AR18

CODE: 18BST209 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech I Semester Regular Examinations, October-2019

BIOLOGY

(Common to CE & CSE & IT)

Time: 3 Hours **Max Marks: 60**

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)	Enumerate fundamental differences between Science and Engineering with suitable examples	6M
	b)	Discuss the major discoveries of biology that lead to prominent discoveries in engineering	6M
		(OR)	
2.	a)	What are basic principles and need to study of Biology in Engineering	6M
	b)	Write applications of laws of Thermodynamics with reference to Brownian movement	6M

UNIT-II

3.	a)	Describe in detail the ultra structure of an Eukaryotic cell with neat labelled diagram	6M
	b)	Classify the organisms based on their Ammonia excretion with suitable examples.	6M
		(OR)	
4.	a)	What are the principles of taxonomy? and mention three kingdoms of life	6M
	b)	What is meant by Sterilization? Discus any two methods of sterilization	6M

UNIT-III

5.	a)	What is Mendel's Di hybrid cross? Derive laws of segregation and independent assortment	6M
	b)	Explain the concept of dominance and Recessiveness, alleles and Gene interaction.	6M
		(OR)	
6.	a)	Define bio molecule and bring out functional aspects of nucleic acids in life	6M
	b)	Discus major steps in Recombinant DNA Technology	6M

UNIT-IV

7.	a)	Discuss about Physical and Chemical properties of Enzymes	6M
	b)	Discuss the Enzyme kinetics and kinetic parameters	6M
		(OR)	
8.	a)	Explain the Mechanism of enzyme action with suitable examples	6M
	b)	Describe the structure and functions of Proteinss	6M

UNIT-V

9.	a)	Write the process of break down on glucose molecule into pyruvic Acid	6M
	b)	Explain the light reaction of Photosynthesis in plants	6M
		(OR)	
10.	a)	Explain the sequence of biochemical reactions in Krebs cycle	6M
	b)	what is energy currency and bring out important energy yielding and energy consuming reactions in a cell	6M

AR18

CODE: 18BST204 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech I Semester Regular Examinations, October-2019

COMPLEX VARIABLES AND STATISTICAL METHODS

(Common to EEE, ME & ECE)

Time: 3 Hours **Max Marks: 60**

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. Find the conjugate harmonic function of $u = e^{x^2-y^2}.Cos2xy$. Hence find f(z) in terms of z — 12M

(OR)

2. Show that $u(x,y) = e^{2x}(x\cos 2y - y\sin 2y)$ is harmonic function and find its harmonic conjugate. — 12M

UNIT-II

3. a) Evaluate $\int_c \frac{z^3 - \sin 3z}{(z-\pi/2)^3} dz$, with $c: |z| = 2$ using Cauchy's integral formula. — 6M

   b) Evaluate $\int_c \frac{e^{2z}}{(z-1)(z-2)} dz$, with c is the circle, $c: |z| = 3$ using Cauchy's integral formula. — 6M

(OR)

4. Using Residue theorem, Evaluate $\int_c \frac{z-3}{z^2+2z+5} dz$, where Cis the circle given by (i) $|z| = 1$, (ii) $|z+1-i| = 2$ — 12M

UNIT-III

5. Prove that in a Normal Distribution, Mean = Median = Mode — 12M

(OR)

6. a) A random sample of size 100 is taken from an infinite population having the mean 76 and variance 256. What is the Probability that $\bar{x}$ will be between75 and 78 — 6M

   b) The Mean and standard deviation of a population are 11,795 and 14,054 respectively. What can one assert with 95% confidence about the maximum error if $\bar{x}$ = 11,795 and n = 50. Also construct 95% confidence interval for the true mean. — 6M

UNIT-IV

7. a) A Sample of 26 bulbs gives a mean life of 990 hours with a S.D of 20 hours. The manufacturer claims that the mean life of bulbs is 1000 hours. Is the sample not upto the standard. 6M

   b) A sample of 64 students have a mean weight of 70Kgs. Can this be regarded as a sample from a population with mean weight 56kgs and standard deviation 25kgs. 6M

(OR)

8. a) Two horses A and B were tested according to the time (in seconds) to run a particular track with the following results: 12M

Horse A	28	30	32	33	33	29	34
Horse B	29	30	30	24	27	29	-

Test whether the two horses have the same running capacity?

