Code No: R1621012 **R16** SET - 1

II B. Tech I Semester Regular Examinations, October/November - 2017
BASIC ELECTRICAL AND ELECTRONICS ENGINEERING
(Com to CE & PE)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

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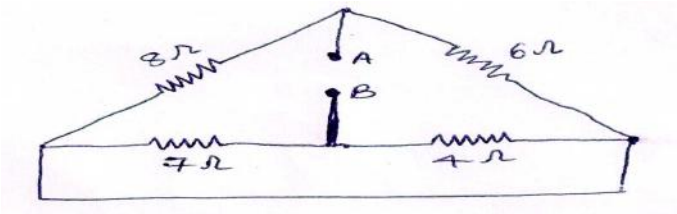
PART –A

1. a) Distinguish between linear and non – linear elements (2M)
   b) Why starter is needed to start dc shunt motor (2M)
   c) Why transformer rating is done in kVA (2M)
   d) What is synchronous impedance of an alternator (2M)
   e) Sketch and explain the characteristics of P – N junction Diode (3M)
   f) Explain the terms linear region, saturation region and cut off region w.r.t characteristics of a transistor (3M)

PART -B

2. a) Explain why current through an inductor cannot change instantaneously? Justify (7M)
   b) Determine the equivalent resistance between points AB inr the following circuit: (7M)



3. a) Derive the torque equation of dc motor (7M)
   b) Explain the various characteristics of a dc shunt and series generator (7M)

4. a) Explain the working principle of a transformer with the help of phasor diagram (7M)
   b) A single phase, 500 kVA, 3300/230V transformer has R_1=3.05 ohm, X_1= 6.4 ohm, R_2=0.0065 ohm, X_2= 0.023 ohm. Find the total impedance referred to primary and secondary, copper losses? (7M)

5. a) Derive the emf equation of an alternator (7M)
   b) Explain the principle of operation of inductor motor. (7M)

6. a) Explain the operation of a half wave rectifier with neat waveform (7M)
   b) Explain the operation of OP – AMP as an Integrator (7M)
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7. a) Explain in detail how a transistor can be used as an amplifier (7M)

b) Compare and contrast between PNP and NPN transistors (7M)

Code No: R1621012 **R16** SET - 2

II B. Tech I Semester Regular Examinations, October/November - 2017
BASIC ELECTRICAL AND ELECTRONICS ENGINEERING
(Com to CE & PE)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

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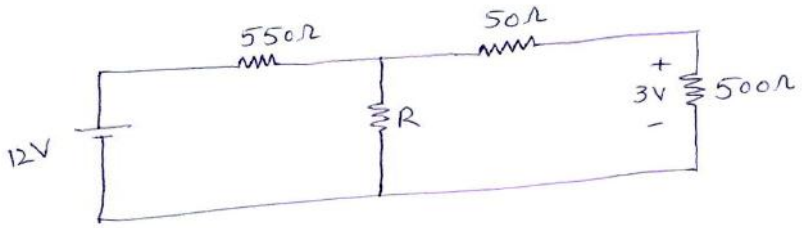
PART –A

1. a) State and explain Ohm's law (2M)
   b) What do you mean by separately excited generator (2M)
   c) Explain why transformer core is laminated (2M)
   d) Write the applications of induction motor (3M)
   e) What do you understand by Depletion region in a diode (2M)
   f) Explain the effect of variation of operating point in the output characteristics of a transistor (3M)

PART -B

2. a) Distinguish between Active and passive elements (7M)
   b) What is the value of unknown resistor for the following circuit: (7M)



3. a) Explain the concept of back emf of a dc motor (7M)
   b) Derive the emf equation of a dc generator (7M)

4. a) Explain how the regulation of transformer is determined (7M)
   b) The number of turns of primary and secondary of a single phase transformer is 800 and 2000 respectively. Voltage per turn is 0.5V.Calculate i)Secondary voltage on no load ii)maximum value of flux density if the area of cross section is 55 cm^2 and frequency is 50 Hz (7M)

5. a) Explain the synchronous impedance method to determine the regulation of alternator (7M)
   b) Distinguish between squirrel cage Induction motor and Slip ring induction motor (7M)
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6. a) Explain how an OP-AMP work as an integrator (7M)
   b) Explain the operation of full bridge rectifier (7M)

7. a) Explain in detail the operation of a P – N – P Transistor (7M)
   b) Explain the frequency response of CE amplifier (7M)

Code No: R1621016 **R16** SET - 1

II B. Tech I Semester Regular Examinations, October/November - 2017
FLUID MECHANICS
(Civil Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer**ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

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PART –A

1. a) How does the viscosity of air vary with temperature? (2M)
   b) State the condition for Irrotational flow (2M)
   c) Explain any one application of momentum equation (2M)
   d) Discuss the practical applications of Reynolds experiment. (2M)
   e) Write the expressions for c_v , c_c and c_d for an orifice (3M)
   f) Define displacement and momentum thickness. (3M)

PART -B

2. a) Explain the differences between manometer and mechanical gauges. What are the different types of mechanical pressure gauges (7M)
   b) A metal ball weighs 9500N in air and 8000N in water. Find out its volume and specific gravity. (7M)

