AR16

CODE: 16OE2021 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech II Semester Regular & Supplementary Examinations, April-2019
TRANSFORM THEORY

Time: 3 Hours **MaxMarks: 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) Show that $Z\left(\frac{1}{n}\right) = log\ \frac{z}{(z-1)}$ **7M**
   b) Find the value of $Z(\sin n\theta)$ and $Z(\sin(3n+5))$ **7M**

(OR)

2. a) Find $Z(2.3^n + 5.n)$ and deduce $Z(2.3^{n+3} + 5(n+3))$ using shifting theorem **8 M**
   b) Find the value of $Z(n^2a^n)$ **6 M**

UNIT-II

3. a) Find $Z^{-1}[\frac{z^3-20z}{(z-2)^3(z-4)}]$ **14M**

(OR)

4. a) Find $Z^{-1}[\frac{z+1}{z^2-3z+2}]$ **7M**
   b) Using Convolution Theorem, evaluate $Z^{-1}[(\frac{z}{(z-a)})^2]$ **7M**

UNIT-III

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

(OR)

6. Find the Fourier cosine transform of $f(x)$ defined by $f(x) = \frac{1}{1+x^2}$ and hence find the Fourier sine transform of $f(x) = \frac{x}{1+x^2}$ **14M**

UNIT-IV

7. Find the Fourier transform of $f(x)$ defined by $f(x) = \begin{cases} 1, |x| < a \\ 0,\ |x| > a \end{cases}$ and hence evaluate $\int_{-\infty}^{\infty} \frac{sinapcospx}{p}\ dp$ and $\int_0^\infty \frac{sinp}{p}\ dp$ **14M**

(OR)

8 Find the Fourier cosine transform of $e^{-ax}, a>0$ and hence deduce the inversion formula **14M**

UNIT-V

9. Using Z-transform, solve the difference equation $u_{n+2} - 3u_{n+1} + 2u_n = 0$, given $u_0 = 0, u_1 = 1$ **14M**

(OR)

10. Using Z-transform, solve the difference equation $u_{n+2} + 2u_{n+1} + u_n = n$, given $u_0 = 0, u_1 = 0$ **14M**

AR16

CODE: 16OE2022 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech II Semester Regular & Supplementary Examinations, April-2019

FUNDAMENTALS OF BUILDING PLANNING

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) Draw sign conventions of earth, sand filling, concrete, timber and marble? 10M
   b) Draw symbols for electrical installation. 4M
      i. Socket outlet,
      ii. Earth point

(OR)

2. a) Draw conventional signs for following building materials. 8M
      i. Rock
      ii. Aluminum
      iii. Clay tile
      iv. Glass
   b) Draw symbols for electrical installation. 6M
      i. Wiring under the surface
      ii. Siren
      iii. Ceiling fan

UNIT-II

3. a) What is the principle of planning of residential building? And brief any four factors which governs planning of residential building. 8M
   b) Give the slandered dimensions for the following rooms; 6M
      i. Kitchen room
      ii. Bed room

(OR)

4. a) Name the different rooms in residential building and briefly describe their grouping. 7M
   b) How do achieve the roominess & flexibility? Explain with examples. 7M

UNIT-III

5. a) What orientation would you suggest for locating a building in? 7M
   i. East coast city-Chennai
   ii. West coast city-Mumbai
   iii. Hot, Dry climate-Tirupathi
   b) What is the importance of lighting and ventilation in general constructions? Explain? 7M

(OR)

6. a) Write a short note on orientation of residential building' 7M
   b) What is the importance of structural elements Doors & Windows in general constructions? Explain? 7M

UNIT-IV

7. a) Explain the phenomenon to calculate the total number of floors by a building by using the factor FAR 7M
   b) Explain the principles underlying the building bye laws? 7M

(OR)

