AR16

CODE: 16BS2006 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech II Semester Supplementary Examinations, July-2018

COMPLEX VARIABLES AND STATISTICAL METHODS

(Common for CE & ME)

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) Show that $f(z) = z^3$ is analytic **7M**
   b) Show that $u = 2\log(x^2 + y^2)$ is harmonic **7M**

(OR)

2. Find an analytic function whose real part is $e^{-x}(x\sin y - y\cos y)$ **14M**

UNIT-II

3. a) Evaluate $\oint_C \frac{e^{2z}}{(z+1)^4} dz$ where C is the circle $|z-1| = 3$ by Cauchy's integral formula **12M**
   b) Define essential singularity with an example **2M**

(OR)

4. a) Evaluate by residue theorem $\oint_C \frac{3\sin z}{z^2 - \frac{\pi^2}{4}} dz$ where C is the circle $|z| = \pi$ **12M**
   b) State Residue theorem **2M**

UNIT-III

5. a) Expand $f(z) = \frac{z^2 - 1}{z^2 + 5z + 6}$ as Laurent's series about $z = 0$ in the regions $2 < |z| < 3$ **12M**
   b) Define radius of convergence and circle of convergence of a power series **2M**

(OR)

6. a) Expand $f(z) = \frac{z-1}{z+1}$ as Laurent's series in the region $|z-1| < 2$ **12M**
   b) Define residue at a point using Laurent's series **2M**

UNIT-IV

7 a) If A, B and C are events such that $P(A)=\frac{1}{3}, P(B)=\frac{1}{4}$ and $P(A\cup B)=\frac{1}{2}$, find (i) $P\left(\frac{B}{A}\right)$ (ii) $P\left(\frac{B}{A^C}\right)$ **7M**

b) A random variable X has the following probability distribution **7M**

x	0	1	2	3	4	5	6	7
$p(x)$	0	k	$2k$	$2k$	$3k$	k^2	$2k^2$	$7k^2+k$

Find (i) k (ii) $P(X<6)$ (iii) $P(X\geq 6)$

(OR)

8 a) Probability density function of a random variable X is **7M**

$$f(x)=\begin{cases}\frac{1}{2}\sin x, & for\ 0\leq x\leq \pi\\ 0, & elsewhere\end{cases}$$

Find (i) mean (ii) $P(0<X<\frac{\pi}{2})$

b) The mean weight of 300 students is 68 kg and the standard deviation is 3 kg., assuming that weights are normally distributed. Find how many students have weight (i) more than 72 kg (ii) less than or equal to 64 kg (iii) lie between 65 and 71 kgs. **7M**

UNIT-V

9 a) By the method of least squares, fit a straight line $x=a+by$ for the following data **7M**

x	12	15	21	25
y	50	70	100	120

b) Determine the rank correlation coefficient for the following data **7M**

x	10	15	12	17	13	16	24	14	22
y	30	42	45	46	33	34	40	35	39

(OR)

10 a) Fit a second degree parabola $y=a+bx+cx^2$ for the following data **7M**

x	1.0	1.5	2.0	2.5	3.0	3.5	4.0
y	1.1	1.3	1.6	2.0	2.7	3.4	4.1

b)

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

7M

AR16

CODE: 16EE2011 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech II Semester Supplementary Examinations, July-2018

POWER SYSTEMS – II

(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) Explain different types of conductors used for over head transmission lines. **6M**
   b) A single phase overhead line 32km long consists of two parallel conductors each 1cm in diameter, 3 meters apart. Determine the capacitance and charging current, if the line voltage is 25kV at 50Hz . **8M**

(OR)

2. a) The three conductors of a 3-ø line are arranged at the corners of a triangle of sides 2.5m, 3m and 3.5m. Calculate the inductance per km of the line when the conductors are regularly transposed. The diameter of each conductor is 1.24 cm. **6M**
   b) Derive an expression for the inductance per phase for a 3-phase overhead transmission line when conductors are un symmetrically spaced and transposed at regular intervals **8M**