UNIT-V

9. a) Fit a straight line to the following data 6M

x	0	1	2	3	4
y	1	1.8	3.3	4.5	6.3

By the method of least squares.

   b) Fit a curve of the form $y = ae^{bx}$ to the data 6M

x	0	1	2	3
y	1.05	2.10	3.85	8.30

By the method of least squares.

(OR)

10. a) Find the most likely production corresponding to a rain fall40 from the following 6M

	Rainfall(X)	Production(Y)
Average	30	500
Standard deviation	5	100
Coefficient of Correlation	0.8	

   b) If $\sigma_x = \sigma_y = \sigma$ and angle between the regression lines is $\tan^{-1}(4/3)$, find r. 6M

AR16

CODE: 16CE2005 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, October-2019

ENVIRONMENTAL ENGINEERING-I

(Civil 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. Explain briefly about Chemical and biological examinations of drinking water standards 14

(OR)

2. Predict the population for the year 2021 and 2031 using the following data by geometrical increase method and incremental increase method. 14

Year	Population
1951	21000
1961	22800
1971	30000
1981	42000
1991	50000
2001	55500

UNIT-II

3. a) Define an intake structure. What are the factors governing the location of an intake 8
   b) Name the types of valves and explain any two of them in detail. 6

(OR)

4. a) Explain briefly about methods of distribution of water 6
   b) Explain briefly about Hardy-cross method. 8

UNIT-III

5. a) Derive the terminal velocity using stokes law. 8
   b) Define Coagulation. Explain factors affecting the coagulation. 6

(OR)

6. a) 4 MLD of water per day passes through a sedimentation tank basin which is 6 m wide, 16 m long and 3.5 m deep. 8
   (i) Find the detention time for this basin
   (ii) Determine the average velocity of flow through the basin (iii) Compute the SOR of the basin.
   b) Draw a neat flow chart of water treatment plant and explain it 6

UNIT-IV

7. a) Explain process of aeration with help of neat sketch. 6
   b) What are different types of filers for filtration process 8

(OR)

8. a) Explain about any three methods of disinfection. 6

   b) What is break point chlorination explain it with sketch of chlorine residual vs chlorine dosage. 8

UNIT-V

9. a) Explain terms Reduce, Recovery, Reuse, recycle in solid waste management 4
   b) Explain different treatment methods in Solid waste management 10

(OR)

10. Explain briefly about characteristics, generation and collection of municipal solid waste. 14

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AR16

CODE: 16EE2006 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, October-2019

ELECTRICAL TECHNOLOGY

(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)	Determine the generated EMF in the armature of a DC generator with suitable mathematical equations?	7M
	b)	Develop the expression for efficiency of a DC Machine?	7M
		(OR)	
2.	a)	A 250V compound generator has armature, series field and shunt field resistances of 0.4 ohms, 0.2 ohms and 125 ohms respectively. If this generator supplies 10kW at rated voltage find the emf generated in the armature when the machine is connected in long shunt	7M
	b)	Explain in detail various losses in a DC Machine?	7M

UNIT-II

3.	Explain the constructional details of a single phase transformer?	14M
	(OR)	
4.	A 20 Kva, 2500/250V,50Hz single phase transformer gave the following test results: Open circuit test: 250V,1.4A,105W Short circuit test: 104V,8A, 320W. Compute the parameters of the approximate equivalent circuit referred to high voltage and low voltage sides.	14M

UNIT-III

5.	Explain various types of single phase induction motors.	14M
	(OR)	
6.	Derive the torque equation of induction motor and also draw the torque slip characteristics	14M