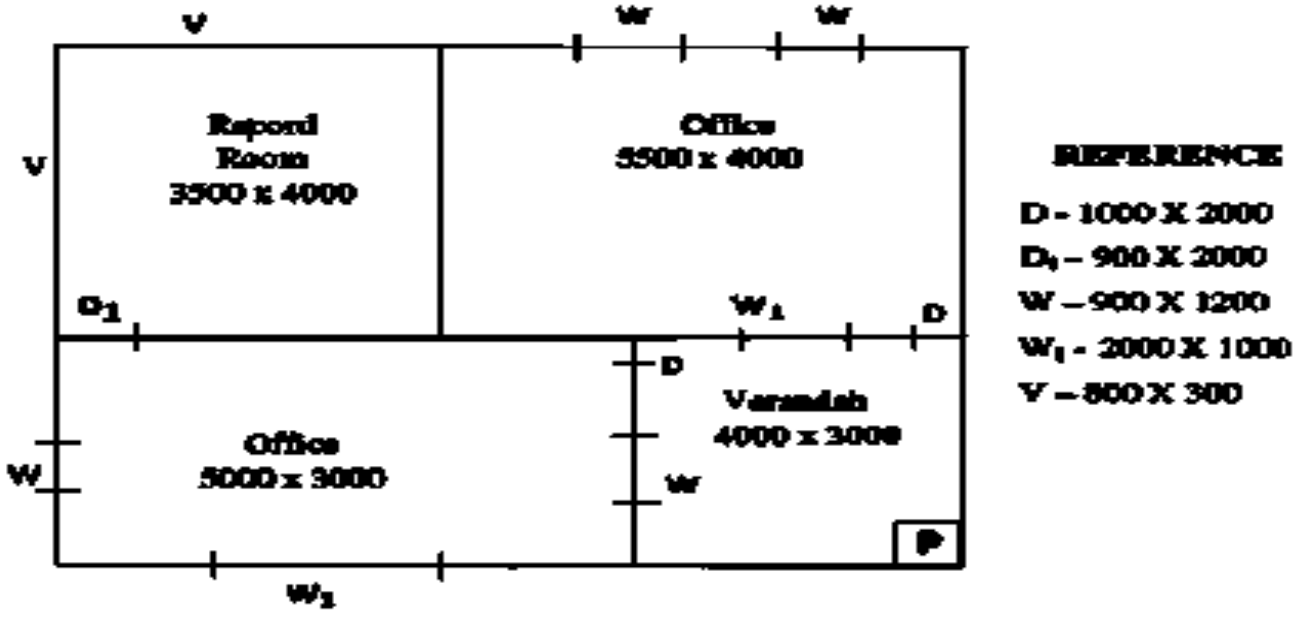
8. a) Write short notes on building bye-laws, bring out their merits and de-merits against their implementation. 7M
   b) What are the open space requirements and height limitations in building bye-laws 7M

UNIT-V

9. Draw a developed plan and elevation for following fig.1 14M

(OR)

10. Sketch the section along record room and Office room. 14M



AR16

CODE: 16OE2023 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech II Semester Regular & Supplementary Examinations, April-2019

RENEWABLE ENERGY SOURCES

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)	What is the difference between extraterrestrial and terrestrial solar radiations?	**[7M]**
	b)	Explain the different types of instruments for measuring solar radiation.	**[7M]**
		(OR)	
2.	a)	Define Solar energy, Solar constant and why solar energy as an option.	**[7M]**
	b)	Explain the working of a Pyranometer solar energy measuring instrument?	**[7M]**

UNIT-II

3.	a)	What are the main components of Flat plate solar collector, Explain the function of each?	**[7M]**
	b)	Explain various applications of solar energy.	**[7M]**
		(OR)	
4.	a)	Enumerate the different types of concentrating type collectors?	**[7M]**
	b)	What are the advantages and Disadvantages of Photo voltaic solar energy conversion.	**[7M]**

UNIT-III

5.	a)	What are the major factors for wind flows on earth?	**[4M]**
	b)	Describe Horizontal and Vertical axis type wind turbines.	**[10M]**
		(OR)	
6.	a)	What is biomass? Explain the benefits of using biomass for energy generation.	**[7M]**
	b)	Explain the process of anaerobic digestion.	**[7M]**