3. a) Explain the terms: (i) Path line (ii) Streak line (iii) Stream line (iv) Stream tube. (7M)
   b) A pipe, through which water is flowing, is having diameters 40 cm and 20 cm at the cross-sections 1 and 2 respectively. The velocity of water at section 1 is 5 m/s. Find the velocity head at the sections 1 and 2 and also rate of discharge. (7M)

4. a) State and derive Bernoulli's theorem, mentioning clearly the assumptions underlying it. (7M)
   b) A 30 cm diameter horizontal pipe terminates in a nozzle with the exit diameter of 7.5 cm. If the water flows through the pipe at the rate of $0.15 m^3/s$. What force will be exerted by the fluid on the nozzle? (7M)

5. a) What are the different losses in flow through the circular pipes?. (7M)
   b) Define minor losses in pipes and obtain equation for any four losses. (7M)

6. a) What are the applications of Venturimeter? Explain the working principle of venturimeter. (7M)
   b) What are the different types of notches? Explain Rectangular and Stepped notches (7M)

7. a) What is a boundary layer? Differentiate between a laminar and turbulent boundary layer. (7M)
   b) Explain Boundary layer separation with a neat sketch. What are the conditions under which separation takes place? (7M)

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Code No: R1621016 **R16** SET - 2

II B. Tech I Semester Regular Examinations, October/November - 2017
FLUID MECHANICS
(Civil Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer**ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

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PART –A

1. a) Explain atmospheric, gauge and vacuum pressures. (2M)
   b) What is center of pressure? (2M)
   c) Explain any one application of momentum equation (2M)
   d) State Darcy-Weisbach equation. (2M)
   e) Write the empirical formulas for discharge over a rectangular weir? (3M)
   f) What are the characteristics of laminar boundary layer? (3M)

PART -B

2. a) Define the following fluid properties: (7M)
   Density, weight density, specific volume and specific gravity of a fluid.
   b) An oil film of thickness 1.5 mm is used for lubrication between a square plate of size 0.9 m × 0.9 m and an inclined plane having an angle of inclination 20^0. The weight of the square plate is 392.4 N and it slides down the plane with a uniform velocity of 0.2 m/s. Find the dynamic viscosity of the oil (7M)

3. Distinguish between: (14M)
   (i) Steady flow and un-steady flow,
   (ii) Uniform and nonuniform flow,
   (iii) Compressible and incompressible flow,
   (iv) Rotational and irrigational flow (v) Laminar and turbulent flow.

4. a) What are the applications of Momentum equation? Explain. (7M)
   b) Describe the procedure of finding the forces on pipe bend. (7M)

5. a) Explain how the following flow problems are analyzed. (7M)
   i) Series pipe connection (ii) parallel pipe connection and iii) Equivalent pipe connection.
   b) Explain how Reynold's experiment is conducted in the lab and bring its practical uses. (7M)
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6. a) A Pitot tube was used to measure the quantity of water flowing in a pipe of 0.30m diameter. The water was raised to a height of 0.25m above the centre line of pipe in the vertical limb of the tube. If the mean velocity is 0.78 times the velocity at the centre and coefficient of Pitot tube is 0.98, find the discharge in the pipe line. The static pressure head at the centre of the pipe is 0.2 m. (7M)

   b) A Venturi-meter is provided to measure the water flowing through a horizontal pipe of25 cm diameter. The throat of the venture- meter is 12cm. The pressure of water flowing through the pipe is 1.5 bar and the vacuum measured at the throat is 30 cm of Hg. Find the water flow rate through the pipe. Take Cd=0.975. (7M)

7. a) Derive Von Karman momentum integral equation. (7M)

   b) Define energy thickness. Derive an expression for the energy thickness (7M)

Code No: R1621016 **R16** SET - 3

II B. Tech I Semester Regular Examinations, October/November - 2017
FLUID MECHANICS
(Civil Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer**ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

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PART –A

1.	a)	Define the terms surface tension and capillarity.	(2M)
	b)	Write about flownet analysis.	(2M)
	c)	Explain how to find out the force on a pipe bend.	(2M)
	d)	Discuss minor losses in pipes.	(2M)
	e)	Define orifice and write its classification w.r.t shape and size?	(3M)
	f)	Define local and average drag coefficients and write corresponding empirical relations?	(3M

