AR16

UNIT-I

1. (a) Verify that the given function is harmonic and find its harmonic conjugate function where $u = x^2 - y^2 - y$.   7

   (b) Find the real and imaginary u, v of $f(z) = u + iv$ where   7

   $$f(z) = z + \frac{1}{z}$$

(OR)

2. Show that $f(z) = \dfrac{x^3 y(y - ix)}{x^6 + y^2}$ is not analytic at origin although CR equations are satisfied at the point.   14

UNIT-II

3. Evaluate using Cauchy Integral formula $\int\limits_{c} \dfrac{dz}{z^2 + 9}$ where c is (a) $|z - 3i| = 4$ 14

(OR)

4. Evaluate by Residue theorem $\int\limits_{c} \dfrac{z - 3}{z^2 + 2z + 5} dz$ where C is   14

   (a) $|z| = 1$ (b) $|z + 1 - i| = 2$ (c) $|z + 1 + i| = 2$

UNIT-III

5. Expand the Laurent series expansion of the function $f(z)=\dfrac{1}{(z-1)(z+3)}$ in the region $1<|z|<3$ 14

(OR)

6. Expand the Laurent's series expansion of the function $f(z)=\dfrac{z^2-1}{z^2+5z+6}$ about $z=0$ in the region $2<|z|<3$.   14

UNIT-IV

7. A random variable x has the following probability distribution   14

x_i	-2	-1	0	1	2	3
$f(x_i)=p(X=x_i)$	0.1	k	0.2	$2k$	0.3	k

Find (i) the value of k (ii) mean (iii) variance

(OR)

8. The probabilities of a poisson variate taking the values 3 and 4 are equal .Calculate the probabilities of the variable taking the values 0 and 2.   14

UNIT-V

9. a) Calculate the Coefficient of Correlation from the following data   7

X	1	2	3	4	5	6	7	8	9
Y	9	8	10	12	11	13	14	16	15

b) Obtain the equation of the lines of regression   7

(OR)

10. a) Fit a curve of the form $y=ae^{bx}$ for the following data   7

x	1	3	5	7	9
y	100	81	73	54	43

b) Fit a second degree parabola to the following data   7

x	1	2	3	4
y	1.7	1.8	2.3	3.2

AR16

CODE: 16EE2010   **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech II Semester Regular & Supplementary Examinations, October / November-2020
ELECTRO MAGNETIC FIELD THEORY
(Electrical & Electronics Engineering)

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) State and explain Coulomb's law in vector form   6M
   b) Determine electric field intensity due to a surface charge   8M

   (OR)

2. a) Two infinite uniform sheet of charge, each with density ρ_s are located at x=±2. Determine Electric field intensity (E) in all regions.   7M
   b) What are applications of potential function?   7M

UNIT-II

3. a) What are Laplace and Poisson's equations   7M
   b) An electric dipole located at the origin in free space has a moment $P=3a_x-2a_y+a_z$ ncm. Find potential(V) at Pa(2,3,4)   7M

   (OR)

4. a) Discuss ohm's law in point form   6M
   b) Discuss the boundary conditions between two dielectrics   8M

UNIT-III

5. Calculate the magnetic field due to a finite current element along z-axis at a point p at 'ρ' away from y-axis.   14M

   (OR)

6. a) Discuss Oesterd's experiment in detail   6M
   b) Derive an expression for torque on a current loop   8M

UNIT-IV

7. a) Calculate the inductance in a solenoid.   7M
   b) Derive Lorentz force equation   7M

   (OR)

8. A point charge of Q=1.2C has velocity $V=5a_x+2a_y-3a_z$, find the magnitude of the force exerted on the charge if   14M
   a) $E=-18a_x+5a_y-10a_z$ b) $B=-4a_x+4a_y+3a_z$ c) Both are present simultaneously

UNIT-V

9. a) Find the conduction and displacement current densities in a material having conductivity of 10^{-3} S/m and ε_r=2.5 if the electric field in the material is $E=5\sin(9*10^9 t)\mu V/m$ 7M
   b) Write max well's equations in integral form   7M

   (OR)

10. a) Define displacement current and explain its importance   7M
    b) Write modified max well's equation for time varying fields   7M