UNIT-IV

7.	a)	Discuss about various types of geothermal resources?	**[7M]**
	b)	State the advantages and disadvantages of geothermal energy?	**[7M]**
		(OR)	
8.	a)	Explain the principle of Tidal power Generation.	**[4M]**
	b)	Discuss about various tidal power conversion plants.	**[10M]**

UNIT-V

9.	a)	Explain the principles of direct energy conversion and examples.	**[7M]**
	b)	Explain the principle of MHD power generation	**[7M]**
		(OR)	
10.	a)	Discuss about thermo electric power generator and examples.	**[7M]**
	b)	Discus about working principle of operation of fuel cell and advantages.	**[7M]**

AR16

CODE: 16OE2024 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech II Semester Regular & Supplementary Examinations, April-2019

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.		State and explain the desirable static and dynamic characteristics of an instrument?	**14**
		(OR)	
2.		Explain briefly about the types of errors involved in measurement systems by giving suitable examples. Discuss the means adopted to reduce these errors.	**14**

UNIT-II

3.		Describe the construction, working and theory of Bourdon tube for measurement of pressures?	**14**
		(OR)	
4.	a)	Differentiate between Atmospheric pressure and Gauge pressure and Vacuum.	**6**
	b)	Describe the construction and working of rotameter and its application.	**8**

UNIT-III

5.		Explain working of gas filled thermometer with relevant sketches?	**14**
		(OR)	
6.		Explain briefly working of any one of high temperature measurements?	**14**

UNIT-IV

7.		Explain the working and principle of LVDT with diagram?	**14**
		(OR)	
8.		What is potentiometer? How it measures linear and angular displacements?	**14**

UNIT-V

9.		Describe in detail the construction and working of dynamo meter?	**14**
		(OR)	
10.		Discuss in detail with neat sketch the working principle of electrical torsion meters.	**14**

AR16

CODE: 16OE2025 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech II Semester Regular & Supplementary Examinations, April-2019

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

UNIT-II

3.	a)	Compute the total power of a AM modulated signal if a 400 watts carrier is modulated to a depth of 75% for a sinusoidal modulating signal.	**10M**
	b)	Compare Frequency Modulation & Phase Modulation	**4M**
		(OR)	
4.	a)	Explain one of the demodulation methods of Amplitude Modulation with neat diagram.	**10M**
	b)	Discuss bandwidth consideration of Frequency Modulation.	**4M**

UNIT-III

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

UNIT-IV

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

UNIT-V

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

AR16

CODE: 16OE2026 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech II Semester Regular & Supplementary Examinations, April-2019

INTRODUCTION TO JAVA

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)	What is an object oriented programming? Explain principles of OOPs?	**7M**
	b)	List out Data Types and write about Type Conversion and Type Casting in Java	**7M**
		(OR)	
2.	a)	Explain different types of operators in java with suitable examples.	**7M**
	b)	Explain about scope and lifetime of variables in java	**7M**

UNIT-II

3.	a)	Write syntax for defining a class and how to access members of class through object explain with suitable example.	**8M**
	b)	Explain the usage of 'this' keyword with example	**6M**
		(OR)	
4.		What is an overloading? Explain Constructor and Method Overloading with suitable example.	**14M**

UNIT-III

5.	a)	Write a program to implement multiple inheritances by using interfaces.	**7M**
	b)	What is a package? Explain with a simple program how to create and access packages.	**7M**
		(OR)	
6.		Define Inheritance? Discuss about different forms of inheritance with an example	**14M**

UNIT-IV

7.		What is an Exception? Explain about Exception Handling mechanism with an example.	**14M**
		(OR)	
8.	a)	Explain user defined exceptions with suitable example?	**7M**
	b)	Explain the usage of throws keyword with suitable example?	**7M**

UNIT-V

9.		Write differences between Process and Thread? Explain creation of multiple threads using thread class?	**14M**
		(OR)	
10.	a)	What is thread? Explain the life cycle of the thread?	**7M**
	b)	Explain Thread Synchronization in java with suitable example?	**7M**