PART -B

2.	a)	What is the importance of a manometer? Explain the types of manometers in brief.	(7M)
	b)	Explain the term total pressure acting on a plane surface immersed in a fluid at any angle. Obtain an expression for this, and also for the corresponding depth of the centre of pressure	(7M)
3.	a)	Define stream function and velocity potential. What are their uses?	(7M)
	b)	Determine whether the following velocity components satisfy the continuity equation. i) $u = cx$, $v = -cy$ ii) $u = -cx/y$, $v = c \log xy$	(7M)
4.	a)	State the assumptions made in the derivation of Bernoulli's equation. State the momentum equation and explain its significance.	(7M)
	b)	What are the surface and body forces associated with fluid flow? How are they incorporated in Euler's equation?	(7M)
5.	a)	Define 'Hydraulic gradient line' and 'Total energy line'. The cross section of a pipe carrying a given discharge is suddenly enlarged. What would be the ratio of the two diameters of the pipe if the magnitude of the loss of head at this change of section is same irrespective of the direction of flow? Assume CC = 0.64.	(7M)
	b)	Derive an expression for the loss of head due to friction in flow through circular pipes.	(7M)
~~~~~~

6. a) Differentiate between stagnation pressure head and static pressure head with reference to a pitot tube. Explain with the help of a neat sketch. (7M)
   b) A Venturimeter of throat diameter 5cm is fitted into a 12.5 cm diameter water pipe line. The coefficient of discharge is 0.96. Calculate the flow in the pipe line when the reading on a mercury water differential U tube manometer connected to the upstream and throat sections shows a reading of 20 cm. (7M)

7. a) Define physically and mathematically the concept of displacement, momentum and energy thickness of a boundary layer. (7M)
   b) Water is flowing over a thin smooth plate of length 5m and width 2.7m at a velocity of1.2 m/sec. If the boundary layer flow changes from laminar to turbulent at a Reynolds number 5 x 10^5. Find: (7M)
      i) The distance from leading edge up to which boundary layer is laminar and
      ii) Thickness of the boundary layer at the transition point.

Code No: R1621016 **R16** SET - 4

II B. Tech I Semester Regular Examinations, October/November - 2017
FLUID MECHANICS
(Civil Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

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PART –A

1. a) Define Pascal's law. (2M)
   b) Derive momentum equation. (2M)
   c) What do you mean by surface and body forces? (2M)
   d) What are TEL and HGL? Explain. (2M)
   e) Write a short note on Broad Crested weir? (3M)
   f) Write a short note on Magnus effect? (3M)

PART -B

2. a) What is metacentric height? Explain how the it is calculated. (7M)
   b) What are the modes of measuring pressure? How can you convert the pressure in KPa into the liquid columns and vice versa. (7M)

3. a) The flow field is given by $\psi = x^3y$ Check whether the given field exists or not? Further check whether it is irrotational? (7M)
   b) Given that $u = x^2 - y^2$ and $v = -2xy$, determine the stream function and potential function for the flow (7M)

4. a) Derive Bernoulli`s equation from Euler`s equation of motion. (7M)
   b) A pipe through which water is flowing, is having diameters, 20cm and 10cm at the cross-sections 1 and 2 respectively. The velocity of water at section 1 is given as 4 m/s. Find the velocity head a sections 1 and 2 and also rate of discharge (7M)

5. a) Explain with neat sketch the Reynold's experiment and define Laminar and Turbulent flow. (7M)
   b) A compound piping system consists of a1600m of 0.4m diameter, 1200m of 0.3m diameter and 800m pipe of 0.25m diameter cast iron pipes connected in series. Convert the system to (i) an equivalent length of 0.4m pipe and (ii) an equivalent size pipe 3000m long. (7M)
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6. a) A Venturimeter has its axis vertical, the inlet and throat diameters being 150mm and 80 mm respectively. The throat has 220mm about inlet and coefficient discharge is 0.96. Petrol of specific gravity 0.78 flows up through the meter at a rate of 0.029 m^3/s. Find the pressure difference between the inlet and the throat. (7M)
   b) A 150mm X 75mm Venturi meter with a coefficient of discharge 0.98 is to be replaced by an orifice meter having a coefficient of discharge 0.60. If the both the meters are to give the same differential mercury manometer reading for a discharge of 100 liters per second and the inlet diameter is to remain 150mm. what should be diameter of the orifice? (7M)

7. a) What do you understand by Boundary Layer? Explain the development of Boundary layer over a flat plate. (7M)
   b) What do you mean by boundary layer separation? What is the effect of pressure gradient on boundary layer separation? (7M)

Code No: R1621011 **R16** SET - 1

II B. Tech I Semester Regular Examinations, October/November - 2017
PROBABILITY AND STATISTICS
(Civil Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

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PART –A

1. a) Verify whether Poisson Distribution is probability mass function (3M)
   b) Define Maximum error estimate (2M)
   c) Write the test statistic for two way ANOVA classification (3M)
   d) Write the normal equations for the least square curve of the form $y = ab^x$ (2M)
   e) What is the purpose of control charts (2M)
   f) Write the mean and variance of standard normal distribution (2M)

PART -B

