AR16

CODE: 16OE2021 SET-I

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech II Semester Supplementary Examinations, February-2021
TRANSFORM 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) Find the values of $Z(\cos n\theta)$ and $Z(\text{ncos}\, n\theta)$ **7M**

   b) Find the value of $Z\left(\frac{1}{n(n+1)}\right)$ **7M**

(OR)

2. Find $Z(n^2)$ using $Z(n^2)$Show that $Z(n^2a^n) = \frac{az^2+a^2z}{(z-a)^3}$ **14 M**

UNIT-II

3. a) Find the value of $Z^{-1}[\frac{2z^2+3z}{(z+2)(z-4)}]$ **7 M**

   b) Using Convolution Theorem, show that $Z^{-1}\left[\frac{1}{n!} * \frac{1}{n!}\right] = \frac{2^n}{n!}$ **7 M**

(OR)

4. a) Find the value of $Z^{-1}\left[\frac{z^2-3}{(z+2)(z^2+1)}\right]$ **7M**

   b) Using Convolution Theorem, find the value of $Z^{-1}\left[\frac{z^2}{(z-1)(z-3)}\right]$ **7M**

UNIT-III

5. Using Fourier integral show that $e^{-ax} - e^{-bx} = \frac{2(a^2-b^2)}{\pi}\int_0^\infty \frac{\lambda sin\lambda x}{(\lambda^2+a^2)(\lambda^2+b^2)}d\lambda\,, a, b > 0$ **14M**

(OR)

6. Find the finite Fourier sine and cosine Transform of $f(x) = 2x\ for\ 0 < x < 2\pi$ **14M**

UNIT-IV

7. a) Find the inverse Fourier sine transform of $f(x)$of $F_s(p) = \frac{p}{p^2+1}$ **7 M**

   b) Find $f(x)$ if its finite fourier cosine transform is **7 M**

$$F_c(n) = \begin{cases} \frac{\sin\left(\frac{n\pi}{2}\right),}{2n} & if\ n = 1,2,3\ldots \\ \frac{\pi}{4}\ if\ n = 0 \end{cases} \quad \text{given } 0 < x < 1.$$

(OR)

8. Find the Fourier transform of $f(x)$ defined by **14M**

$$f(x) = \begin{cases} 1 - x^2, & |x| \le 1 \\ 0, & |x| > 1 \end{cases}$$ and hence evaluate and $\int_0^\infty \frac{xcosx-sinx}{x^3} cos\frac{x}{2}dx$

UNIT-V

9. Solve the difference equation, using Z-transform **14M**
$$y(n+2) - 4y(n+1) + 3y(n) = 0, \quad \text{given } y(0) = 2, y(1) = 4$$

(OR)

10. Solve the difference equation, using Z-transform $y(n+2) - 6y(n+1) + 8y(n) = 6n$, Given $y(0) = 0, y(1) = 0$ **14M**

AR16

CODE: 16OE2022 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech II Semester Supplementary Examinations, February-2021

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 characteristics of good brick?	6M

(OR)

2.	a)	Explain the characteristics of good timber?	8M
	b)	Explain the process of manufacturing of bricks?	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 difference between pitched roof and shell roof?	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 different types of bonds in brick masonry with neat sketches?	6M

UNIT-IV

7. a) Explain the classification of buildings? 8M
   b) Explain height of the building? 6M

(OR)

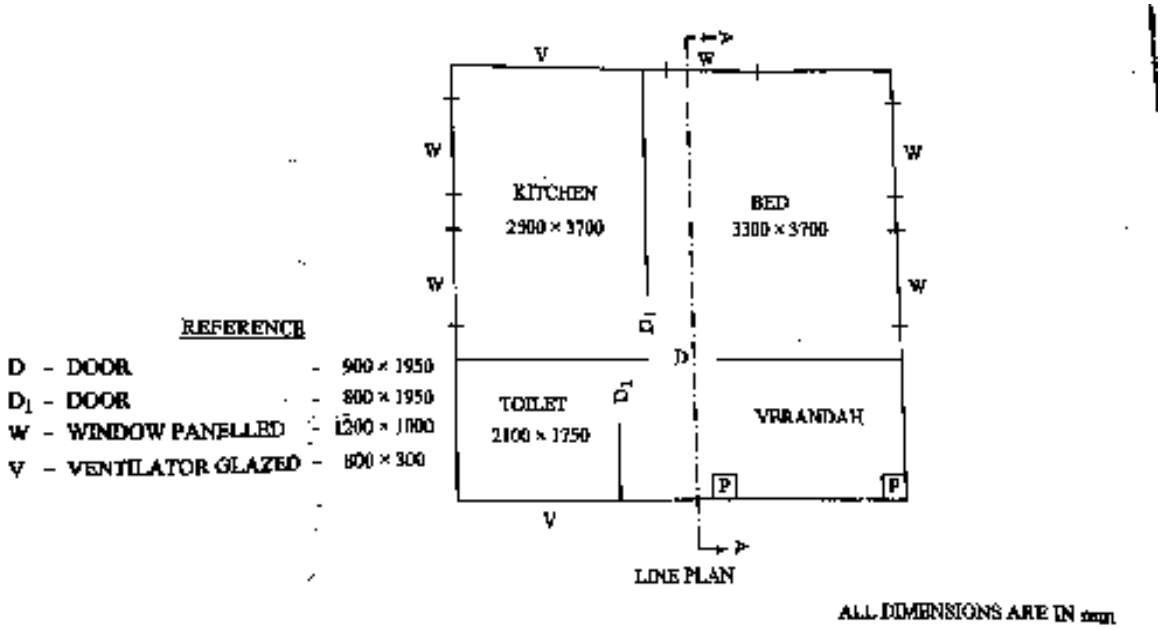
8. a) Explain about floor area ratio and floor space index? 6M
   b) What are building byelaws? Explain the objectives of building byelaws? 8M