UNIT-II

3. a) Obtain the ABCD parameters of nominal-T and nominal-π circuits of medium transmission lines **6M**
   b) A 3-phase, 50 Hz, overhead transmission line delivers 20 MW at 0·8 p.f. lagging and at 66 kV. The resistance and inductive reactance of the line per phase are 10 Ω and 20 Ω respectively while capacitive admittance is 4×10^{-4} Siemens. Calculate (i) the sending end current (ii) sending end voltage (line-to-line) (iii) sending end power factor (iv) transmission efficiency using nominal-T method **8M**

(OR)

4. a) What do you understand by medium transmission lines? How capacitance effects are taken into account in such lines? **6M**
   b) A 3-phase, 50 Hz overhead transmission line, 100 km long, 110 kV between the lines at the receiving end has the following constants : Resistance per km per phase = 0·153 Ω Inductance per km per phase = 1·21 mH Capacitance per km per phase = 0·00958 μF. The line supplies a load of 20,000 kW at 0·9 power factor lagging. Calculate using **nominal -π** representation, the sending end voltage, current, regulation and the efficiency of the line. Neglect leakage **8M**

UNIT-III

5. Starting from the first principles, deduce expressions for ABCD constants of a long line in terms of its parameters **14M**

(OR)

6. a) Derive the equivalent- T network of the long transmission line. **6M**
   b) The per-unit-length parameters of a 220kV, 450km, 50Hz, three phase long transmission line are y= j3.2 x 10^{-6} mhos per km per phase and z = (0.2 + j 0.5) ohm/km. The line supplies a 175 MW load at unity power factor. Determine (i) the (i) the sending-end power and (ii) the efficiency of transmission by using rigorous method **8M**

UNIT-IV

7. a) Explain various factors affecting corona loss in transmission lines . **6M**
   b) An overhead transmission line having a surge impedance of 450 ohms runs between two substations A and B; at B it branches into two lines C and D, of surge impedances 400 and 50 ohms respectively. If a travelling wave of vertical front and magnitude 25 kV travels along the line AB, calculate the magnitude of the voltage and current waves which enter the branches at C and D **8M**

(OR)

8. a) Explain skin and Ferranti effects on transmission lines. **6M**
   b) A 3-phase, 220 kV, 50 Hz transmission line consists of 1·2 cm radius conductors spaced 2 m at the corners of an equilateral triangle. Calculate the corona loss per km of the line. The condition of the wire is smooth and the weather is fair with temperature of 20ºC and barometric pressure of 72·2cm of Hg. **8M**

UNIT-V

9. a) Explain different types of insulators used in transmission and distribution systems **6M**
   b) A transmission line conductor at a river crossing is supported from two towers at heights of 50 and 80 meters above water level. The horizontal distance between the towers is 300m. If the tension in the conductor is 2000kg, find the clearance between the conductor and water at a point midway between the towers. Weight of conductor is 0.844 kg. Assume that the conductor takes the shape of a parabola **8M**

(OR)

10. a) Explain the effect of wind and ice on sag of the conductor **6M**
    b) An insulator string consists of three units, each having a safe working voltage of 15kV. The ratio of self-capacitance to shunt capacitance of each unit is 8:1. Find the maximum safe working voltage of the string. Also find the string efficiency. **8M**

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AR16

CODE: 16EC2008 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech II Semester Supplementary Examinations, July-2018

ELECTROMAGNETIC FIELD THEORY AND TRANSMISSION LINES

(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)	State and Explain coulomb's law.	**6**
	b)	State and explain Gauss law and also write its applications	**8**
		(OR)	
2.	a)	Derive Poisson's and Laplace equations from fundamentals.	**8**
	b)	Derive the capacitance between two parallel plate conductors.	**6**

UNIT-II

3.	a)	State Ampere's circuital law. Specify the conditions to be met for determining magnetic field strength **H** based on Ampere's circuital law.	**6**
	b)	Two infinitely long parallel conductors are separated by a distance 'd'. Find the force per unit length exerted by one of the conductor on the other if the currents in the two conductors are I1 and I_2.	**8**
		(OR)	
4.	a)	State and explain the Biot-Savart's law relating magnetic field produced at a point due to the current in a small elemental wire.	**8**
	b)	An infinitely long straight conducting rod of radius 'a' carries a current of **I** in positive Z direction. Using Ampere's circuital law, find **H** in all regions and sketch the variation of **H** as a function of radial distance. If is I=3mA and a=2cm, find **H** and **B** at (0, 1cm, 0) and (0, 4cm, 0)	**6**