AR16

CODE: 16OE2027 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech II Semester Regular & Supplementary Examinations, April-2019

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 list=[2,5,'k',99.99], str = "HELLO", str1="hello" then Predict the output of the following statements. i. print 'L' in str ii. print list[-1:] iii. print str==str1 iv. print str[1::2] v. print str+str1 vi. print type(list[3]) vii. print str+str1[3]	**7M**

UNIT-II

3.	a)	Write about the Conditional control structures in Python. Explain with syntaxes.	**8M**
	b)	Write a python script to find minimum number from a given four integers.	**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)	What is a List in python, write the difference between Lists and Tuples.	**6M**
	b)	Define Module. Illustrate the use of import statement with an example.	**8M**
		(OR)	
6.	a)	Define Function. Write the syntax for function declaration in Python. Give Example.	**7M**
	b)	Write a python script to find sum of first N integers using functions.	**7M**

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. 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: 16OE2028 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech II Semester Regular & Supplementary Examinations, April-2019

COMPLEX VARIABLES

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. Show that $f(z) = \begin{cases} \dfrac{x^3(1+i)-y^3(1-i)}{x^2+y^2} & , z \neq 0 \\ 0 & , z = 0 \end{cases}$ is continuous at z=0 but not differentiable at z=0 **14 M**

(OR)

2. a) Prove that $u = e^{(x^2-y^2)}$ is not a harmonic function **7 M**

   b) Determine P Such that the function $f(z) = \frac{1}{2}\log(x^2+y^2) + i\tan^{-1}\left(\frac{px}{y}\right)$ be an analytic function **7 M**

UNIT-II

3. a) Evaluate $\int_0^{1+i}(x^2 - iy)dz$ along the paths (i) y = x (ii) $y = x^2$ **7 M**

   b) Evaluate $\int_c \frac{z^2+1}{z(2z+1)}dz$ where c is $|z| = 1$ using Cauchy's integral formula. **7 M**

(OR)

4. Evaluate $\int_c \frac{z^3 e^{-z}}{(z-1)^3}dz$ where c is $|z-1| = \frac{1}{2}$ using Cauchy's integral formula. **14 M**

UNIT-III

5. Find the Laurent series of $\frac{7z-2}{(z+1)z(z-2)}$ in the annulus region $1 < |z+1| < 3$ **14 M**

(OR)

6. Expand $f(z) = \frac{z+3}{z(z^2-z-2)}$ in powers of z where i)$|z| < 1$ ii) $1 < |z| < 2$ iii)$|z| > 2$ **14 M**

UNIT-IV

7. a) Evaluate $\int_c \frac{12z-7}{(2z+3)(z-1)^2}dz$ where C is $x^2 + y^2 = 4$ using Residue Theorem. **7 M**

   b) Find the poles and corresponding Residues of $f(z) = \frac{z^2}{(z+1)^2(z+2)}$ **7 M**

(OR)

8. a) Find the poles of the function $\frac{z+1}{z^2(z-2)}$ and the Residues at these poles. **7 M**

   b) Evaluate $\int_c \frac{(2z+1)^2}{4z^3+z}dz$ where C is the circle $|z| = 1$ using Residue Theorem. **7 M**

UNIT-V

9. Evaluate $\int_0^{2\pi} \frac{\sin 3\theta}{5-3.\cos\theta}d\theta$ using residue theorem. **14 M**

(OR)

10. Evaluate $\int_{-\infty}^{\infty} \frac{x^2}{(x^2+1)(x^2+4)}dx$ using residue theorem. **14 M**

AR16

CODE: 16OE2029 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech II Semester Regular & Supplementary Examinations, April-2019

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 275 and 200 **7M**

   b Express 275 and 200 in the form of m.275 + n.200 **7M**

(OR)

2. a. Obtain number of divisors of 600 **7M**

   b. Obtain Sum of divisors of 600 **7M**

UNIT-II

3. Show that $4^{2n+1} + 3^{n+2} \equiv 0\ (Mod\ 13)$ **14M**

(OR)