UNIT-V

9. Draw the plan and section of given line diagram of residential building. 14M

(OR)

10. Draw the Plan and elevation of given line diagram. 14M



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AR16

CODE: 16OE2024 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech II Semester Supplementary Examinations, February-2021

PRINCIPLES OF MECHANICAL MEASUREMENTS

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.		Define accuracy, precision, sensitivity, repeatability, tolerance, range, span and resolution?	14M
		(OR)	
2.		Differentiate static characteristics with dynamic characteristics in measuring systems?	14M

UNIT-II

3.	a)	With a neat sketch explain working principle and operation of bourdon mechanical pressure gauge?	7M
	b)	Illustrate working principle of diaphragm gauges with suitable sketch and state merits and demerits?	7M
		(OR)	
4.	a)	With a neat sketch explain working principle and operation of rota meter and list out any 4 merits and demerits?	7M
	b)	Briefly explain working principle and operation of magneto flow meter with a neat sketch?	7M

UNIT-III

5.		Explain working principle of bimetallic thermometer with a neat figure? And list out their advantages and disadvantages?	14M
		(OR)	
6.		Briefly discuss working principle and operation of resistance temperature detector with neat sketch?	14M

UNIT-IV

7.		Explain working principle and operation of LVDT and state their advantages, disadvantage and application?	14M
		(OR)	
8.		With suitable sketches explain working principle and operation of resistance transducers. State their advantages, disadvantage and application??	14M

UNIT-V

9.		With a neat sketch explain working principle and operation of stroboscope and list merits, demerits and applications?	14M
		(OR)	
10.	a)	Write short notes on optical torsion meter?	7M
	b)	Write a short note on elastic force meter?	7M

AR16

CODE: 16OE2025 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech II Semester Supplementary Examinations, February, 2021

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)	Define a communication system and give its functions	4M
	b)	Draw the Block diagram of communication system and explain each block in detail	10M
		(OR)	
2.	a)	Define auto correlation function and convolution.	4M
	b)	Discuss types of signals and write Fourier Transform for various signals.	10M

UNIT-II

3.	a)	Explain one of the demodulation methods of Amplitude Modulation with neat diagram.	10M
	b)	Write advantages of FM over AM.	4M
		(OR)	
4.	a)	Explain AM,DSBSC ,SSBSC Modulation techniques in detail	10M
	b)	Compare Frequency Modulation & Phase Modulation	4M

UNIT-III

5.	a)	What is nyquist rate of Sampling? Discuss types of sampling in detail.	10M
	b)	Discuss Time Divison Multiplexing.	4M
		(OR)	
6.	a)	Describe Pulse Amplitude Modulation and demodulation in detail.	10M
	b)	What is multiplexing? What are the types of multiplexing?	4M

UNIT-IV

7.	a)	What are the elements of PCM Modulation and explain the functions of it.	10M
	b)	Define quantization and quantization error.	4M
		(OR)	
8.	a)	Explain Delta Modulation and Adaptive Delta Modulation methods.	10M
	b)	Define ASK and show its waveform.	4M

UNIT-V

9.	a)	Explain Shannon Fano code and obtain Shannon Fano Code with an example.	10M
	b)	Define coding efficiency.	4M
		(OR)	
10.	a)	Discuss **a)**Concept of information b)rate of information c)entropy	10M
	b)	What is source coding? List source coding techniques.	4M