UNIT-IV

7.	Explain the constructional details of alternator?	14M
	(OR)	
8.	Discuss in detail about voltage regulation in synchronous impedance method?	14M

UNIT-V

9.	Explain the construction and working of Moving Iron instruments?	14M
	(OR)	
10.	Explain the construction and working of PMMC instruments?	14M

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AR16

CODE: 16ME2008 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, October-2019

FLUID MECHANICS & HYDRAULIC MACHINERY

(Common to EEE & ME Branches)

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: i)Specific mass ii)Specific gravity iii)Surface tension	7M
	b)	Express the viscosity of water in SI units if it is 0.01008 poise find also kinematic viscosity in SI units if its specific gravity is 0.998.	7M

(OR)

2.	a)	Express the relation between Atmosphericpressure, vacuum pressure and gauge pressure with the help of a diagram if necessary.	4M
	b)	Two pipes running full of water connected to a differential manometer using mercury, the connecting being filled with water. The central line of the high pressure pipe is 180 cm lower in elevation then the centre line of the other pipe. The temperature of the both water and mercury is 10^0C. If mercury reading is 60 cm. What is the pressure difference in cm of water? If a measuring liquid having a specific gravity of 0.8 is used in place of mercury,	10M

UNIT-II

3.	a)	State Bernouli'sTheorm and explain its assumptions.	4M
	b)	The water is flowing through a pipe having dia 20cm and 10 cm at section 1 and 2 respectively. The rate of flow through pipe is 35liter/sec the section 1 is 6m above datum and section 2 is 4m above datum. If pressure at section 1 is 39.24N/cm^2, find the intensity of pressure at section 2.	10M

(OR)

4.	a)	Derive an expression for the force exerted by a flowing fluid on a pipe bend.	7M
	b)	250 lit/sec of water is flowing in a pipe of 30cm diameter, if the pipe is bent by 135^0(i.e change from initial to final direction) find the magnitude and direction of resultant force in the bend, the pressure of water flowing is 39.24N/cm^2.	7M

UNIT-III

5.	a)	The rate of flow of water through a horizontal pipe is 0.25m^3/sec the diameter of the pipe which is 20cm is suddenly enlarged to 40cm, the pressure intensity in the smaller pipe is 11.772N/cm^2 determine i) Loss of head due to sudden enlargement. ii) Pressure intensity in the large pipe iii) Power lost due to enlargement.	10M

b) Derive an expression for the force exerted on an inclined plate moving in the direction of the jet. 4M

(OR)

6. a) A jet of water of diameter 5cm moving with a velocity of 40m/sec strikes a curved fixed symmetrical plate at the centre find the force exerted by the jet of water in the direction of the jet if the jet is deflected through an angle of 120^0at the outlet of the curved plate. 7M

b) Determine the rate of flow of water through a pipe of diameter 20cm and length 50m.when one end of the pipe is connected to a tank and another end of the pipe is open to the atmosphere the pipe is horizontal and the height of water in the tank is 4m above the centre of the pipe consider all minor loses and take f= 0.009. 7M

UNIT-IV

7. a) Explain the classification of turbines. 4M

b) The water available for a pelton wheel is 4 cumec and the total head from the reservoir to the nozzle is 250m. The turbine has two runners with two jets per runner. All the four jets have the four jets have the same diameters the pipeline is 3000m long , the efficiency of power transmission through the pipe line and the nozzle is 91% and efficiency of each runner is 90% the velocity coefficient of each nozzle is 0.975 and coefficient of friction is 4f for the pipe is 0.0045.determine 10M
i)power developed by the turbine, ii) the diameter of the jet and pipeline.