2. a) A sample of 4 items is selected at random from a box containing 12 items of which 5 are defective. Find the expected number of defective items (7M)
   b) A box contains 100 transistors , 20 of which are defective and 10 are selected at random , find the probability that (7M)
   (i) all are defective (ii) all are good (iii) at most 2 are defective

3. a) Show that Normal distribution is symmetrical distribution (7M)
   b) If the probability density function is $f(x) = e^{-x}$ for $x > 0$, then find mean and variance of X (7M)

4. Samples of size 2 are taken from the population 4,8,12,16,20,24 with replacement. Find (14M)
   a) The mean of the population
   b) The standard deviation of the population
   c) Mean of the sampling distribution of means
   d) The standard deviation of the sampling distribution of means

5. a) A sample of 900 members is found to have a mean of 3.4 cm .Can it be reasonably regarded as truly random sample from large population with mean 3.25cm and S.D 1.61cm (7M)
   b) Two horses A and B were tested according to the time (in seconds) to run a particular the track with the following results. (7M)

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

Test whether the two horses have the same running capacity.
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6. a) Fit the curve $y = ae^{bx}$ for the following data and also estimate y(2.4) for the following data (7M)

x	2	4	6	8	10	12
y	1.8	1.5	1.4	1.1	1.1	0.9

b) Calculate the two regression lines from the following data (7M)

x	12	10	14	11	12	9
y	18	17	23	19	20	15

7. a) Draw the control chart for $\bar{X}$, R chart for the following data for $A_2 = 0.483$ (7M)

Sample	1	2	3	4	5	6	7	8	9	10
Mean	43	49	37	44	45	37	51	46	43	47
Range	5	6	5	7	7	4	8	6	4	6

b) If the average fraction defective of a large sample of products is 0.1537 calculate the control limits (7M)

Code No: R1621011 **R16** SET - 2

II B. Tech I Semester Regular Examinations, October/November - 2017
PROBABILITY AND STATISTICS
(Civil Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

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PART –A

1\. a) Write the density function of Gamma distribution. (2M)

b) Write the moment generating function of Normal distribution. (2M)

c) State central limit theorem. (2M)

d) Find the z – statistics for $\bar{x} = 40, \mu = 40, \sigma = 5.8, n = 64$. (3M)

e) What is mean by goodness of fit ? (2M)

f) Find upper and lower 3-σ control limits for means of 4 samples with mean is 0.6230 and standard deviation of 0.032 (3M)

PART -B

2\. a) Find the moment generating function for binomial distribution (7M)

b) If $P(x = 2) = 9P(x = 4) + 90P(x = 46)$ for a Poisson variate then find (i)$P(x < 2)$ (ii) $P(x \geq 1)$ (7M)

3\. a) Obtain the moment generating function of random variable X having density function $f(x) = \begin{cases} \frac{x}{2}, & 0 \leq x < 1 \\ 3 - x, & 1 \leq x < 2 \\ 0 & otherwise \end{cases}$ (7M)

b) If X is Normally distributed with mean 2 and variance 0.1 , then find $P(|X - 2| \geq 0.01$ (7M)

4\. a) Define unbiased estimator and show that x/n is an un biased estimator of binomial parameter p. (7M)

b) Let S = {1,5,6,8} , find the probability distribution of the sample mean for a random sample size two drawn without replacement.Also find (i) The mean of the sampling distribution of means (ii) The standard deviation of the sampling distribution of means (7M)

5\. a) Three samples ,each of size 5 , were drawn from three uncorrelated normal populations with equal variances .Test the hypothesis that the population means are equal at 5% level (7M)

Sample I	10	12	9	16	13
Sample II	9	7	12	11	11
Sample III	14	11	15	14	16

b) 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 up to the standard. (7M)

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6. a) Fit the curve $y = ab^x$ for the following data and also estimate y(9) for the following data (7M)

x	2	4	6	8	10	12
y	1.8	1.5	1.4	1.1	1.1	0.9

b) Calculate the coefficient of correlation from the following data (7M)

x	50	60	70	90	100
y	65	51	40	26	8

7. a) Draw the control chart for $\bar{X}$ for the following data for $A_2 = 0.483$ (7M)

Sample	1	2	3	4	5	6	7	8	9	10
Mean	383	508	505	582	557	337	514	614	707	753
Range	95	128	100	91	68	65	148	28	37	80

b) Explain "Statistical quality control (SQC)". (7M)

Code No: R1621011 **R16** SET - 3

II B. Tech I Semester Regular Examinations, October/November - 2017
PROBABILITY AND STATISTICS
(Civil Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

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PART –A

1. a) Write the distribution for tossing a coin two times (2M)
b) Write the test statistic for differences of two means (2M)
c) Write the normal equations for the curve $y = a + \frac{b}{x}$ (2M)
d) Find the maximum error estimate with 95% confidence if the sample proportion (p) is 0.5775 for 400 samples (3M)
e) Define upper and lower 2-σ limits for c-chart (2M)
f) Find the $P(X > 2150)$ if $\mu = 2040$ & $\sigma = 60$ Assume X is Normally Distributed (3M)

PART -B

2. a) Fit a binomial distribution to the following data (7M)

x	0	1	2	3	4	5
f	42	33	14	6	4	1

b) Find the moment generating function for Poisson distribution (7M)

3. a) Find (i) mean (iii) variance of the Distribution $f(x) = \frac{k}{x^2+1} \quad if - \infty < x < \infty$ (7M)
b) Obtain the moment generating function of normal distribution (7M)

4. a) A sample of 11 rats from central population had on average blood viscosity with the S.D of 0.61.Estimate 95% confidence limits for the mean blood viscosity of the population. (7M)