AR16

CODE: 16OE2027 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech II Semester Supplementary Examinations, February-2021

INTRODUCTION TO PYTHON

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 the features of Python.	**6M**
	b)	Write about operators in python.	**8M**
		(OR)	
2.	a)	Explain about variables and data types in Python.	**7M**
	b)	Consider the code below If A=7, B = 4.99, C = B+2, D = "HELLO", then Predict the output of the following statements. i. print D[1:] ii. print B//2 iii. print (A**2) iv. print B/1 v. print type(B) vi. print D[2:4] vii. print D[::2]	**7M**

UNIT-II

3.	a)	Write about the Looping structures in Python. Explain with syntaxes.	**8M**
	b)	Write a python script to find factorial of a given positive integer.	**6M**
		(OR)	
4.	a)	Explain about the statements break, continue and pass with examples.	**9M**
	b)	Write any five string methods in python with example.	**5M**

UNIT-III

5.	a)	Define Dictionary. Write in detail how to Initialize and retrieve the values from dictionary.	**4M**
	b)	Write any five dictionary methods with examples.	**10M**
		(OR)	
6.	a)	What is a List in python, write the difference between Lists and Tuples.	**6M**
	b)	Write a python script that sorts given list of integers in ascending order without using predefined sort() function.	**8M**

UNIT-IV

7.	a)	Explain about python File operations in detail.	**8M**
	b)	Illustrate seek() and tell() file operations with example.	**6M**
		(OR)	
8.	a)	Define Exception. Give some examples for exceptions.	**6M**
	b)	Write about how to handle the exceptions. Give examples.	**8M**

UNIT-V

9.	a)	Define class and object. Differentiate class and object. What are object oriented concepts in python.	**8M**
	b)	Write a python script that illustrates concept of Inheritance.	**6M**
		(OR)	
10.	a)	Explain the Object oriented principles in Python.	**7M**
	b)	Write a python script that illustrates concept of Multiple Inheritance.	**7M**

AR16

CODE: 16OE2029 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI (AUTONOMOUS)

II B.Tech II Semester Supplementary Examinations, February-2021

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 180 and 200 **7M**

   b . Express 180 and 200 in the form of ax+by **7M**

(OR)

2. a. Obtain sum and number of divisors of 520 **7M**

   b. Find highest power of 13 in 1000! **7M**

UNIT-II

3. a. Show that $10^n + 3.4^n + 5 \equiv 0$ ($modulo$ 9) **7M**

   b. Find the remainder in the division of 2^{10} by 7 **7M**

(OR)

4. Solve the congruence $98x \equiv 1$ $(Mod\ 139)$ **14M**

UNIT-III

5. a. Define Euler-Fermate theorm . Hence, Show that $n^{18} - a^{18}$ is divisible by 133 if n and a are co-prime to 133. **7M**

   b. Find sum and number of divisors of 856 **7M**

(OR)

6 Obtain all integers that leave remainders 1 or 2when they are divided by each of 5, 7and 11. **14M**

UNIT-IV

7. Define Mobius function μ. Determine $\mu(n)$ for n= 11,12,13,14,15,16,17,18,19,20. **14M**

(OR)

8. Define Euler Totient Function Φ. Determine Φ(n) for n=50, 125, 600, 1150 , 1900 **14M**

UNIT-V

9. Evaluate (73/383) and (17/223) **14M**

(OR)

10. Determine whether -104 is quadratic residue of 997 or not **14M**

AR16

CODE: 16OE2024 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech II Semester Supplementary Examinations, February-2021

PRINCIPLES OF MECHANICAL MEASUREMENTS

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.		Define accuracy, precision, sensitivity, repeatability, tolerance, range, span and resolution?	14M
		(OR)	
2.		Differentiate static characteristics with dynamic characteristics in measuring systems?	14M

UNIT-II

3.	a)	With a neat sketch explain working principle and operation of bourdon mechanical pressure gauge?	7M
	b)	Illustrate working principle of diaphragm gauges with suitable sketch and state merits and demerits?	7M
		(OR)	
4.	a)	With a neat sketch explain working principle and operation of rota meter and list out any 4 merits and demerits?	7M
	b)	Briefly explain working principle and operation of magneto flow meter with a neat sketch?	7M

UNIT-III

5.		Explain working principle of bimetallic thermometer with a neat figure? And list out their advantages and disadvantages?	14M
		(OR)	
6.		Briefly discuss working principle and operation of resistance temperature detector with neat sketch?	14M

UNIT-IV

7.		Explain working principle and operation of LVDT and state their advantages, disadvantage and application?	14M
		(OR)	
8.		With suitable sketches explain working principle and operation of resistance transducers. State their advantages, disadvantage and application??	14M