(OR)

8. a) Explain by deriving suitable equation for draft tube theory. 4M

b) A conical draft tube having inlet and outlet diameters 1m and 1.5 m discharges water at outlet with a velocity of 2.5m/sec the total length of the draft tube is 6m and 1.20m , of the length of draft tube is immersed in water . if the atmostspheric pressure head is 10.3 meter of water and loss of head due to friction in the draft tube is equal to 0.2 X velocity head at the outlet of the tube. Find pressure head at inlet and efficiency of the draft tube. 10M

UNIT-V

9. a) Derive an expression for the minimum speed for starting a centrifugal pump. 7M

b) A centrifugal pump with 1.2m diameter runs at 200 rpm and pumps 1880 lit/sec the average lift being 6m. The angle which the vanes make at exit with the tangent to the impeller is 26^0 and the radial velocity of flow is 2.5m/sec, determine the manometric efficiency and the least speed to start pumping against a head of 6m.yhe inner diameter of the impeller being 0.6m. 7M

(OR)

10. a) Derive an expression for the specific speed of a centrifugal pump. 4M

b) Two geometrically similar pumps are running at the same speed of 1000rpm, one pump has an impeller diameter of 0.30 meter and lifts water at the rate of 20lit/sec against a head if 50m. Determine the head and impeller diameter of the other pump to deliver half the discharge. 10M

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AR16

CODE: 16BS2005 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, October-2019

PROBABILITY AND STATISTICS

(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) A box contains 6 Red , 4 White and 5 Black balls. A person draws 4 balls at random. Find the probability that among the balls drawn there is at least one ball of each colour. 7M

   b) In a factory which manufactures bolts, machines A, B and C manufacture respectively 25%,35% and 40% of the bolts. Of their output 5,4 and 2 percent are respectively defective bolts. A bolt is drawn at random from the product and is found to be defective. What is the probability it is manufactured by the machine B 7M

(OR)

2. a) A random variable X has the following probability function:

X	0	1	2	3	4	5	6	7	8
P(X)	a	3a	5a	7a	9a	11a	13a	15a	17a

   i) Find the value of a.
   ii) Evaluate $P(X<3)$, $P(X\geq 3)$, $P(2\leq X<5)$
   iii) Find the minimum value of x so that $P(X\leq x)>0.5$? 7M

   b) If the probability density function of a r.v is given by

   $f(x) = kx^3 \quad 0 < x < 1$

   $= 0$ elsewhere.

   Find the value k and the probability that the r.v takes on a value 7M

   a) between 1/4 and 3/4 b) greater than 2/3

   c) greater than 0.8 d) between 0.2 and 0.4

UNIT-II

3. a) Derive the mean and variance of Binomial distribution 7M

   b) In a test on 2000 electric bulbs , it was found that the life of a particular type was normally distributed with an average life of 2040 hours and a standard deviation of 60 hours. Estimate the number of bulbs likely to burn for 7M

   i) more than 2150 hours
   ii) less than 1950 hours
   iii) more than 1920 hours but less than 2160 hours

(OR)

4. The following mistakes per page were observed in a book. Fit a Poisson distribution 14M

No.of mistakes / page	0	1	2	3	4
No.of pages	211	90	19	5	0

UNIT-III

5. A population consists of 3,6,9,15 and 27 . Consider all possible samples of size 2 which can be drawn with replacement. Find
   i) The population mean
   ii) The population standard deviation
   iii) Mean of the sampling distribution of means
   iv) Standard deviation of the sampling distribution of means — 14M

(OR)

6. a) A random sample of 8 envelopes is taken from a letter box of a post office and their weights in grams are found to be 12.1,11.9,12.4,12.3,11.9,15.4,13.9,12.8. Find 99% confidence interval for the population mean weight of the envelopes received at that post office. — 7M

   b) What is the maximum error one can expect to make with probability 0.9 when using the mean of a random sample size n=64 to estimate the mean of a population with $\sigma^2=2.56$ — 7M

UNIT-IV

7. The following random samples are measurements of heat producing capacity in millions of calories per ton of specimens of coal from two mines.