b) Define biased estimator and prove that $\left(\frac{x+1}{n+2}\right)$ is a biased estimate of binomial parameter p. (7M)

5. a) 20 people were attacked by a disease and only 18 survived. Will you reject the hypothesis that the survival rate if attacked by this disease is 85% in favour of the hypothesis that is more at 5% level. (7M)
b) Three different machines are used for a production. On the basis of the outputs , test whether the machine are equally effective (7M)

OUT PUTS		
Machine I	Machine II	Machine III
10	9	20
5	7	16
11	5	10
10	6	4

|''|||'|''||'''|'|
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6. a) Fit the curve $y = a+bx+cx^2$ for the following data and also estimate y(2.4) for the following data (7M)

x	1	2	3	4
y	1.7	1.8	2.3	3.2

b) Determine the coefficient of correlation from the following data N= 25, (7M)
$\sum x = 127, \sum y = 100, \sum x^2 = 760, \sum y^2 = 449, \sum xy = 500$

7. The number of defects on 20 items are given below (14M)
Item No. 1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20
No. of defects:2,0,4,1,0,8,0,1,2,0,6,0,2,1,0,3,2,1,0,2
Devise a suitable control scheme for the future

Code No: R1621011 **R16** SET - 4

II B. Tech I Semester Regular Examinations, October/November - 2017
PROBABILITY AND STATISTICS
(Civil Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

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PART –A

1. a) Obtain the binomial distribution with mean 3 and variance 4 (2M)

   b) Kind the value of 'k' and mean if f(x) is a density function given by (3M)

$$f(x)=\begin{cases} kx^2, \ if \ \ 0<x<3 \\ 0, \quad otherwise \end{cases}$$

   c) Write all possible samples of size two with replacement from the population {5,10,14,18,13,24} (2M)

   d) Give an example for Type-I and Type-II errors (2M)

   e) Write the two regression lines X on Y and Y on X (2M)

   f) Find 3-σ limits for $\bar{X}$ chart if $\sum \bar{X} = 595.8, \sum \sigma = 8.28, n = 18, A_{1=1.03}$ (3M)

PART -B

2. a) A player wins if he gets 5 on a single throw of a die. He loses if he gets 2 or 4 If he wins he gets Rs.50, if he loses he gets Rs. 10, otherwise he has to pay Rs.15. Find the value of the game to the player (7M)

   b) Fit a Poisson distribution to the following data (7M)

x	0	1	2	3	4	5
f	142	156	69	27	5	1

3. a) Find the mean and variance of Gamma distribution (7M)

   b) Find (i) density function (ii) Mean (iii) variance of the distribution $F(X) = 1-e^{-2x}$ if $x>0$ (7M)

4. a) A random sample of 400 items is found to be have mean 82 and S.D of 18 Find the maximum error estimate of 95% confidence interval (7M)

   b) Let S = {3,,6,9,15,27} , find the probability distribution of the sample mean for a random sample size three drawn without replacement and also find (i) The mean of the sampling distribution of means (ii) The standard deviation of the sampling distribution of means (7M)
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5. a) Three samples of 5, five and four motor car tyres are drawn respectively from three brands A, B, C manufactured by three machines. The life time of three tyres (in 1000 miles) is given below. Test whether the average life time of three brands of tyres are equal or not (10M)

A	B	C
35	30	28
40	25	24
33	34	30
36	28	26
31	33	--

b) Write the procedure for testing of the hypothesis (4M)

6. a) Fit the linear curve $y = a+bx$ for the following data and also estimate y(4) for the following data (7M)

x	1	2	3	4	5	6
y	6	4	3	5	4	2

b) Find the rank correlation for the following data (7M)

x	2	4	5	6	8	11
y	18	12	10	8	8	5

7. (14M)

Discuss the basic principles under lying control Charts. Explain in brief how control limits are determined for i) P-chart ii) C-chart (iii) np-chart

Code No: R1621013 **R16** SET - 1

II B. Tech I Semester Regular Examinations, October/November - 2017
STRENGTH OF MATERIALS - I
(Civil Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

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PART –A

1. a) Define Poisson' Ratio. (2M)
   b) What are the different types of beams? Differentiate between a cantilever and a simply ported beam. (3M)
   c) Define bending stress in a beam. (2M)
   d) What do you mean by shear stresses in beams? (2M)
   e) What are the different methods of finding slope and deflection of a cantilever? (2M)
   f) Differentiate between Thin and Thick Cylinder. (3M)

PART -B

2. a) A straight circular rod tapering from diameter 'D' at one end to a diameter 'd' at the other end is subjected to an axial load 'P'. Obtain an expression for the elongation of the rod. (7M)
   b) Derive strain energy equation for gradual loading. (7M)

3. A simply supported beam of length 8 m rests on supports 6 m apart, the right hand end is overhanging by 2 m. The beam carries a uniformly distributed load of 1500N/m over the entire length. Draw S.F. and B.M diagrams and find the point of contraflexure, if any. (14M)

4. a) What are the assumptions of simple bending? (4M)
   b) A timber cantilever 200 mm wide and 300 mm deep is 3 m long. It is loaded with a U.D.L of 3kN/m over the entire length. A point load of 2.7 kN is placed at the free end of the cantilever. Find the maximum bending stress produced. (10M)

5. Derive the stress distribution for circular section & plot shear stress distribution. (14M)

6. a) Find the expression for the slope and deflection of a cantilever of length L which carries a uniformly distributed load over a length 'a' from the fixed end by Moment area method. (8M)
   b) Prove that the relation that $M = EI\frac{d^2y}{dx^2}$ where M= Bending moment, E= young's modulus, I = M.O.I. (7M)