UNIT-III

5. a) State the Faraday's laws of electromagnetic induction and derive the expressions for the transformer and motional e.m.f.s. **8**

   b) Explain the concept of displacement current and obtain an expression for the displacement current density. **6**

(OR)

6. a) Write the Maxwell's equations in point and integral form for time varying fields? **8**

   b) Derive the boundary conditions between media having dielectric and conductor. **6**

UNIT-IV

7. a) Discuss about reflection and refraction of plane waves for normal incidence at the interface between two dielectrics. **8**

   b) Derive the wave equation in **E** and **H** for free space conditions. **6**

(OR)

8. a) State and prove Poynting theorem. Explain its significance **8**

   b) In free space ($z \leq 0$), a plane wave with **Hi** = $10\cos(10^8 t - \beta z)$**ax** mA/m is incident normally on a lossless medium ($\varepsilon = 2\varepsilon_0$, $\mu = 8\mu_0$) in the region $z \geq 0$. Determine the reflected wave **Hr**, **Er** and the transmitted wave **Ht**, **Et**. **6**

UNIT-V

9. a) A 100Ω loss less line connects a signal of 100 KHz to load of 140 Ω. The load power is 100mW. Calculate (i) Voltage reflection coefficient (ii) VSWR (iii) Position of V_{max}, I_{max}, V_{min} and I_{min}. **8**

   b) Write the applications of smith chart. **6**

(OR)

10. a) Derive an expression for Reflection coefficient when a wave is incident on a dielectric obliquely with parallel polarization. **8**

    b) Discuss about Single and Double stub matching. **6**

AR16

CODE: 16CS2007 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech II Semester Supplementary Examinations, July-2018
FORMAL LANGUAGES AND AUTOMATA THEORY
(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) Design DFA to accept the language **7 M**
L= {w | w is of even length and begins with 10}.

b) Give NFA to accepts the set of all strings such that containing 01 as substring over {0, 1}. **7 M**

(OR)

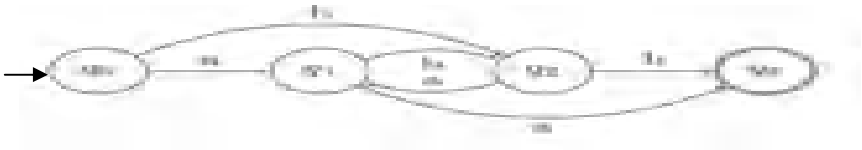
2. a) Consider the following ε-NFA, convert the automaton to a NFA. **7 M**

Q/Σ	ε	a	b
→ p	{r}	{p}	{p, r}
q	Ø	{p}	Ø
(r)	{p, q}	{r}	{p}

b) Construct a mealy machine that takes set of strings over {a, b} as input and prints **'1'** as output for every occurrence of 'ab' as a string, otherwise '0' as ouput. **7 M**

UNIT-II

3. a) Construct regular expression for the following DFA. **7 M**



b) Write regular expression to represent the set of all strings that begin or end with 110. **7 M**

(OR)

4. a) Design a ε-NFA for the regular expression a*bc + ab* **7 M**

b) List any 5 closure properties of regular languages. **7 M**

UNIT-III

5. Consider the grammar **14 M**

S-> 0A0 | 1B1 | BB
A-> C
B-> S | A
C-> S | ε

i) Eliminate ε- productions.
ii) Eliminate any unit productions in the resultant grammar.
iii) Eliminate any useless productions in the resultant grammar.
iv) Put the resultant grammar into Chomsky Normal Form.

(OR)

6. a) Use pumping lemma to show L= { $a^n b^n c^n$ } is not CFL. **7 M**

b) Consider the grammar given below and string " aabbba". **7 M**

A->AS | ε
A->aa | ab| ba |bb

Construct leftmost most derivation and derivation tree.