   Mine 1: 8260 8130 8350 8070 8340

   Mine 2: 7950 7890 7900 8140 7920 7840

   Use 0.01 level of significance to test whether the difference between the means of these two samples is significant? — 14M

(OR)

8. a) A sample of 400 individuals is found to have a mean height of 67.47 inches. Is it reasonable to regard the sample drawn from the large population with mean height 67.39 inches and standard deviation of 1.3 inches. Test at 1% level of significance. — 7M

   b) A manufacturer of bulbs claims that only 2% of the bulbs are defective. A random sample of 400 bulbs from his factory shows that 13 of them are defective on the evidence of this sample, can we accept the manufacturer's claim? Test at 5% level of significance. — 7M

UNIT-V

9. a) Find the Karl Pearson's correlation coefficient to the given data: — 7M

X	16	21	26	23	28	24	17	22	21
Y	33	38	50	39	52	47	35	43	41

   b) In a partially destroyed laboratory record of analysis of correlation data, the following results are only legible:
   Variance of x=9.
   Regression lines are $8x-10y+66=0$ — 7M
   $40x-18y-214=0$.
   Find
   (i) mean values of x and y (ii) correlation coefficient (iii) standard deviation of y.

(OR)

10. a) Fit a straight line of the form $Y=a+bX$ to the following data: — 7M

X	1	2	3	4	6	8
Y	2.4	3	3.6	4	5	6

    b) Find the regression lines to the given data and estimate the values of Y when X=6 — 7M

X	2	5	3	4	9	12
Y	12	8	6	8	4	5

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AR13

CODE: 13BS2007 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, October-2019
COMPLEX VARIABLES AND STATISTICAL METHODS
(Common to CIVIL & MECH)

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

PART-A

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

1. a) Define Harmonic function
   b) State Cauchy 's integral theorem
   c) Define Removable Singularity with an example
   d) Determine the residue of the function $f(z)=\frac{2e^z}{z(z-3)}$ at z=0
   e) Find the invariant points of $f(z)=\frac{3z-5}{z+1}$
   f) Define critical points of the function
   g) Define Axiomatic Probability
   h) Show that the mean and variance of standard normal variate are zero and one
   i) State central limit theorem
   j) Define one tailed and two tailed tests

PART-B

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

UNIT-I

2. a) Show that the function $f(z)=\frac{\bar{z}}{z}$ is not continuous at z = 0 — 4M
   b) State and Prove necessary and sufficient conditions for Cauchy-Riemann Equations in Cartesian form — 8M

(OR)

3. a) 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 — 6M
   b) Evaluate $\int_C (y^2+2xy)dx+(x^2-2xy)dy$ where C is the boundary of the region by $y=x^2$ *and* $x=y^2$ — 6M

UNIT-II

4. a) Find the residue of $f(z)=\frac{z^3}{(z^2-1)}$ *at* $z=\infty$ — 4M
   b) Evaluate $\int_C \frac{z-3}{z^2+2z+5}dz$ *where C*: 1) $|z|=1$ 2) $|z+1-i|=2$ 3) $|z+1+i|=2$ — 8M

(OR)

5 Show that $\int_0^\infty \frac{1}{x^6+1}dx=\frac{\pi}{3}$ using residue theorem — 12M

UNIT-III

6. a) Determine the linear fractional transformation that maps $z_1 = -2, z_2 = 0, z_3 = 2$ onto $w_1 = \infty, w_2 = 1/4, w_3 = 3/8$ respectively 6M

   b) Find and plot the image of the triangular region with vertices at (0,0),(1,0),(0,1) under the transformation w= (1-i)z+3 6M

(OR)

7. a) Prove that a bilinear transformation preserves cross ration property of four points 6M

   b) Prove that a bilinear transformation is conformal and find the fixed points 6M

UNIT-IV

8. a) State and Prove Baye's Theorem 8M

   b) Find p for a binomial random variable X if n=6 and 9P(X=4) = P(X=2) 4M

(OR)