7. Derive Lame's formulae for thick cylinder. (14M)
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Code No: R1621013 **R16** SET - 2

II B. Tech I Semester Regular Examinations, October/November - 2017
STRENGTH OF MATERIALS - I
(Civil Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

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PART –A

1. a) Derive volumetric strain. (2M)
   b) What are the different types of loads acting on a beam? Differentiate between a point load and uniformly distributed load. (3M)
   c) Define Neutral Axis. (2M)
   d) Write shear stress equation (2M)
   e) What are the important points in finding slope and deflection by Macaulay's Method? (2M)
   f) What do you mean by thick compound cylinder? (3M)

PART -B

2. a) A rod, whose ends are fixed to rigid supports, is heated so that rise in temperature is T^0C.Prove that the thermal strain and thermal stresses set up in the rod are given by, Thermal strain = α.T and Thermal stress = α.T.E (7M)
   Where α = Co-efficient of linear expansion.
   b) Derive strain energy equation for sudden loading. (7M)

3. A simply supported beam of length 8 m rests on supports 5 m apart, the right hand end is overhanging by 2 m and the left hand end is overhanging by 1m. The beam carries a uniformly distributed load of 5 kN/m over the entire length. It also carries two point loads of 4 kN and 6 kN at each end of the beam. The load of 4 kN is at the extreme left of the beam. Whereas the load of 6 kN is at the extreme right of the beam. Draw S.F and B.M diagrams for the beam and find the points of contraflexure. (14M)

4. a) How would you find the bending stress in unsymmetrical section? (7M)
   b) A cast iron pipe of external diameter 60mm, internal diameter of 40mm, and of length 5 m is supported at its ends. Calculate the maximum bending stress induced in the pipe if it carries a point load of 100 N at its centre. (8M)

5. Derive the Stress distribution for 'T'section and plot shear stress diagram. (14M)

6. a) A cantilever of length 3 m carries a uniformly distributed load of 15kN/m over a length of 2 m from the free end. If $I = 10^8$ mm^{4}and E=2 x 10^5 N/mm^2, find: (8M)
   (i) Slope at the free end and (ii) Deflection at the free end.
   b) Find an expression for the slope at the supports of a simply supported beam, carrying a point load at the centre. (7M)
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7. a) Derive formulae for longitudinal and circumferential stresses of Thin cylinder. (10M)

   b) Differentiate between thin and thick cylinders. (4M)

Code No: R1621013 **R16** SET - 3

II B. Tech I Semester Regular Examinations, October/November - 2017
STRENGTH OF MATERIALS - I
(Civil Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

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PART –A

1. a) Define Resilience (2M)
   b) Define point of contra flexure. (3M)
   c) Calculate section Modulus for circular function (2M)
   d) Define Shear centre. (2M)
   e) What is Moment area method? (2M)
   f) Explain about wire wound cylinders. (3M)

PART -B

2. a) A mild steel rod of 20 mm diameter and 300 mm long is enclosed centrally inside a hollow copper tube of external diameter 30 mm and internal diameter of 25 mm. The ends of the tube and rods are brazed together, and the composite bar is subjected to an axial pull of 40 kN. If E for steel and copper is 200 GN/m^2 and 100 GN/m^2 respectively, find the stresses developed in the rod and tube. Also find the extension of the rod. (7M)
   b) Derive the strain energy equation for impact loading. (7M)

3. a) A simply supported beam of length 5 m, carries a uniformly distributed load of 100 N/m extending from the left end to a point 2 m away. There is also a clockwise couple of 1500 Nm applied at the centre of the beam. Draw the S.F and B.M diagrams for the beam and find the maximum bending moment. (10M)
   b) What are the sign conventions for shear force and bending moment in general? (4M)

4. Derive the bending equation. (14M)

5. A beam of square section is used as a beam with one diagonal horizontal. The beam is subjected to a shear force F, at a section. Find the maximum shear in the cross section of the beam and draw the shear stress distribution diagram for the section. (14M)

6. Find the expression for the slope and deflection of a cantilever of length L which carries a uniformly distributed load over a length ‘a’ from the fixed end by Double integration method. (14M)

7. A thick spherical shell of 200 mm internal diameter is subjected to an internal fluid pressure of 7 N/mm^2. If the permissible tensile stress in the shell material is 8 N/mm^2, find the thickness of the shell. (14M)

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Code No: R1621013 **R16** SET - 4

II B. Tech I Semester Regular Examinations, October/November - 2017
STRENGTH OF MATERIALS - I
(Civil Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

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PART –A

1. a) What are Temperature stresses? (2M)
   b) Draw SFD for SSB uniformly carrying varying load. (3M)
   c) Calculate Section Modulus for rectangular section. (2M)
   d) Define shear centre (2M)
   e) State Mohr's theorems of deflection. (2M)
   f) What is the radial pressure and hoop stresses for a thick spherical shell? (3M)

PART -B

2. Derive the relation between Modulus of elasticity, Modulus of rigidity and Bulk Modulus. (14M)

3. a) How will you draw the S.F and B.M diagrams for a beam which is subjected to inclined loads? (7M)