4. Solve the congruence $342x \equiv 5\ \ (Mod\ 13)$ **14M**

UNIT-III

5. Define Euler-Fermate theorm . Hence, Show that $n^5 - n$ is divisible by 30 **14M**

(OR)

6 Define Wilson theorem. Hence, show that $2(p-3)! + 1$ is divisible by a prime p. **14M**

UNIT-IV

7. Define Mobius function μ. Determine $\mu(17), \mu(20)$ **14M**

(OR)

8. Define Euler Totient Function Φ. Determine $\Phi(100)$ **14M**

UNIT-V

9. Evaluate (3/383) & (5/223) **14M**

(OR)

10. Determine whether 888is quadratic residue of 1999 or not **14M**

AR16

CODE: 16OE202A **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech II Semester Regular & Supplementary Examinations, April-2019

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.	List and describe the stages of remote sensing with neat sketch?	14
	(OR)	
2.	With a suitable diagram, explain Electromagnetic Spectrum and it's characteristics used in remote sensing?	14

UNIT-II

3.	Classify and describe the sensors with a neat sketch? Explain about aerial camera, video camera and radio meter?	14
	(OR)	
4.	Define the term sensor? Illustrate the laser scanner, radar altimeter and imaging radar?	14

UNIT-III

5.	What is meant by spaceborne remote sensing and describe the characteristics of orbit?	14
	(OR)	
6.	List and discuss the types of remote sensing platforms with neat sketch?	14

UNIT-IV

7.	Discuss the process of carrying out visual interpretation?	14
	(OR)	
8.	Briefly discuss about the concept of filtering in image enhancement?	14

UNIT-V

9.	Describe the various steps and processes involved in image classification?	14
	(OR)	
10.	Elucidate the supervised classification?	14

AR13

CODE: 13CE2009 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech II Semester Supplementary Examinations, April-2019

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?
   b) What is heat of hydration of cement?
   c) Define initial setting time of cement
   d) Differentiate between accelerating admixture and retarding admixture.
   e) How aggregates are classified based on source?
   f) Define workability.
   g) What is meant by segregation?
   h) List the different types of non destructive tests.
   i) List the different types of shrinkage.
   j) Define durability of concrete.

PART-B

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

UNIT-I

2. a) What are the main compounds in Portland cement and explain their role in the process of hydration of cement? 6M
   b) Write briefly about different types of OPC-based cement (any three)? 6M

(OR)

3. a) What are admixtures? Mention any eight functions of admixtures? 6M
   b) Write briefly about retarders, accelerators and plasticizers 6M

UNIT-II

4. a) What is bulking of fine aggregate and importance of it in production of concrete by volume batching? 6M
   b) Explain the physical and mechanical properties of aggregate used in concrete 6M

(OR)

5. a) What are the factors affecting the workability of concrete 6M
   b) List the various methods to determine workability? Explain any one method in detail? 6M

UNIT-III

6. a) What is the relation between compressive strength and tensile strength of concrete? 6M
   b) Explain about the factors influencing the strength of hardened concrete? 6M

(OR)

7. a) Explain the test procedure to finding out the spilt tensile strength of concrete 6M
   b) What are the different NDT tests? What are the codal provisions? 6M

UNIT-IV

8. a) What is creep of concrete and what are the factors affecting creep? 6M
   b) What are the different factors affecting shrinkage of concrete? 6M

(OR)

9. a) How the shrinkage of concrete is classified and explain each one of them briefly? 6M
   b) Define Creep and explain how creep is measured. 6M

UNIT-V

10. Design a concrete mix for characteristic strength of 35MPa at 28 days with a standard deviation of 4MPa.The specific gravity of FA and CA are 2.65 and 2.75respectively. A slump of 40mm is necessary. The specific gravity of cement is 3.15. Assuming the necessary data, design the mix as per IS code method? 12M

(OR)

11. Step by step, Explain the IS method of mix design 12M

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AR13

CODE: 13ME2010 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech II Semester Supplementary Examinations, April-2019
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 the basic requirements of machine element.
   b) Name the various alloying elements in alloy steels.
   c) Draw the amplitude and mean stress curve for goodman line,soderberg line, modified goodman line.
   d) What is the advantage of butt joint over lap joint.
   e) Why are riveted joints replaced by welded joints.
   f) What are the steps involved to design of bolted joints under eccentric loading.
   g) Explain the difference between spigot and socket joint.
   h) How are hollow shafts generally manufactured.
   i) What are the applications of flexible coupling.
   j) What is the Wahl factor why it is used.