9. a) Define Moment Generating function and write its properties 6M

   b) In a normal distribution 31% of the items are under 45 and 8% are over 64. Find the mean and standard deviation. 6M

UNIT-V

10. a) In a restaurant, the average sales of Pizzas are 200 per day. Due to a new office building in the vicinity, the sales increased during first 27 days, and these were found to be 205, 215,216, 220,236,240,241,245,250,216,240,238,204,217,219,225,235,196, 193,215,168,190,216,218,222,219. Discuss that the sales of Pizzas have increased. 6M

    b) What are the different types of sampling, Explain them 6M

(OR)

11. a) The time taken by the workers in performing a job by Method I and Method II is given below Method 1: 20 16 26 27 23 22 , Method 2 : 27,33,42,35,32,34,38
    Do the data show that the variance of the time distribution from population from which these samples are drawn do not differ significantly? 6M

    b) Define the following terms 1) Type I error and Type II error 2) Critical region 3) Alternative Hypothesis 4) Small and Large samples 5) confidence intervals 6) Test statistics 6M

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AR13

Code: 13EE2008 **SET-1**

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

ELECTRICAL TECHNOLOGY

(Electronics and Communication Engineering)

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

PART – A

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

1. Answer the following.
   a) How Hysteresis losses can be minimized?
   b) What are the disadvantages of Swinburne's Test?
   c) Why Transformers are rated in kVA?
   d) Define Voltage Regulation of Transformer?
   e) Draw Energy flow diagram of Induction Motor.
   f) What is Eddy current loss?
   g) Define winding factor.
   h) What are the types of Synchronous machine based on their construction features?
   i) Permanent Magnet Moving Coil type of instrumentworks on which principle.
   j) List out any two of the applications of Moving iron type of Instrument

PART – B

Answer one question from each Unit **[5 x 12 = 60M]**

UNIT – I

2. Explain the Construction and operating principle of DC Generator. [12M]

(OR)

3. a).How can you conduct Swinburne's test. Write the advantages and disadvantages of the above test. [6M]

   b).A 220V D.C shunt motor has armature resistance of 0.25Ω on load, it takes an armature current of 50A and runs at 1500 r.p.m. If the flux of motor is reduced by 10% without changing the load torque, find the new speed of the motor. [6M]

AR13

Code: 13EE2008 **SET-1**

UNIT – II

4. A 230/1100V, 50Hz single phase transformer give the following test results:
   O.C. Test (LV Side): 230V, 0.7A, 75W
   S.C. Test (HV Side):20V, 10A, 100W
   Calculate the voltage regulation at 0.9 pf and parameters of the equivalent circuit referred to the LV Side. [12M]

(OR)

5. a). Explain the principle of operation of single phase transformer [8M]. .
   b). Discuss about losses of a transformer. [4M]

UNIT – III

6. Derive the condition for maximum starting torque and running torque of 3Φ induction motor and also draw Torque-slip characteristics. [12M]

(OR)

7. Explain briefly various starting method of a three phase induction motor. [12M]

UNIT – IV

8. a) Derive the expression for EMF equation of an alternator. [6M]
   b) A 120 kVA, 415V, three phase star connected alternator has the following parameters:
   Armature Resistance = 0.5 Ω
   Synchronous reactance = 10 Ω
   Calculate the percentage voltage regulation at full load at 0.8 p.f lagging and leading [6M]

(OR)

9. A 3-phase, 8-pole star connected alternator has the following data:
   Number of slots=192; Conductors/slot =8(conductors of each phase are connected in series); the coil span=160 electrical degrees; the speed of the alternator =375 r. p. m; flux / pole=55 mWb. Calculate the phase and line voltages. [12M]

UNIT – V

10. What are types of MI type of Instruments? Describe the constructional details and working of an attraction type MI instruments. [12M]

(OR)

11. a). Explain the principle of operation of Moving coil instruments. [6M]
    b).What are the basic requirements of indicating type of instruments? Briefly discuss them. [6M]

AR13

CODE: 13BS2006 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, October-2019

PROBABILITY AND STATISTICS
(Common to CSE & IT)

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

PART-A

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

1. a) Define independent events
   b) Define discrete random variable.
   c) Write the probability density function of exponential distribution.
   d) Define Probability.
   e) What is alternative hypothesis.
   f) Find the value of the finite population correction factor for n = 10 and N = 1000.
   g) What is control chart.
   h) Write the formula for rank correlation when ranks are repeated.
   i) Write the LCL for np chart.
   j) Define Queuing system.