   b) A cantilever 2 m long is loaded with a uniformly distributed load of 2 kN/ m run over a length of 1m from the free end. It also carries a point load of 4 kN at a distance of 0.5 m from the free end. Draw the Shear force Diagrams and Bending Moment diagrams. (7M)

4. a) A rectangular beam 300 mm deep is simply supported over a span of 4 meters. Determine the uniformly distributed load per meter which the beam may carry, if the bending stress should not exceed 120 N/mm^2. Take I = 8 × 10^6 mm^4. (10M)
   b) What is pure bending? (4M)

5. The Shear force acting on a section of a beam is 50 kN. The section of the beam is of T-shaped of dimensions 100 mm × 100 mm × 20 mm. The moment of inertia about the horizontal neutral axis is 314.221× 10^4 mm^4. Calculate the shear stress at the neutral axis and at the junction of the web and the flange. (14M)

6. A cantilever of length 2 m carries a uniformly varying load of zero intensity at the free end, and 45 kN / m at the fixed end. If E = 2 × 10^5 N/mm^2 and $I = 10^8$ mm^4, find the slope and deflection of the free end. (14M)
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7. A steel cylinder of 300 mm external diameter is to be shrunk to another steel cylinder of 150 mm internal diameter. After shrinking the diameter at the junction is 250 mm and radial pressure at the common junction is 28 N/mm^2. Find the original difference in radii at the junction. Take E = 2×10^5 N/mm^2. (14M)

Code No: R1621015 **R16** SET - 1

II B. Tech I Semester Regular Examinations, October/November - 2017
SURVEYING
(Civil Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

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PART –A

1. a) List the reasons for incorrect length of chain? (2 M)
   b) List the fundamental lines of Dumpy Level? (2M)
   c) Define the term "contour"? (2M)
   d) Define the terms : i)Transiting ii)Swinging face left iii)Face Right (3 M)
   e) Define the terms "Compound Curve" (3 M)
   f) Write the formula for Simpson's rule? (2M)

PART -B

2. a) A 20 m chain was found to be 15 cm too long after chaining a distance of 1600 m. It was found to be 30 cm too long at the end of day's work after chaining a total distance of 3200 m. Determine the correct distance if the chain was correct before the commencement of the work. (7M)
   b) State the reasons for incorrect length of Chain? (7M)

3. a) Find the angles between the lines AB and AC, If their respective bearings are 35^0 40' and 142^0 20'? (7M)
   b) Differentiate between (7M)
   i)True meridian and Magnetic Meridian ii) Declination and Dip

4. a) Describe the profile leveling method? (7M)
   b) Find out the missing (?) F.S and B.S values in table of a Leveling field book given . (7M)

Station	B.S	I.S	F.S	Rise	Fall	Remarks
1.	4.550					Starting Point
2.	2.125		?		0.750	Change Point
3.		2.225				
4.	?		1.975			Change Point
5.		2.445		1.500		

5. a) How to calculate the area of closed traverse from the rectangular co - ordinates? (7M)
   b) State the Principle of tachometric Surveying? (7M)

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6. a) Two straights of a circular curve meet at an intersection angle of 65^0 and the length of the long chord is 130 m. Find out the Tangent length, apex distance, and rise in meter of curve? (7M)
   b) Explain the method of setting out curve by Chord and Angle method? (7M)

7. a) Explain the Double Meridian Distance (D.M.D) method for the computation of area of a closed traverse? (7M)
   b) The following perpendicular offsets were taken at 5 m intervals from a traverse line to an irregular boundary line (7M)
   2.10; 3.15; 4.50; 3.60; 4.58; 7.85; 6.45; 4.65; 3.14 m.
   Compute the area enclosed between the traverse line and the irregular boundary from the first to the last offset.

Code No: R1621015 **R16** SET - 2

II B. Tech I Semester Regular Examinations, October/November - 2017
SURVEYING
(Civil Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

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PART –A

1. a) What do you mean by plane surveying? (2 M)
   b) Define the term 'Magnetic declination" (2M)
   c) Define the term "Reduce Level" (2M)
   d) State the rules for distribution of error of closure? (3 M)
   e) Define the term "Super elevation"? (3 M)
   f) List the methods of calculation for volume of barrow pits? (2M)

PART -B

2. a) List the instruments for Direct measurement of Distances? (7M)
   b) Give the broad classification of Surveying? (7M)

3. a) In a triangle ABC, The bearings of the sides AB, BC ,and CA are 60^0,130^0 and 270^0 respectively. Calculate the Interior angles A,B, and C in degrees? (7M)
   b) Find out the missing figures and complete the level book page. Apply usual arithmetic check. (7M)

B.S	I.S	F.S	H.I	R.L	Remarks
4.390			×	×	Point1
	×			192.00	Point2
3.910		6.520	×	×	Point3
	5.390			191.620	B.M
	4.730			×	Point4
	×			203.300	Point5 staff inverted
4.330		×	×	×	Point 6
		2.990		194.830	Point 7

4. a) Discuss the characteristics of contours, give suitable sketches. (7M)
   b) Describe the method of Reciprocal leveling. (7M)
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5. a) The following fore and back bearings were observed in traversing with a compass

Line	**F.B**	**B.B**
AB	S45°00¹E	N45°00¹W
BC	N60°30¹E	S60°30¹W
CD	N5°30¹E	S5°30¹W
DE	N65°30¹W	S65°30¹E
EA	S40°00¹W	N40°00¹E

Compute the included angles of the traverse

b) Explain the procedure of running a traverse by the method of included angles. (7M)

6. Write short notes on the following (14M)
a) Elements of a compound curve
b) Reverse Curve

