]**

1. a) What are preferred numbers?
- b) Define fatigue stress concentration factor?
- c) Define notch sensitivity factor?
- d) What is meant by Circumferential stress in thin cylindrical shells?
- e) What is the purpose of caulking process?
- f) Draw a double riveted lap joint with chain riveting
- g) What is pressure vessel and give some examples
- h) Name various types of keys
- i) What are the applications of a cotter joint?
- j) What is nipping of a leaf spring?

PART-B**Answer one question from each unit****[5x12=60M]****UNIT-I**

2. Describe any five theories of failure? 12M

(OR)

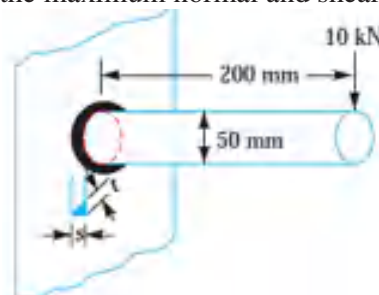
3. A steel rod is subjected to a reversed axial load of 180 kN. Find the diameter of the rod for a factor of safety of 2. Neglect column action. The material has an ultimate tensile strength of 1070 MPa and yield strength of 910 MPa. The endurance limit is reversed bending may be assumed to be one half of the ultimate tensile strength. The correction factors are as follows.
Load factor = 0.7; surface finish factor = 0.8
Size factor = 0.85; stress concentration factor = 1. 12M

UNIT-II

4. Double riveted double cover butt joint in plates 20 mm thick is made with 25 mm diameter rivets at 100 mm pitch. The permissible stresses are :
 $\sigma_t = 120 \text{ MPa}$; $\tau = 100 \text{ MPa}$; $\sigma_c = 150 \text{ MPa}$ 12M
Find the efficiency of joint, taking the strength of the rivet in double shear as twice than that of single shear.

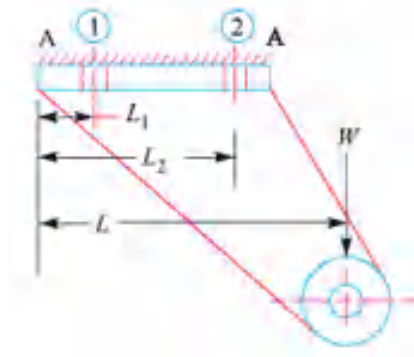
(OR)

5. a) What are the advantages and limitations of welding over riveting? 6M
b) 50 mm diameter solid shaft is welded to a flat plate as shown in Fig. If the size of the weld is 15 mm, find the maximum normal and shear stress in the weld. 6M



UNIT-III

- 6 A bracket, as shown in fig. supports a load of 30 kN. Determine the size of bolts, if the maximum allowable tensile stress in the bolt material is 60 MPa. The distances are : $L_1 = 80$ mm, $L_2 = 250$ mm, and $L = 500$ mm. 12M



(OR)

7. a) Describe circumferential stress and longitudinal stress in a cylindrical shell when subjected to internal pressure? 4M
b) A cast iron cylinder of internal diameter 200 mm and thickness 50 mm is subjected to a pressure of 5 N/mm². Calculate the tangential and radial stresses at the inner, middle (radius = 125 mm) and outer surfaces. 8M

UNIT-IV

8. Design and draw a cotter joint to support a load varying from 30 kN in compression to 30 kN in tension. The material used is carbon steel for which the following allowable stresses may be used. The load is applied statically. 12M
 $\sigma_c = 50$ MPa ; $\tau = 35$ MPa and crushing stress, $\sigma_c = 90$ MPa.

(OR)

9. a) List out the various types of stresses induced in shafts. 4M
b) Compare the weight, strength and stiffness of a hollow shaft of the same external diameter as that of solid shaft. The inside diameter of the hollow shaft being half the external diameter. Both the shafts have the same material and length. 8M

UNIT-V

10. Design a muff coupling which is used to connect two steel shafts transmitting 40 kW at 350 r.p.m. The material for the shafts and key is plain carbon steel for which allowable shear and crushing stresses may be taken as 40 MPa and 80 MPa respectively. The material for the muff is cast iron for which the allowable shear stress may be assumed as 15 MPa. 12M

(OR)

11. a) Explain the buckling of springs? 2M
b) Design a helical compression spring for a maximum load of 1000 N for a deflection of 25mm using the value of spring index as 5. The maximum permissible shear stress for spring wire is 420 MPa and modulus of rigidity is 84 KN/mm². 10M