PART-B

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

UNIT-I

2. a) Explain the distortion energy theory. 6M
   b) The stresses induced at a critical point in a machine component made of steel $45C_8$ (S_{yt}=380N/mm^2) are as follows: σ_x=100N/mm^2 σ_y=40N/mm^2 and τ_{xy}=80N/mm^2.Calculate the factor of safety by i) maximum normal stress theory ii) the maximum shear stress theory and iii) maximum distortion energy theory. 6M

(OR)

3. a) A rod of a linkage mechanism made of steel 40Crl (S_{ut}=550N/mm^2) is subjected to a completely reversed axial load of 100KN.The rod is machined on a lathe and the expected reliability is 95%.There is no stress concentration. Determine the diameter of the rod using a factor of safety of 2 for an infinite life condition. 6M
   b) A machine component is subjected to fluctuating stress that varies from 40 to 100N/mm^2, the corrected endurance limit stress for the machine component is 270N/mm^2,the ultimate tensile strength and yield strength of the material are 600 and 450N/mm^2 respectively. Find the factor of safety using i) gerber theory ii) soderberg line iii) goodman line. Also find the factor of safety against static failure. 6M

UNIT-II

4. A pressure vessel of the boiler consists of cylindrical shell of 0.8m inner diameter. It is subjected to to internal steam pressure of 2Mpa.Tripple-riveted double-strap longitudinal butt joint is used to make the shell. The straps are of un equal width. The pitch of the rivets is outer row is twice the pitch of rivets in middle and inner rows. A zig zag pattern is used for arrangement of rivets. The efficiency of the joint should be at least 80%.The corrosion resistance is 2mm.The permissible stresses for rivets and shell in tension,shear and compression are 80,60,120N/mm^2 respectively calculate i) thickness of the shell ii) diameter of the rivets iii) pitch of the rivets in outer row iv) distance between outer and middle rows v) distance between middle and inner rows vi) thickness of inner strap vii) thickness of outer strap viii) efficiency of the joint 12M

(OR)

5. a) Two plates are joined together by means of fillet welds. The leg dimension of the welds is 10mm and the permissible shear stress at the throat cross section is 75N/mm^2,determine the length of each weld, if 15mm weld length is required for starting and stopping of the weld run,35KN force is applied on the plate. 8M

b) Write the advantages and disadvantages of welded joints. 4M

UNIT-III

6. a) A bolted joint is used to connect two components. The combined stiffness of the two components is twice the stiffness of the bolt. The initial tightening of the nut results in a preload of 10KN in the bolt. The external force of 7.5KN create futher tension in the bolt. The bolt is made of plain carbon steel $30C_8$(S_{yt}=400N/mm^2) and the factor of safety is 3.There are coarse threads on the bolt. Calculate the tensile stress area of the bolt and specify a suitable size for the bolt. 7M

b) The maximum pull in the tie rods of a turnbuckle used in the roof truss is 4.5KN.The tie rods are made of steel$40C_8$ (S_{yt}=380N/mm^2) and the factor of safety is 5.Determine the nominal diameter of the threads on the tie rod on the basis of maximum principal stress theory. Assume d_c=0.8d. 5M

(OR)

7. a) A cylindrical vessel whose ends are closed by means of rigid flange plates is made of steel plate 4mm thick. The length and the internal diameter of the vessel are 100cm and 300cm respectively. Determine the longitudinal and hoop stresses in the cylinder shell due to an internal fluid pressure of 2N/mm^2.Also calculate the increase in length, diameter and volume of the vessel. Take E=2*10^{5}N/mm^2 And μ=0.3. 9M

b) A cylindrical shell is subjected to internal fluid pressure, Find an expression for change in diameter and change in length of the cylinder. 3M