UNIT-IV

7. a) Design PDA for the language L= {w C w^R |w belongs {a, b}*}. **7 M**
w^R represents reverse of the string w.

b) Consider the following PDA which accepts L by empty stack and convert it into equivalent PDA which accepts L by final state. **7 M**

A=({q_0,q_1},{a,b},{Z_0,Z_1}, δ,q_0,Z_0, Ø) and δ is given by

$\delta(q_0, b, Z_0) = (q_0, ZZ_0)$
$\delta(q_0, b, Z_0) = (q_0, \varepsilon)$
$\delta(q_0, b, Z) = (q_0, ZZ)$
$\delta(q_0, a, Z) = (q_1, Z)$
$\delta(q_1, b, Z) = (q_1, \varepsilon)$
$\delta(q_1, a, Z_0) = (q_0, Z_0)$

(OR)

8. a) Design PDA for the language L= {$a^n b^m c^n$ | n, m>=1}. **7 M**

b) Convert the grammar **7 M**
S -> 0AA
A -> 0S | 1S | 0
to a PDA that accepts the same language by empty stack.

UNIT-V

9. a) Design TM for L={ $0^n1^n2^n$ | n>=1}. **7 M**

b) Write short notes on Church's hypothesis. **7 M**

(OR)

10. a) Prove that PCP with two lists X = (110, 0011, 0110) **7 M**
Y=(110110,00,110) has solution.

b) Explain about types of Turing machines. **7 M**

AR13

CODE: 13CE2005 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech II Semester Supplementary Examinations, July-2018

CONSTRUCTION MATERIALS AND PRACTICE
(Civil Engineering)

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

PART-A

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

1. a) Define density index?
   b) Define lustre?
   c) When is volume batching generally recommended?
   d) What is meant by distempering?
   e) Define closer (as used in masonry)?
   f) What is guniting?
   g) What is a mullion?
   h) What is Terrazo flooring?
   i) What is pointing?
   j) What is underpinning?

PART-B

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

UNIT-I

2. a) Write a brief note about the important properties of rock-forming minerals? 6
   b) Explain classification of bricks? 6

(OR)

3. a) Explain about the various tests on a lime sample? 6
   b) Describe the effects of fly ash on cement concrete? 6

UNIT-II

4. a) Explain the characteristics of a good mortar? 6
   b) Discuss the used of fibers in building industry? 6

(OR)

5. a) Write the properties of stainless steel and high carbon steel? 6
   b) Write a brief description of the process of painting on different surfaces? 6

UNIT-III

6. a) Describe Ashlar stone masonry and state its use in construction of structures? 6
   b) Explain English bond and Flemish bond with neat sketches? 6

(OR)

7. a) What is damp proofing? Discuss the materials used. 6
   b) Describe types of partitions? 6

UNIT-IV

8. a) Explain about the types of roofs? 6
   b) Write a note on types of doors? 6

(OR)

9. a) Explain about different types of windows? 6
   b) Write short notes on straight stairs and spiral stairs? 6

UNIT-V

10. a) What is plaster ? State common proportions used in plaster. List the objective of plaster 6
    b) Write short note on pointing? 6

(OR)

11. a) Distinguish between plastering and pointing? 6
    b) Write a brief note on termite proofing? 6

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AR13

CODE: 13BS2007 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech II Semester Supplementary Examinations, July-2018

COMPLEX VARIABLES AND STATISTICAL METHODS
(Electrical and Electronics Engineering)

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

PART-A

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

1. a) Give Cauchy – Riemann equations in polar form
   b) Define entire function
   c) Find the zeros and poles of the function $f(z)=\frac{1+z}{(1-z)^2}$
   d) Find the residue of $f(z)=\frac{1+z}{z^2(z-2)}$ at z = 2
   e) Determine the fixed points of $f(z)=\frac{6z-9}{z}$
   f) Define Bilinear transformation
   g) Determine $E\left[(4X+3)^2\right]$ when $E\left(X^2\right)=3$ *and* $E(X)=2$
   h) Write any two important properties of moment generating function
   i) Define standard error of sampling distribution of test statistic
   j) Define Null and Alternative Hypothesis