AR16

CODE: 16EC2007   **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech II Semester Regular & Supplementary Examinations, October / November-2020
ANALOG COMMUNICATIONS
(Electronics and Communication Engineering)

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 the need for modulation? Why the carrier signal frequency should be more than the message signal frequency? Explain.   7M
    b) Explain demodulation of AM signal using envelope detector   7M
    (OR)
2. a) Explain the operation of communication system with block diagram   7M
    b) Define AM. Derive expression for the power required to transmit single-tone AM signal.   7M

UNIT-II

3. a) Explain coherent detection of DSBSC signal.   7M
    b) Explain the generation of DSBSC using balanced modulator.   7M
    (OR)
4. a) Derive the time domain equation for SSB modulated signal   7M
    b) Explain detection of SSB with block diagram.   7M

UNIT-III

5. a) Explain indirect method of generating FM   8M
    b) Distinguish between narrowband FM and wideband FM   6M
    (OR)
6. a) Explain the operation of balanced frequency descriminator used for FM detection.   7M
    b) Illustrate the spectral analysis of single tone FM   7M

UNIT-IV

7. a) Explain the functioning of "Super heterodyne Receiver" with the help of a block diagram   8M
    b) Explain Effect of feedback on performance of AM Transmitter   6M
    (OR)
8. a) Explain Variable reactance type FM Transmitter   7M
    b) Explain phase modulated FM Transmitter   7M

UNIT-V

9. a) Compare different pulse modulation schemes   6M
    b) Illustrate PAM.   8M
    (OR)
10. a) Derive the expression for figure of merit of FM   6M
    b) Explain noise in AM systems   8M

AR16

CODE: 16CS2006   **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech II Semester Regular & Supplementary Examinations, October / November-2020

COMPUTER ORGANIZATION AND ARCHITECTURE
(Common to CSE & IT)

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 a bus? Describe the working of single bus structure.	7 M
	b)	Illustrate the floating-point representation of data with appropriate examples.	7 M

(OR)

2.	a)	Give the short sequence of machine instructions for the task: "Add the contents of memory location A to those of location B, and place the answer in location C." Instructions Load LOC, R_i and Store R_i, LOC are the only instructions available to transfer data between memory and general purpose register R_i. Do not destroy the contents of either location A or B.	7 M
	b)	Explain how to measure the performance of a computer system.	7 M

UNIT-II

3.	a)	With suitable examples, explain the working of Booth's multiplication algorithm.	8 M
	b)	Briefly describe BCD addition and subtraction.	6 M

(OR)

4.		Write in detail about the division algorithms.	14 M

UNIT-III

5.	a)	Write in detail about stack organization.	8 M
	b)	Write short notes on Reduced Instruction Set Computer.	6 M

(OR)

6.	a)	Discuss in detail about arithmetic microoperations.	7 M
	b)	What is an addressing mode? By means of suitable examples, explain different types of addressing modes.	7 M

UNIT-IV

7.	a)	Explain asynchronous data transfer.	6 M
	b)	What is DMA? Explain it in detail.	8 M

(OR)

8.	a)	What is associative memory? Describe its role in a computer system.	9 M
	b)	Write notes on ROM variants.	5 M

UNIT-V

9.	a)	Briefly describe vector processing.	8 M
	b)	Formulate a six-segment instruction pipeline for a computer. Specify the operations to be performed in each segment.	6 M

(OR)

10.		Present the physical forms available for establishing interconnections among the components of a multiprocessor system.	14 M

AR13

CODE: 13CE2005   **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech II Semester Supplementary Examinations, October / November-2020
CONSTRUCTION MATERIALS AND PRACTICE
(Civil Engineering)

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

PART-A

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

1. a) What is the meaning of seasoning of timber?
   b) Define initial setting time of cement?
   c) What is a thermosetting plastic?
   d) Where is Aluminium used in building construction?
   e) What is the type of foundation suggested for construction on expansive soils?
   f) Name any one material used in the damp proofing course?
   g) What is a louvered door?
   h) Where are ventilators usually provided in a building?
   i) What is the difference between whitewashing and distempering?
   j) What is the basic difference between scaffolding and form work?

