

# **Sai Nath University**

## **Assignment For B.TECH in Electrical Engineering 2<sup>nd</sup> Sem.**

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The Assignment will consist of two parts, A and B. Part A will have 5 short answer questions(40-60 words) of 4 marks each. Part B will have 2 long answer questions of 10 marks each

### **All questions are compulsory.**

These Assignments should be completed and submitted in written form by the student to his/her respective Faculty/ Examiners. Assignment Submission Dates are:

➤ Session-2018

### **List Of Suggested Questions**

The list of suggested questions are for students to practice. Although optional, we recommend that students solve these questions, as they will help them in preparing for exams as well as in clearing the important concepts of the subject.

### **List of Practical and suggested practical's**

The list of practical's should be done by the students in their Lab Sessions. These are the basic practical's, which each student should be able to do himself independently. While the list of suggested practicals are optional, but it is recommended that students should perform those practical so as to have a thorough knowledge of the subject

### **Education Delivery Schedule (EDS)**

As per University Semester scheme, the minimum contact hours of each paper has been Divided into two hours theory and practical class.

The faculty will maintain this attendance paper wise for his/her batch.

<b>Subject Code</b>	<b>Subject Name</b>
<b>BTEE-201</b>	<b>Mathematics II</b>
<b>BTEE -202</b>	<b>Applied Physics</b>
<b>BTEE-203</b>	<b>Programming and Data Structure</b>
<b>BTEE -204</b>	<b>Basic Electronics</b>
<b>BTEE- 205</b>	<b>Engineering Drawing and Graphics</b>
<b>BTEE-206</b>	<b>Environmental Studies</b>
<b>BTEE-207</b>	<b>Practical Physics</b>
<b>BTEE-208</b>	<b>Practical Basic Electronics</b>



## SAINATH UNIVERSITY

### Cover page of Assignment

ID NUMBER .....

NAME .....

COURSE B. Tech .....

STREAM Electrical.....

SEM 2<sup>nd</sup> .....

SUBJECT CODE .....

SUBJECT NAME .....

**Assignments will be completed by the Student in his/her own handwriting.**

## BTEE-201

### [Mathematics II]

#### Part A

1. Test the following series for convergence and absolute convergence :

$$x + \frac{x^3}{3} + \frac{x^5}{5} + \frac{x^7}{7} + \dots$$

2. Find the radius of convergence of the series.

$$\sum_{n=1}^{\infty} \frac{x^n}{n!}$$

3. Find the Fourier series to represent  $e^{ax}$  from  $x = -\pi$  to  $x = \pi$ .
4. Show that the following function is harmonic and find its conjugate function :  
 $u = 2x - 3x^3 + 9xy^2$ .
5. Solve the following :  
 $(y^2 + z^2 - x^2) p - 2xyq + 2xz = 0$

#### Part B

1. Use the method of variation of parameters to solve the following equation :

$$y'' + y = \cos x.$$

2. Evaluate :

$$\int_0^{2\pi} \frac{d\theta}{1 - 2a \cos \theta + a^2}, \quad a^2 < 1.$$

**BTEE-202**  
**[Applied Physics]**

**Part A**

1. Explain in detail the laws of refraction with suitable diagrams. Also define refractive index and give its expression.
2. Explain Total internal reflection with suitable examples.
3. Calculate the electric force between two charged spheres having charges  $4 \times 10^{-7} \text{ C}$  and  $6 \times \text{C}$  and placed 60 cm apart in air.
4. Explain in detail Kirchhoff's First and Second Rules.
5. Describe the Michelson-Morley experiment and explain the physical significance of negative results.

**Part B**

1. State and explain Newton's law of motion. When two bodies interact only through mutual forces, show that the net momentum of the bodies does not change with time.
2. Write short notes on any four of the following : (a) Galvanometer (b) Wheatstone Bridge (c) Astronomical Telescope (d) Potentiometer (e) Ferromagnetic Substance (f) Ohm's Law

**BTEE-203**  
**[Programming and Data Structure]**

**Part A**

1. (i) Round off the following numbers to two decimal places : 48.21416, 2.3742, 52.275, 2.375, 2.385 and 81.255 (ii) If  $u = 3v^7 - 6v$ , find the percentage error in  $u$  at  $v = 1$ , if the error in  $v$  is 0.005.
2. Compute the real root of the equation  $x^3 - 2x - 5 = 0$  by Regula-Falsi method, correct to four decimal places.
3. Explain the following control constructs with examples : (i) IF (ii) DO (iii) CASE (iv) GOTO.
4. What is a file ? Explain the various types of files. Explain the various file operating systems with.
5. Write an algorithm to sort the elements of an array using selection sort technique.