UNIT-IV

8. It is required to design a knuckle joint to connect two circular rods subjected to an axial and tensile force of 50KN.The rods are coaxial and a small amount of angular movement between their axes is permissible. Design the joint and specify the dimensions of its components. Select suitable materials for the parts. 12M

(OR)

9. a) A centrifugal pump is driven by 10KW power 1440rpm electric motor. There is a reduction gear box between the motor and the pump. The pump shaft rotates at 480rpm. The design torque is 150% of the rated torque. The motor and pump shafts are made of plain carbon steel $40C_8$ (S_{yt}=380N/mm^2) and the factor of safety is 4.Assume (S_{Sy}=0.5S_{yt}) calculate i) diameter of the motor shaft and ii) diameter of the pump shaft. 7M

b) Define equivalent torsional moment and equivalent bending moment. State when these two terms are used in the design of shafts. 5M

UNIT-V

10. a) Design and make a neat dimensioned sketch of 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. 6M

b) What are the advantages and dis advantages of bushed-pin flexible coupling. 6M

(OR)

11. a) A helical compression spring of he exhaust valve mechanism is initially compressed with a pre load of 375N.When the spring is further compressed and the valve is fully opened, the torsional shear stress in the spring wire should not exceed 750N/mm^2.Due to space limitations, the outer diameter of the spring should not exceed 42mm.The spring is to be designed for minimum weight. Calculate the wire diameter and the mean coil diameter of the spring. 8M

b) What are graduated-length and full length leaves in multi-leaf spring. 4M

AR13

CODE: 13CS2006 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech II Semester Supplementary Examinations, April-2019

OBJECT ORIENTED PROGRAMMING
(Common to CSE & IT)

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

PART-A

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

1. a) What is an Encapsulation?
   b) Give one example for type conversion.
   c) What is a constructor?
   d) What is method overloading?
   e) What is the difference between static member and an instance member?
   f) Give the syntax for achieving multiple inheritance using interfaces?
   g) What is the role of 'finally' block in exception handling?
   h) Give the syntax for activation of a thread that extends a Thread class.
   i) Give any two methods in KeyListener interface.
   j) What is the code for deploying an Applet on the web page?

PART-B

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

UNIT-I

2. a) What is an operator? Explain various types of operators used in Java. [8M]
   b) Write a program for separating even and odd elements in an Array. [4M]

(OR)

3. a) What is a control structure? Discuss various types of control structures with syntax. [7M]
   b) Write a program that prints the sum of elements of a matrix diagonal wise. [5M]

UNIT-II

4. a) What is a class? Explain the process for creating the members inside a class. [5M]
   b) Write a program that creates a class called 'Student' having variable RollNo, Percentage and method divisioncalc() that decides the division based on Percentage, also creates a main class that creates a Student object and access it's members. [7M]

(OR)

5. a) What is a constructor? Explain, it's significance in creating object of a class. [5M]
   b) Write a program that creates a class called 'polygon' that contains methods with same name for calculating areas of Rectangle and Square, also create a main class that tests it. [7M]

UNIT-III

6. What is 'super' key word? Write a program that implements a multilevel inheritance. [12M]

(OR)

7. a) What is the usage of CLASSPATH? Explain the steps for creation of CLASSPATH. [5M]
   b) What is a nested package? Write one example program for it. [7M]

UNIT-IV

8. a) What are the various steps that are followed in exception handling? Explain with syntaxes. [8M]
   b) Explain any two built in exceptions, with syntax. [4M]

(OR)

9. What is a Thread? Explain about Thread synchronization and Inter thread communication. [12M]

UNIT-V

10. What is the need of ActionListener interface? Create a Frame that contains three text fields in which two of them accepts two numbers, third for loading their sum when a button 'SUM' is clicked. [12M]

(OR)

11. a) Explain any six swing components, with syntax. [6M]
    b) Write a program to implement the Grid Layout [6M]

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