PART-B

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

UNIT-I

2. a) Discuss the characteristics of good building stones?   6
   b) What are the different uses of bricks?   6

(OR)

3. a) Differentiate between fat lime and hydraulic lime?   6
   b) What should be the properties of timber such that it is fit for building construction?   6

UNIT-II

4. a) List the properties of good sand for use in preparation in mortar?   6
   b) Explain workability, segregation and bleeding of concrete?   6

(OR)

5. a) What is varnish? What are the desirable characteristics of an ideal varnish?   6
   b) List the important properties of glass?   6

UNIT-III

6. a) With neat sketches explain conventional spread footing?   6
   b) Describe types of partitions?   6

(OR)

7. a) Briefly explain how depth and width of foundations are fixed.   6
   b) What are ill effects of dampness in buildings?   6

UNIT-IV

8. a) Write short notes on sizes of doors and windows?   6
   b) Explain any four types of windows classified on the basis of their position?   6

(OR)

9. a) Explain hollow block and ferro-cement constructions?   6
   b) Write a note on prefabricated elements?   6

UNIT-V

10. a) Write a note on shoring and underpinning?   6
    b) Discuss external and internal finishes?   6

(OR)

11. a) Explain different types of formwork?   6
    b) Write a short note on Scaffolding?   6

AR13

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

PART-A

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

1. a) What is meant by an entire function?
    b) Show that the function $v = \frac{y}{x^2+y^2}$ is harmonic.
    c) Find the invariant points of $f(z) = \frac{z+1}{z}$.
    d) What is a pole of $f(z)$ of order m.
    e) State Cauchy's Residue theorem.
    f) Define conformal mapping.
    g) State Baye's theorem.
    h) What is probability function of Binomial distribution and write its mean and variance.
    i) Define Null hypothesis and Alternate hypothesis.
    j) Define degrees of freedom.

PART-B

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

UNIT-I

2. Determine analytic function $f(z)$ whose real part is $u = x^3 - 3xy^2 + 3x^2 - 3y^2$.   12M

(OR)

3. a) Show that $v(r, \theta) = r^2 \cos2\theta - r\cos\theta + 2$ is harmonic and find its conjugate harmonic.   6M
    b) Evaluate $\int_C \frac{\sin^2 z}{\left(z-\frac{\pi}{6}\right)^3} dz$ where $C : |z| = 1$.   6M

UNIT-II

4. Show that $\int_{-\infty}^{\infty} \frac{x^2}{(x^2+a^2)(x^2+b^2)} dx = \frac{\pi}{(a+b)}$ by using Cauchy's residue theorem.   12M

(OR)

5. a) Evaluate $\int_C \tan z \, dz$ where C is the circle $|z| = 2$.   6M
    b) Using Cauchy's Residue theorem, evaluate $\int_{-\infty}^{\infty} \frac{1}{x^4+1} dx$.   6M

UNIT-III

6. a) Discuss the transformation $w = f(z) = z^2$.   6M
    b) Show that the Bilinear transformation $f(z) = \frac{3z+1}{z-1}$ preserves the cross ration of four points.   6M

(OR)

7. a)   Find the Bilinear transformation which maps $z = 1, i, -1$ into the points $w = 0, 1, \infty$.   12M

UNIT-IV

8. a)   Find the mean and variance of a Binomial distribution.   8M
     b)   Write any three properties of Normal distribution.   4M

(OR)

9. a)   Define Discrete and Continuous random variables and show that the function   6M
$f(x) = \begin{cases} e^{-x} & if\ x \geq 0 \\ 0 & if\ x < 0 \end{cases}$ is a probability density function.

     b)   In a Normal distribution, 31% of the items are under 45 and 8% are over 64. Find the   6M
mean and S.D. of the distribution.

UNIT-V

10. a)   A normal population has a mean 0.1 and a S.D. of 2.1. Find the probability that the mean   6M
of simple sample of 900 members will be negative.

     b)   A group of boys and girls were given an intelligence test. The mean score, S.D.s and   6M
numbers in each group are as follows.

	Boys	Girls
Mean	124	121
S.D.	12	10
N	18	14

Is the mean score of boys significantly different from that of girls?

(OR)

11. a)   The means of samples of sizes 1000 and 2000 are 67.5 and 68.0 cm respectively. Can   6M
the samples be regarded as drawn from the same population of S.D. 2.5 cm.

     b)   A die was thrown 60 times and the following frequency distribution was observed: 6M

Faces	1	2	3	4	5	6
f_0	15	6	4	7	11	17

Test whether the die is unbiased?