PART-B

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

UNIT-I

2. a) If w = log z , determine $\frac{dw}{dz}$ and find where w is non –analytic 6M

   b) Evaluate $\int_c \frac{e^{2z}}{(z-1)(z-2)}dz \; where\, C \; is\, the\, circle\, |z|=3$ 6M

(OR)

3. a) Prove that $\left(\frac{\partial^2}{\partial x^2}+\frac{\partial^2}{\partial y^2}\right)\left|\mathrm{Re}\, al\, f(z)\right|^2=2\left|f^1(z)\right|^2$ where w = f(z) is analytic 6M

   b) Using Cauchy's theorem to Evaluate $\int\frac{e^{2z}}{z-2}dz$ where C is $|z|=1$. 6M

UNIT-II

4. a) Evaluate the integral $\int_0^{2\pi}\frac{d\theta}{2-\sin\theta}$ 6M

   b) Find the residue of $\frac{ze^z}{(z-1)^3}$ at its pole 6M

(OR)

5. a) Prove that $\int_{-\infty}^{\infty} \frac{\cos(ax)}{x^2+1}dx = \pi e^{-a}, a \geq 0$ 6M

b) Evaluate $\int_C \frac{e^{-2z}z^2}{(z-1)^3(z+2)}dz$ *where C is* $|z+2|=1$ using Cauchy's integral formula 6M

UNIT-III

6. a) Find the image of the circle $|z|=2$ under the transformation w = z + 3 + 2i 6M

b) Find the bilinear transformation that maps the points $(0,1,\infty)$ in z-plane onto the points (-1, -2, -i) in the w-plane 6M

(OR)

7. a) Under the transformation $w=\frac{z-i}{1-iz}$, find the image of the circle $|z|=1$ in the w-plane 6M

b) Under the transformation $w=\frac{1}{z}$, find the image of the circle $|z-2i|=2$ in the w-plane 6M

UNIT-IV

8. a) A random variable X has the following probability function 6M

Values of X, x :	-2	-1	0	1	2	3
P(x) :	0.1	k	0.2	2k	0.3	k

i) Find the value of k ii) Calculate mean and variance of X

b) If X is a Poisson variate such that $P(X=2)=9P(X=4)+90P(X=6)$ 6M

i) Find λ ii) Find the mean of X

(OR)

9. a) If X is normal variate with mean 30 and standard deviation 5. Find the probabilities that i) $26 \leq X \leq 40$, ii) $X \geq 45$, iii) $|X-30|>5$ 6M

b) Define Moment Generating function and find MGF for Binomial distribution and Poisson distribution 6M

UNIT-V

10. Two independent random samples of 8 an 7 items respectively had the following values 12M

Sample I : 9 11 13 11 15 9 12 14

Sample II : 10 12 10 14 9 8 10

Do the estimates of population variance differ significantly

(OR)

11. a) A random sample of 500 apples was taken from a large consignment and 60 were found to be bad. Obtain the 98% confidence limits for the percentage of bad apples in the consignment 6M

b) A sample of 900 members has a mean 3.4 cms and standard deviation 2.61 cms. Is the sample from a large population of mean 3.25 cms and Standard deviation 2.61cms. 6M

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AR13

CODE: 13ME2008 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech II Semester Supplementary Examinations, July-2018
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) Differentiate between dynamic viscosity and kinematic viscosity.
   b) What is vapour pressure?
   c) Define stream tube.
   d) Define momentum equation.
   e) What do you mean by equivalent pipe?
   f) What is the range of Reynold's number for laminar flow?
   g) What is venturimeter?
   h) Define the term "Governing of a turbine".
   i) What is meant by unit discharge?
   j) What are the important components parts of a reaction turbine?

PART-B

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

UNIT-I

2. a) The pressure inside a soap bubble of 50 mm diameter is 2.5 N/m^2 above the atmosphere. Estimate the surface tension of the soap film.
   b) Measurements of pressure at the base and top of a mountain 74 cm and 60 cm of mercury respectively. Workout the height of mountain if air has a specific weight of 11.97 N/m^3.