**Part B**

1. What is a pointer ? Write a program using a pointer to swap two numbers.
2. Explain the following : (a) Lagrange's Mean Value Theorem (b) Round off and Truncation errors (c) Numerical Integration (d) Global and Local Variables.

**BTEE-204**  
**[Basic Electronics]**

**Part A**

1. Discuss the energy band theory with the energy band diagrams of a conductor, a semiconductor and an insulator.
2. What is doping ? How are p-type and n-type semiconductors formed ?
3. A bridge rectifier is connected to 230 V AC, 50 Hz source voltage and load resistance of 20 ka Calculate : (i) Output d.c. voltage (ii) Output d.c. current (iii) Ripple voltage.
4. Discuss the working principle of BJT. Derive an expression for transistor current gains.
5. Explain the working of SCR with its I - V characteristics.

**Part B**

1. Draw logic circuit of half adder and full adder. Explain its working with Truth Table.
2. Write short notes on any two of the following : (a) Single Phase Induction Motor (b) Storage CRO (c) X-Y Recorder (d) DC Tachogenerator

**BTEE-205**  
**[Engineering Drawing and Graphics]**  
**Part A**

1. Write various types of scales with their applications.
2. Draw a parabola and show its different parameters. What is the eccentricity of a parabola ?
3. An object is placed in 4th quadrant. What is the position with reference to H.P. and V.P. ?
4. In how many ways can we show the diameter of a circle ? Show any two by neat sketches.
5. Draw the following lines :
  - (a) Short break line
  - (b) Centre line.

**Part B**

1. A line makes an angle of  $60^\circ$  with H.P. and  $30^\circ$  with V.P. Draw its projections.
2. A cone of 50 mm diameter is lying on H.P. as one of its generators is with axis remaining parallel to V.P. Height of the cone is 70 mm. Draw its projections.



**BTEE-206****[Environmental Studies]****Part A**

1. Define average daily per capita demand and list the factors affecting it.
2. Define and explain (i) Surface loading, and (ii) Detention period.
3. An artesian well has a diameter of 20 cm. The thickness of the aquifer is 30 m and its permeability is 36 m/day. Find its yield under a drawdown of 4 m at the well face. Radius of influence is 245 m.
4. Give the flow diagram of activated sludge process and describe its working.
5. Explain sedimentation with coagulation.

**Part B**

1. Draw a neat sketch of a rapid gravity filter and describe how it works.
2. Write short notes on any four of the following : (a) MPN Test (b) Water-borne Diseases (c) Break Point Chlorination (d) B.O.D. (e) Inverted Siphon (f) Dissolved Oxygen (D.O.)

## BTEE-207

### [Practical Physics]

#### Part A

1. Compare the electric and gravitational forces that exist between an electron and a proton.
2. Three capacitors are connected in series across a 75 volts supply. The voltage across them are 20, 25 and 30 volts respectively. The charge on each capacitor is  $3 \times 10^{-3} \text{C}$ . Find the capacitance of each capacitor and also of the combination.
3. State and explain Kirchhoff's rule for electrical circuits.
4. Explain the theory of diffraction grating and derive expressions for maxima and minima.
5. A thin film has a refractive index 1.45. Determine its minimum thickness if it appears black on reflection. ( $\lambda = 6 \times 10^{-7} \text{m}$ ).

#### Part B

1. In a nuclear fusion reaction, a deuteron of mass 2.01355 u and a triton of mass 3.01550 u combine to give a neutron of mass 1.00867 u and an alpha particle of mass 4.00150 u. Calculate the energy released in the process. One atomic mass = 931.5 MeV/c<sup>2</sup>.
2. What is displacement current? A parallel plate capacitor with circular plates of radius 10 cm separated by 5 mm is being charged by an external source. The charging current is 0.2 A. Find the displacement current and rate of change of potential difference between the plates.

## **BTEE-208**

### **[Practical Basic Electronics]**

#### **Part A**

1. Describe the various types of errors in instruments.
2. it necessary that every digital voltmeter should have a high input impedance ? Give reasons.
3. Draw the block diagram of a Digital frequency meter and explain its operation.
4. Define Average and RMS values. Draw the block diagram of an Analog Multimeter.
5. What is the need for inserting isolation between the signal generator output and oscillator in a simple signal generator ? What are the different ways in which this can be achieved ?

#### **Part B**

1. Explain clearly, with the help of an example, how frequency and phase angle is measured using CRO.
2. Write short notes on any four of the following :
  - (a) Signal Generator
  - (b) CRT
  - (c) Successive Approximation Type DVM
  - (d) Sources of Torque
  - (e) Types of Error
  - (f) Classification of Instruments