2 of 2

AR13

CODE: 13ME2008   SET-1

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech II Semester Supplementary Examinations, October / November-2020

FLUID MECHANICS AND HYDRAULIC MACHINERY
(Mechanical Engineering)

Time: 3 Hours   Max Marks: 70

PART-A

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

1. a) What is the difference between cohesion and adhesion?
    b) What do you mean by vacuum pressure?
    c) Differentiate velocity potential and stream functions.
    d) Define the terms potential head and datum head?
    e) Define the terms Hydraulic gradient line.
    f) What is minor loss in pipe flow?
    g) Draw inlet and outlet velocity triangles for a Pelton wheel.
    h) What is Water hammer?
    i) What is priming of a centrifugal pump?
    j) Why pumps are generally less efficient than turbines.

PART-B

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

UNIT-I

2. a) List any three fluid properties and derive Newton's law of viscosity.   6M
    b) A U-tube mercury manometer is used to measure the pressure of oil flowing   6M
        through a pipe whose specific gravity is 0.85. The centre of the pipe is 15 cm
        below the level of mercury. The mercury level difference in the manometer is 25
        cm; determine the absolute pressure of the oil flowing through the pipe.
        Atmospheric pressure = 750 mm of Hg.

(OR)

3. a) Calculate the capillary effect in millimetres in a glass tube of 4 mm diameter, when   8M
        immersed in (i) water and (ii) mercury. The temperature of the liquid is 20^0C and
        the values of surface tension of water and mercury at 20^0C in contact with air are
        0.0735 N/m and 0.51 N/m respectively. The contact angle for water $\theta = 0^0$ and for
        mercury $\theta = 130^0$. Take specific weight of water at 20^0 C as equal to 9790 N/m^3
    b) What is the significance of viscosity and surface tension in fluid flow   4M
        phenomenon?

UNIT-II

4.   What are the surface and body forces? State and prove the Bernoulli's equation and   12M
        discuss the significance of different terms.

(OR)

5.   A 45^0 reducing bend is connected in a pipe line, the diameters at the inlet and   12M
        outlet of the bend being 600 mm and 300 mm respectively. Find the force exerted
        by water on the bend if the intensity of pressure at inlet to bend is 8.829 N/cm^2 and
        rate of flow of water is 600 litres/s.

6.   Define an orifice-meter. Prove that the discharge through an orifice-meter is given   12M

by the relation $Q = C_d \dfrac{a_0 a_1}{\sqrt{(a_1^2 - a_0^2)}} \times \sqrt{2gh}$

Where a_1 = area of pipe in which orifice-meter is fitted, a_0 = area of orifice

(OR)

7.   Three pipes of 400 mm, 200 mm and 300 mm diameters have lengths of 400 m,   12M
200 m, and 300 m respectively. They are connected in series to make a compound
pipe. The ends of this compound pipe are connected with two tanks whose
difference of water levels is 16 m. if co-efficient of friction for these pipes is same
and equal to 0.005, determine the discharge through the compound pipe neglecting
first the minor losses and then including them.

UNIT-IV

8.   What is the importance of a draft tube in a Francis turbine? Discuss different types   12M
of draft tubes.

(OR)

9.   Explain what is meant by unit quantities in turbines. Derive expressions for unit   12M
speed, unit discharge and unit power of a turbine.

UNIT-V

10. a)   List out necessary precautions against cavitation in centrifugal pumps.   4M

    b)   A single acting- acting reciprocating pump, running at 50 r.p.m. delivers 0.00736   8M
m^3/s of water. The diameter of the piston 200 mm and stroke length 300 mm. the
suction and delivery heads are 3.5 m and 11.5 m respectively.
Determine: Theoretical discharge, Co-efficient of discharge, Percentage slip of
the pump, and Power required to run the pump.