7. a) The following perpendicular offsets were taken at 5 m intervals from a traverse line to an irregular boundary line (7M)
2.10; 3.15; 4.50; 3.60; 4.58; 7.85; 6.45; 4.65; 3.14 m.
Compute the area enclosed between the traverse line and the irregular boundary from the first to the last offset.

b) Calculate the side widths and cross-sectional areas of cut and fill in a side hill (7M)
Section having the following dimensions.
Centre height in cut :1m
Formation width :22m
Side slope in cut :1 to 1
Side slope in fill :2 to 1
Transverse slope : 5.5 to 1

Code No: R1621015 **R16** SET - 3

II B. Tech I Semester Regular Examinations, October/November - 2017
SURVEYING
(Civil Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

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PART –A

1. a) State the Principles of Surveying (2 M)
   b) Define Azimuth (2M)
   c) Define the term Levelling? (2M)
   d) List the method of traversing with theodolite? (3 M)
   e) Classify the Curves? (3 M)
   f) Write the formula for area of Triangle (2M)

PART -B

2. a) Discuss briefly the classification of surveying based on purpose and Instruments.? (7M)
   b) A 30m tape standardized in catenary as 29.990m at 100N is used in the field with a tension of 80 N in catenary. Calculate the Sag correction if the mass of the tape is 0.33 kg per m. (7M)

3. a) Discuss basic objective of survey and (7M)
   Convert the following W.C.Bs into Q.Bs
   i) 54^0-$30'$ ii) 132^0 iii) 243^0-$30'$ iv) 315^0-00
   b) Explain the effects of curvature and refraction in Levelling? (7M)

4. a) What is a contour line? What is the importance of contour maps in Civil engineering works? (7M)
   b) Following are the staff readings taken with a dumpy level. Find the reduced levels of points by line of collimation method if the R.L bench mark is 100.00m (7M)

STATION	B.S	I.S	F.S
P	**1.220**		
A		**1.750**	
B		**1.620**	
Q	**1.110**		**1.545**
C		**1.990**	
D		**1.670**	
E			**1.550**
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5. a) State the Bowdich rule and transit rules of balancing. (7M)

   b) Calculate latitudes ,departures and closing error for the following traverse, and adjust using Bowditch's rule. (7M)

Line	Length(m)	WCB
AB	89.31	$45^0\ 10'$
BC	219.76	$72^0\ 05'$
CD	151.18	$161^0\ 52'$
DE	159.10	$228^0\ 43'$
EA	232.26	$300^0\ 42'$

6. a) Write short notes on the following (7M)
   i) Transition Curve
   ii) Super elevation.

   b) Two tangents meet at chainage 1023 metres the deflection angle being 36°.A Circular curve of radius 300m is to be introduced in between the two tangents Calculate the following (7M)
   i) Tangent Length
   ii) Length of Circular curve
   iii) Chainages of the tangent points.

7. a) The following perpendicular offsets were taken from a chain line to an irregular boundary. (7M)

Chainage	**0**	**8**	**20**	**35**	**47**	**60m**
Offsets	**14.5**	**24.5**	**30.8**	**27.4**	**28.4**	**18.4m**

   Compute the area between the chain line ,the boundary and the end offsets. Determine the volume of cut and fill from chainage 0 to 100 m from the three X-sections at chainage 0,45.0, and 100.0 m.

   b) State the determination of capacity of reservoir? (7M)

Code No: R1621015 **R16** SET - 4

II B. Tech I Semester Regular Examinations, October/November - 2017
SURVEYING
(Civil Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

PART –A

1. a) Define the term ' Surveying' (2 M)
   b) State the uses of Compass? (2M)
   c) Define the term "Bench Mark"? (2M)
   d) Define terms " Contour interval and "Horizontal equivalent" of contour? (3 M)
   e) Name different methods of Curve ranging. (3 M)
   f) State the mid-ordinate rule of area calculation? (2M)

PART -B

2. a) What are different methods of making linear measurements? Describe briefly (7M)
   b) The length of a line measured with 20 m chain was found to be 372 metres. The true length of the line was known to be 371 metres. Find the error in the chain? (7M)

3. a) The following are the observed fore end back bearings of a closed compass traverse ABC. (7M)
   Calculate the include angles

Line	F.B	B.B
AB	40°	220°
BC	110°	290°
CA	275°	95°

   b) Explain the terms "Local attraction" and "Magnetic declination" (7M)

4. a) Explain the principle of leveling? (7M)
   b) Define the terms "Contour Interval" and "Horizontal Equivalent of Contour"? (7M)

5. a) Describe the Transit Vernier theodolite with sketch. (7M)
   b) The lengths and bearings of the four lines of a closed traverse ABCDE. (7M)
   Determine the length and bearing of the fifth line EA.

Line	Length	Bearing
AB	194.1m	85^0
BC	201.2m	15^0
CD	165.4m	285^0 30'
DE	172.6m	195^0 30^0
EA	?	?

6. a) What is a "Compound Curve "? Describe in a few sentences, how this curve differs from other ones. (7M)

   b) A Circular curve has been set off touching the line AB and BC at points A and C respectively. If the angles CBA is 156° and the minimum distance from point B to the curve is 20 metres, Calculate i) the length of the lines AB and BC and (ii) Area bounded by the lines AB and BC and the Curve. (7M)

7. a) The area with in the contour lines at the site of Abandoned Quarry used as the water reservoir and the face of the proposed dam are as follows; (7M)

Contour in Metres	350	352	354	356	358	360	362
Area in Sq.M	300	10,500	76000	1,45000	270000	4,15000	4,70000

   Taking 350 as bottom level of reservoir and 362 as the F.R.L. Find the volume of water in the reservoir in cubic metres using Trapezoidal rule.

   b) Strata the various methods for computation of areas along irregular boundaries? (7M)