(OR)

3. a) Explain the terms
      (i) Path line (ii) Streak line (iii) stream line
   b) A simple U-tube manometer containing mercury is connected to a pipe in which a fluid of sp.gr. 0.8 and having vacuum pressure is flowing. The other end of the manometer is open to the atmosphere. Find the vacuum pressure in pipe, if the difference of mercury level in the two limbs 40 cm and the height of fluid in the left from the centre of the pipe is 15 cm below.

UNIT-II

4. a) Derive continuity equation for 3-D flow.
   b) A 30 cm diameter pipe, conveying water, branches into two pipes of diameters 20 cm and 15 cm respectively. If the average velocity in the 30 cm diameter pipe is 2.5 m/s, find the discharge in the pipe. Also determine the velocity in 15 cm pipe if the average in 20 cm diameter pipe is 2 m/s.

(OR)

5. a) The water is flowing through a taper pipe of length 100 m having diameters 600 mm at the upper end and 300 mm at the lower end, at the rate of 50 litres/s. The pipe has a slope of 1 in 30. Find the pressure at the lower end if the pressure at the higher level is 19.62 N/cm^2.

b) 250 litres/s of water is flowing in a pipe having a diameter of 300 mm. If the pipe is bent by 135^o (that is change from initial to final direction is 135^o), find the magnitude and direction of the resultant force on the bend, The pressure of water flowing is 39.24 N/cm^2.

UNIT-III

6. a) Derive Darcy Weisbach equation.
   b) A pipe line of 0.6 m diameter is 1.5 km long. To increase the discharge, another line of the same diameter is introduced parallel to the first in the second half of the length. Neglecting minor losses, find the increase in discharge if 4f = 0.04. The head at inlet is 300 mm.

(OR)

7. a) An oil of sp. gr. 0.8 is flowing through a venturimeter having inlet diameter 20 cm and throat diameter 10 cm. The oil-mercury differential manometer shows a reading of 25 cm. Calculate the discharge of oil through the horizontal venturimeter. Take C_d =0.98.
   b) A pitot-static tube is used to measure the velocity of water in a pipe. The stagnation pressure head is 6 m and static pressure head is 5 m. Calculate the velocity of flow assuming the coefficient of tube equal to 0.98.

UNIT-IV

8. a) Explain the classification of types of turbines.
   b) A Francis turbine with an overall efficiency of 75% is required to produce 148.25kW power. It is working under a head of 7.62 m. The peripheral velocity = $0.26\sqrt{2gH}$ and the radial velocity of flow at inlet is $0.96\sqrt{2gH}$. The wheel runs at 150 r.p.m and the hydraulic losses in the turbine are 22% of the available energy. Assuming radial discharge, determine:
   (i) The guide blade angle, (ii) The wheel vane angle at inlet, (iii) Diameter of the wheel at inlet, and (iv) Width of the wheel at inlet.

(OR)

9. a) Obtain an expression for unit speed, unit discharge and unit power for a turbine.
   b) A turbine develops 9000 kW when running at 10 r.p.m. The head on the turbine is 30 m. If the head on the turbine is reduced to 18 m, determine the speed and power developed by the turbine.

UNIT-V

10. a) With a neat sketch, explain the principle and working of a centrifugal pump.
    b) Obtain an expression for the minimum speed for starting a centrifugal pump.

(OR)

11. a) The internal and external diameters of the impeller of a centrifugal pump are 200 mm and 400 mm respectively. The pump is running at 1200 r,p,m. The vane angles of the impeller at inlet and outlet are 20^o and 30^o respectively. The water enters the impeller radially and velocity of flow is constant. Determine the work done by the impeller per unit weight of water.
    b) Derive the expressions for discharge and work done for single acting reciprocating pump.

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AR13 SET-1

Code: 13EC2011

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech II Semester Supplementary Examinations, July-2018

ELECTROMAGNETIC WAVES AND TRANSMISSION LINES
(Electronics and Communication Engineering)

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

PART-A

Answer all questions **[1 X 10 = 10 M]**

1. a) What is Coulomb's law?
   b) Mention some of the applications of Gauss law?
   c) Write Maxwell's Two Equations for Magnetostatic Fields?
   d) What is amperes circuit law?
   e) Define Displacement Current Density?
   f) Define Polarization?
   g) Define Characteristic impedance?
   h) Define reflection coefficient?
   i) Define Uniform plane wave?
   j) What is Distortionlessline?