UNIT-V

9.		With a neat sketch explain working principle and operation of stroboscope and list merits, demerits and applications?	14M
		(OR)	
10.	a)	Write short notes on optical torsion meter?	7M
	b)	Write a short note on elastic force meter?	7M

AR13

CODE: 13CE2009 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech II Semester Supplementary Examinations, February-2021

CONCRETE TECHNOLOGY

(Civil Engineering)

Time: 3 Hours **Max Marks: 70**

PART-A

ANSWER ALL QUESTIONS **[1 x 10 = 10 M]**

1. a) What are Bogue's compounds and proportions of Bogue's compounds in ordinary Portland cement?
   b) List out different applications of four types of Chemical admixtures?
   c) Define workability.
   d) Define segregation and bleeding.
   e) List out the various non destructive methods of testing concrete?
   f) Define Gel-Space ratio.
   g) Define Creep & Shrinkage.
   h) What is meant by durability?
   i) What is the use of w/c ratio in cement concrete mix design?
   j) What is the relation between flexural tensile strength and compressive strength of concrete?

PART-B

Answer one question from each unit **[5x12=60M]**

UNIT-I

2. Briefly explain the properties of cement and their effects on properties of concrete. 12 M

(OR)

3. Explain the following in Detail: i) Fly ash ii) Silica fume 12 M

UNIT-II

4. a) How does the shape, size and texture of aggregates influence the strength of the concrete? 6 M
   b) Explain fineness modulus of aggregates and its significance. 6 M

(OR)

5. Explain manufacturing process of concrete in detail. 12 M

UNIT-III

6. a) Explain different properties of Hardened concrete. 6 M
   b) Explain maturity concept. 6 M

(OR)

7. a) Explain Non-destructive testing of concrete. 6 M
   b) How do you determine the splitting strength of concrete? 6 M

UNIT-IV

8. a) How does the relation between the modulus of elasticity of concrete and strength vary with age? 6 M
   b) Discuss various factors affecting shrinkage of concrete. 6 M

(OR)

9. a) Define the following terms for concrete. 6 M
   i) Poisson's ratio ii) Soundness
   b) Draw the stress strain curve of concrete? Locate initial tangent modulus, tangent modulus and secant modulus on the curve? 6 M

UNIT-V

10. Describe in detail I.S. method for mix design. 12 M

(OR)

11. What are the various factors in the choice of mix proportions? And explain durability of concrete? 12 M

AR13

CODE: 13ME2010 SET-2

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech II Semester Supplementary Examinations, February-2021

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 is factor of safety.
   b) What is meant by eccentric loading and eccentricity?
   c) How stress concentration is taken into consideration for component subjected to dynamic loading?
   d) Distinguish between circumferential and longitudinal stress in a cylindrical shell when subjected to internal pressure.
   e) What are applications of revited joints?
   f) What are different types of welded joints?
   g) What is difference between single start and double start threads
   h) What is purpose of turn buckle?
   i) What are different types of cotter joints?
   j) What do you mean by spring constant?

PART-B

Answer one question from each unit **[5x12=60M]**

UNIT-I

2. Explain about **12M**
   i). Maximum normal stress theory ii). Maximum shear stress theory iii). Maximum distortion energy theory..

(OR)

3. a. What is endurance limit? Explain various factors that influence endurance limit of machine part. **5M**
   b. Determine the diameter of tensile member of a circular cross section. The following data is given. Maximum tensile load= 10kN; Maximum compressive load= 5kN; Ultimate tensile strength=600MPa;Yield point= 380MPa; Endurance limit= 290MPa; Factor of safety= 4; Stress concentration factor=2.2 **7M**

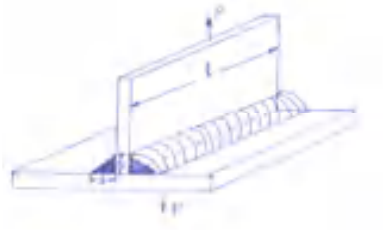
UNIT-II

4. a Explain the procedure for designing longitudinal and circumferential joint for a boiler **4M**
   b A double riveted butt joint, in which the pitch of rivets in the outer rows is twice that in the inner rows, connects two 16mm thick plates with two cover plates each 12mm thick. The diameter of rivets is 22mm. determine the pitches of the rivets in the two rows if the working stresses are not to exceed the following limits. **8M**
   Tensile stress in plates=100MPa; Shear stress in rivets= 75MPa and bearing stress in rivets and plates= 150MPa. Make a fully dimensioned sketch of the joint by showing at least two views.