PART-B

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

UNIT-I

2. a The probability density f(x) of a continuous random variable is given by f(x) $= Ce^{-|x|}, -\infty < x < \infty$. Show that C= 1/2 and find that the mean and variance of the distribution. Also find the probability that the variate lies between 0 and 4. 6

   b From a city 3 news papers A,B,C are being published. A is read by 20%, B is read by 16%, C is read by 14% both A and B read by 8%, both A and C read by 5%,both B and C raed by 4% and all three A,B,C are read by 2%. What is the percentage of the population that read atleast one paper. 6

(OR)

3. a Define probability mass function, probability density function and state the conditions. 6

   b The probability function of a variate X is: 6

X:	0	1	2	3	4	5	6
P(X):	K	3K	5K	7K	9K	11K	13K

   i) Find P(X>4) ii) P(X≥5) iii) P(3<X<6)

UNIT-II

4. Obtain the moment generating function of the Poisson distribution and hence find the mean and variance. 12

(OR)

5. a Four coins are tossed 160 times. The number of times x heads occur is given below. 6

X	0	1	2	3	4
No. of times	8	34	69	43	6

   Fit a binomial distribution to this data on the hypothesis that coins are unbiased.

   b In a random sample of 100 packages shipped by air freight 13 had some damage. Construct 95% confidence interval for true proportion of damage package. 6

UNIT-III

6. A sample of 64 students with mean weight of 70 kgs can this be regarded as a sample mean from a population with mean weight 56 kgs and standard deviation 25 kgs — 12

(OR)

7. a In a big city 325 men out of 600 men were found to be smokers. Does this information support the conclusion that the majority of men in this city are smokers. — 6

   b The means of two large samples of sizes 1000 and 2000 members are 67.5 inches and 68.0 inches respectively. Can the samples be regarded as drawn from the same population of S.D 2.5 inches. — 6

UNIT-IV

8. a A sample of 12 fathers and their elder sons gave the following data about their elder sons. Calculate the coefficient of rank correlation. — 6

Fathers	65	63	67	64	68	62	70	66	68	67	69	71
Sons	68	66	68	65	69	66	68	65	71	67	68	70

   b The average number of defectives in 22 sampled lots 2000 rubber belts each was found to be 16%. Indicate how to construct the relevant control chart. — 6

(OR)

9. a Find the most likely production corresponding to a rainfall 40 from the following data: — 6

	Rainfall (X)	Production (Y)
Average	30	500 kgs
Standard deviation	5	100 kgs
Coefficient of correlation	0.8	

   b A machine is set to deliver packets of a given weight. 10 sample size 5 each were recorded. Below are given relevant data: — 6

Sample No	1	2	3	4	5	6	7	8	9	10
Mean	15	17	15	18	17	14	18	15	17	16
range	7	7	4	9	8	7	12	4	11	5

Construct control charts for mean and comment on the state of control

UNIT-V

10. In a departmental store one cashier is there to serve the customers. And the customers pick-up their needs by themselves. The arrival rate is 9 customers for every 5 minutes and the cashier can serve 10 customers in 5 minutes. Assuming Poisson arrival rate and exponential distribution for service rate, find: (a) Average number of customers in the system. (b) Average number of customers in the queue or average queue length. (c) Average time a customer spends in the system. (d) Average time a customer waits before being served. — 12

(OR)

11. Explain the service mechanism in queuing system — 12