PART-B

Answer one question from each unit **[5 X 12=60M]**

UNIT-I

2. Derive Expression for electric field intensity due to a infinite line charge?

(OR)

3. a) Explain the following terms
      i. Continuity Equation
      ii. Relaxation Time
      iii. Dielectric Constant
   b) Derive the expression for Laplace's Equation from basics of Gauss law?

UNIT-II

4. a) State Ampere's Law?
   b) Define Magnetic flux density and vector magnetic potential.

(OR)

5. Find magnetic field intensity H, at a point P due to a straight conductor carrying current I.

Code: 13EC2011

UNIT-III

6. a) Write down Maxwell's equations in their general integral form. Derive the Corresponding equations for fields varying harmonically with time.
   b) In free space D = D_m sin (ωt + βz) a_x use Maxwell's equations to find E,B,H.

(OR)

7. Derive the boundary conditions for the Tangential components of Magneto static fields at the boundary between two perfect dielectrics.

UNIT-IV

8. a) For good Conductors derive the expressions for α, β, ν and η.
   b) Derive Wave equations for lossless medium.

(OR)

9. a) State and Prove Poynting vector theorem?

   b) Derive an expression for Brewster angle when a wave is parallely polarized.

UNIT-V

10. a) Derive propagation constant for infinite transmission line.
    b) Derive condition for Distortionless transmission line.

(OR)

11. a) Discuss Stub matching techniques for impendence matching.
    b) Sketch input impendence versus line length for short and open circuited transmission lines.

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AR13

CODE: 13CS2009 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech II Semester Supplementary Examinations, July-2018

FORMAL LANGUAGES AND AUTOMATA THEORY
(COMMON TO CSE & IT)

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

PART-A

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

1. a) What is transition diagram? How is it related to finite automata?
   b) Define NFA with ε-moves. Give a suitable example.
   c) Regular expression for all strings of a's and b's starts with ab and ends with bba is-------- .
   d) A language is regular if and only if----------
   e) Define sentential form.
   f) State Pumping Lemma on CFL.
   g) Define push down automata.
   h) When do you say that a string is accepted by PDA?
   i) Define NP hard problem.
   j) Write the transition function for Non Deterministic Turing Machine.

PART-B

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

UNIT-I

2. a) How NFA is different from DFA? explain with example. 6
   b) Write the procedure to minimize a DFA and give an example. 6

(OR)

3. a) Design NFA to recognize the following set of strings: lab, cab and dab over {a,b,c,d,l}. 6
   b) Differentiate between mealy and moore machines. 6

UNIT-II

4. a) Construct a FA equivalent to the regular expression 10
   $10 + (0 + 11)0^*1$
   b) State the Arden's Theorem. 2

(OR)

5. a) Find the RE for the following 6
   i set of all strings that contains exactly two a's.
   ii.set of all strings that contains at least two a's.
   iii. set of all strings that contains at most two a's.
   b) Define Regular set, Regular expression and Regular Language with an example. 6

UNIT-III

6. a) Consider the grammar S-->(L) / a, L-->L,S / S. then Construct LMD,RMD and derivation trees for the following string (a,((a,a),(a,a))). 10
   b) Define Greibach Normal Form. 2

(OR)

7. a) Construct CNF for the following 6
   E-->E+T / T, T-->T*F/F,F-->(T)/a.
   b) Explain about an ambiguous grammar with an example. 6

UNIT-IV

8. a) Explain about the model of pushdown automata. 5
   b) Design Pushdown Automata for L={ wcw^R : w ∈{a , b}* 7

(OR)

9. a) Write procedure for conversion of PDA to CFG. 5
   b) Design PDA that accepts a string of well formed parenthesis(consider the parenthesis is as (/),{,},[,]). 7

UNIT-V

10. a) Explain the Chomsky hierarchy of languages 7
    b) Find whether the post correspondence problem, P = {(11, 11), (100, 001) (111,11)} has a match. Give the solution 5

(OR)

11. Design a Turing machine that accepts L = {$a^n b^n c^n$ / n ≥ 1} 12

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