(OR)

11. a)   Draw and discuss characteristic curves of a pump.   6M

    b)   Explain the working of reciprocating pump with neat sketch.   6M

AR13

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech II Semester Supplementary Examinations, October / November-2020
ANALOG COMMUNICATIONS
(Electronics and Communication Engineering)

Time: 3 Hours   Max Marks: 70

PART-A

ANSWER ALL QUESTIONS   [1 x 10 = 10 M]

1.
   a) Write the expression for AM wave ?
   b) Define modulation index of an AM wave.
   c) What is the bandwidth of SSB signal.
   d) What are the advantages of using VSB
   e) What are the types of angle modulation
   f) What is carson's rule
   g) What is the bandwidth, if Q of a tuned circuit is 250 at the resonant frequency of 500 kHz.
   h) What is the function of AGC
   i) State advantages of PWM
   j) Name the analog pulse modulation system

PART-B

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

UNIT-I

2.
   a) Derive an expression for AM wave and sketch its frequency spectrum.   6M
   b) Explain the concept switching modulator.   6M

(OR)

3.
   a) Explain the process of demodulating an AM wave using envelope detector   6M
   b) Derive the expression for power content in AM wave.   6M

UNIT-II

4.
   a) With a neat diagram explain how a SSB wave is generated using Phase Discriminator method with only USB and rejecting the LSB.   6M
   b) Discus the coherent detection of DSB-SC modulated wave with a block diagram.   6M

(OR)

5. a) Explain the process of generation of VSB waves.   6M
   b) Draw the ring modulator and explain the generation of DSB-SC waves.   6M

UNIT-III

6. a) Draw the spectral representation of FM wave and derive the expression the Transmission bandwidth.   6M
   b) Explain the principle of direct method of generation of FM signal using relevant diagrams.   6M

(OR)

7   With a neat block diagram explain the generation of narrow band and wide band FM.   12M

UNIT-IV

8.   Draw the block diagram of a superheterodyne receiver and explain its operation What are the advantages of this receiver?   12M

(OR)

9. a) Discuss about tracking and alignment in radio receivers.   6M
   b) Explain the operation of TRF receiver with a neat schematic diagram.   6M

UNIT-V

10. a) Explain the generation of PWM with a neat circuit diagram and wave forms   8M
    b) What are the advantages and disadvantages of PPM over PWM   4M

(OR)

11.   Discuss in detail the following (i) thermal noise (ii) shot noise (iii) noise figure (iv) equivalent noise temperature   12M

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AR13

CODE: 13CS2008   SET-1

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech II Semester Supplementary Examinations, October / November-2020

COMPUTER ORGANIZATION AND ARCHITECTURE
(Common to CSE & IT)

Time: 3 Hours   Max Marks: 70

PART-A

ANSWER ALL QUESTIONS   [1 x 10 = 10 M]

1. a) What is sign magnitude representation ?
   b) What is RTL ?
   c) Define Direct addressing mode ?
   d) Difference between RAM and ROM ?
   e) What are the benefits of using I/O Interface ?
   f) What is RISC ?
   g) What are different types of computers?
   h) What is instruction Cycle ?
   i) What is cache memory ?
   j) What is DMA ?

PART-B

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

2. a) Explain the bus structures.   6M
   b) Discuss about Error Detection codes.   6M
   (OR)
3. a) What is fixed point representation of integers? Explain different ways   6M
      to represent signed integers.
   b) Discuss about logic micro operations.   6M

UNIT-II

4. a) Explain the Booth Multiplication algorithm   6M
   b) Briefly explain the different instruction formats with suitable   6M
      examples.
   (OR)
5. a) What is instruction cycle? Explain each phase of instruction cycle   6M
      with neat
   b) Explain the various address modes? Give the suitable examples.   6M

UNIT-III

6.	a)	Explain various mapping procedures of cache memory with an example.	8M
	b)	Write a short note on Memory hierarchy with neat diagram	4M
		(OR)	
7.	a)	Draw and Explain about the virtual memory organization.	6M
	b)	Discuss about memory management hardware.	6M

UNIT-IV

8.	a)	Explain Input-Output Processor with neat block diagram	6M
	b)	What is Interrupt? Explain the Priority Interrupt technique.	6M
		(OR)	
9.	a)	Explain the strobe control method of asynchronous data transfer.	6M
	b)	What is direct memory transfer? Give an overview and the block diagram of a DMA controller.	6M

UNIT-V

10	a)	Illustrate with an example an instruction pipeline.	6M
	b)	Discuss in detail about the multiport memory interconnection structure used in multiprocessors.	6M
		(OR)	
11	a)	Illustrate with an example an arithmetic pipeline.	6M
	b)	Explain in detail inter processor synchronization.	6M

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