(OR)

5. a How welded joint differs from riveted joint. Sketch and discuss the various types of welded joints used in pressure vessels. **6M**

   b The fillet welds of equal legs are used to fabricate a T as shown in figure. Where s is the leg size and l is the length of weld. locate the plane of maximum shear stress when the load is acting at right angles to the weld. **6M**



UNIT-III

6. a Explain the method of determining the size of the bolt when the bracket carries an eccentric load perpendicular to the axis of bolt. **8M**

   b What size of hole must be drilled in a M 42 bolt so as to make the bolt of uniform strength? **4M**

(OR)

7. a Show that in case of thin cylindrical shell subjected to an internal fluid pressure, the tendency to burst length wise is twice as great as at transverse section. **6M**

   b Find the thickness of the flat end cover plates for a $1N/mm^2$ boiler that has a diameter of 600mm. The limiting tensile stress in the boiler shell is 40 MPa. **6M**

UNIT-IV

8. a How keys are classified. Draw neat sketches of different types of keys with applications. **4M**

   b Design a sleeve and cotter joint to resist a tensile load of 60kN. All parts of the joint are made of the same material with the following allowable stresses: σ_t=60MPa;τ=70MPa and σ_c=125 MPa **8M**

(OR)

9. A mild steel shaft transmits 15kW at 210 r.p.m. it is supported on two bearings 750mm apart and has two gears keyed to it. The pinion having 24 teeth and 6mm module is located 100mm to the left of the right hand bearing and delivers the power horizontally to the right. The gear having 80 teeth of , module is located 15mm to the right of left hand bearing and receives power in vertical direction from below. Assuming an allowable working shear stress as 53 MPa and a combined shock and fatigue factor of 1.5 in bending as well as in torsion, determine the diameter of shaft **12M**

UNIT-V

10. Design and draw a cast iron protective flange coupling to connect two shafts in order to transmit 7.5kW at 720 r.p.m. The following permissible stresses may be used. **12M**
    Permissible shear stress for shaft, bolt and key material= 33 MPa
    Permissible crushing stress for bolt and key material= 60 MPa
    Permissible shear stress for cast iron= 15 MPa

(OR)

11. Design and draw a helical spring for a spring loaded safety valve for the following conditions. **12M**
    Operating pressure = 1 N/mm^2 ; Maximum pressure when e valve blows off freely= 1.075 N/mm^2; Maximum lift of the valve=6mm; Diameter of valve seat=100mm; Maximum shear stress= 400MPa; Modulus of rigidity=86kN/mm^2 ; Spring index=5.5

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AR13 SET-2

Code: 13CS2006

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech II Semester Supplementary Examinations, February-2021
OBJECT ORIENTED PROGRAMMING
(Common to CSE & IT)

Time: 3 Hours **Max Marks: 70**

PART-A

Answers ALL Questions **[10 X 1 = 10M]**

1. a) Define packages?
   b) Why java is strongly typed language?
   c) Define ArithmeticException and ClassCastException.
   d) Define Runnable interface?
   e) Define array?
   f) What are different types of inheritance?
   g) Define classes?
   h) Define constructors?
   i) What is meant by Multi-Threading Application?
   j) Differentiate between Applet and Application in JAVA.

PART-B

Answer one question from each unit **[5X12=60M]**

UNIT-I

2. a) Explain scope and life time of variables with suitable example code? [4M]
   b) Explain type conversion and type casting? [8M]

(OR)

3. Explain any three object oriented programming principles with examples? [12M]

UNIT-II

4. Explain the followings by writing JAVA code [12M]
   a) static keyword b)this keyword c) Garbage collection

(OR)

5. a) What is recursion? Write a program to find factorial of a given number (n) using recursion. [8M]
   b) Write down the parameter passing techniques with examples? [4M]

UNIT-III

6. Write java codes for implementing the followings: [12M]
   a) Abstract classes b) Dynamic method dispatch c) Final keyword

Code: 13CS2006

(OR)

7.	a)	What is method overriding ? Explain with example.	[8M]
	b)	Write programs for defining and implementing interfaces.	[4M]

UNIT-IV

8.		Explain the concept of Exception handling and types of exceptions with the usage of try, catch and throw.	[12M]

(OR)

9.		Explain the following terms with suitable examples: a) Synchronization b) Deadlock c) Interface	[12M]

UNIT-V

10.	a)	What is Applet? Explain about Applet Life Cycle.	[6M]
	b)	What are adapter classes? Explain with suitable JAVA code.	[6M]

(OR)

11.	a)	Explain any two event classes?	[6M]
	b)	Write a program to implement the boarder Layout.	[6M]

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