

Course Name:-B.Tech

SEMESTER EXAM, JULY-2022

Semester:- Second

Paper Name:- Fundamental of Electronics Engineering Paper Code:-TES205

समय- 2 घण्टे, 20 मिनट प्रति घण्टे अंतरिक्त-दृष्टिव्याधित एवं सह लेखक परीक्षार्थियों के लिए।

अधिकतम अंक-70

**Instructions:**

- The question paper consists of three sections namely A, B, C. All sections are compulsory.
- Section A- Each question carries 04 marks. All questions are compulsory.
- Section B- Answer any 2 out of 4 given questions in maximum one hundred fifty(150) words. Each question carries 10 marks.
- SectionC- Answer any 2 out of 3 given questions in maximum two hundred fifty (250) words. Each question carries 15 marks.

**निर्देश:**

- प्रश्न पत्र में तीन खण्ड A, B, C सह हैं। सभी खण्ड अनिवार्य हैं।
- खण्ड-A में प्रत्येक प्रश्न चार अंक का है। सभी प्रश्न अनिवार्य हैं।
- खण्ड-B में चार प्रश्नों में से किसीदो प्रश्नों के उत्तर अधिकतम डेढ़ सौ (150) शब्दों में हैं। प्रत्येक प्रश्न 10 अंक का है।
- खण्ड-C में तीन प्रश्नों में से किसीदो प्रश्नों के उत्तर अधिकतम ढाई सौ(250) शब्दों में हैं। प्रत्येक प्रश्न 15 अंक का है।

**Section - A (खण्ड-अ)**

**Objective Questions (वस्तुनिष्ठप्रश्न)**

**1. Answer all the following questions.**

निम्नलिखित सभी प्रश्न अनिवार्य हैं।

5x4=20

- What is the Gray code word for the binary number 101011?  
(a) 101011      (b) 110101      (c) 011111      (d) 111110
- Addition of pentavalent impurity to a semiconductor creates many.....?  
(a) Free Electrons  
(b) Holes  
(c) Valence electrons  
(d) Bound Electrons
- Total emitter current of transistor is ...?  
(a)  $I_E - I_C$       (b)  $I_C + I_E$       (c)  $I_B + I_C$       (d)  $I_B - I_C$
- FET operations depends on ....?  
(a) Minority charge carriers  
(b) Majority charge carriers  
(c) Majority and Minority charge carriers  
(d) None
- Trivalent impurities are...?  
(a) Aluminium(Al), Arsenic(As)  
(b) Boron(B), Antimony(Sb)  
(c) Indium(In), Aluminium(Al)  
(d) None

Section – B (खण्ड-ब)

Short Answer Questions (लघुउत्तरीय प्रश्न)

2. Answer any two of the following questions in maximum 150 words.

$2 \times 10 = 20$

निम्नलिखित में से किसी दो प्रश्नों के उत्तर अधिकतम 150 शब्दों में है।

- i) What do you mean by P-N junction? Explain the phenomenon of the formation of depletion layer in P-N junction. What will be the effect on the depletion layer of a P-N junction diode under different biased condition?
- ii) For a semiconductor diode, define static and dynamic Resistance. Also differentiate between transition and diffusion capacitance of a P-N junction diode.
- iii) Find the voltage at which the reverse current in a Ge diode at room temperature will reach 90% of its saturation value. (a) Find the ratio of diode current with a forward bias of 0.05V to the current with a reverse bias of 0.05V? (b) The reverse saturation current of a Ge diode is  $10\mu\text{A}$ . Find current under forward biases of 0.1V, 0.2V, 0.3V?
- iv) Differentiate between intrinsic and Extrinsic semiconductors. Also define the terms conductivity and energy band gap of semiconductors.

Section – C (खण्ड-स)

Descriptive Questions (विवरणात्मकप्रश्न)

3. Answer any two of the following question in maximum 250 words.

$2 \times 15 = 30$

निम्नलिखित में से किसी दोप्रश्नों के उत्तर अधिकतम 250 शब्दों में है।

- i) Explain the basic construction of n-channel Enhancement MOSFET. Draw and explain its characteristics. Also differentiate between MOSFET and BJT.
- ii) What is transistor biasing?. List different types of transistor biasing. What do you mean by Fixed or Base transistor biasing.
- iii) What are the main application areas of semiconductor diode. Define the term rectification and draw the circuit and output waveform of Half Wave Rectifier (HWR). Also write all parameters of HWR.

**SEMESTER END EXAMINATION, JULY-2022**

**Course Name:** B.Tech.

**Paper Name:** Engineering Mathematics-II

**Time:** 2 Hrs. + 20 Minutes per hour extra for V.I.  
and examinees with writer

Semester : II<sup>nd</sup>

Paper Code: TBS-202

Max. Marks: 70

समय - 2 घण्टे + 20 मिनट प्रति घण्टे अतिरिक्त दृष्टिवाचित एवं  
सहलेखक परीक्षार्थियों के लिए। अधिकतम अंक: 70

**Instructions:**

- (i) The question paper consists of three Sections namely A, B and C. All Sections are compulsory.
- (ii) Section-A - Each question carries 4 marks. All questions are compulsory.
- (iii) Section-B - Answer any 2 out of 4 given questions in maximum one hundred fifty (150) words.  
Each question carries 10 marks.
- (iv) Section-C - Answer any 2 out of 3 given questions in maximum two hundred fifty (250) words.  
Each question carries 15 marks.

**निर्देश:**

- (i) प्रश्न-पत्र में तीन खण्ड अ, ब व स हैं। सभी खण्ड अनिवार्य हैं।
- (ii) खण्ड-अ में प्रत्येक प्रश्न 04 अंकों का है। सभी प्रश्न अनिवार्य हैं।
- (iii) खण्ड-ब में 04 प्रश्नों में से किन्हीं 02 प्रश्नों के उत्तर अधिकतम डेङ सौ (150) शब्दों में दीजिये। प्रत्येक प्रश्न 10 अंकों का है।
- (iv) खण्ड-स में 03 प्रश्नों में से किन्हीं 02 प्रश्नों के उत्तर अधिकतम डाई सौ (250) शब्दों में दीजिये। प्रत्येक प्रश्न 15 अंकों का है।

**Section-A (खण्ड-अ)**

**Objective Questions (वस्तुनिष्ठ प्रश्न)**

(5×4=20)

1. Answer all the following questions:

निम्नलिखित सभी प्रश्न अनिवार्य हैं:

- (i) The value of  $L\left[t^{-\frac{1}{2}}\right]$  is:

(A)  $\sqrt{2}$

(B)  $\sqrt{\frac{\pi}{s}}$

(C)  $\sqrt{s}$

(D)  $\pi s$

- (ii) If  $F[f(x)] = f(s)$  then the value of  $F[f(ax)]$  is:

(A)  $\frac{1}{a}f(s)$

(B)  $\frac{1}{a}f\left(\frac{s}{a}\right)$

(C)  $f\left(\frac{s}{a}\right)$

(D)  $f(as)$

(1)

**TBS-202**

(iii) The Eigen values of matrix  $\begin{bmatrix} 1 & 1 \\ 1 & 1 \end{bmatrix}$  is:

- (A) 0, 1
- (B) 0, 2
- (C) 0, 3
- (D) 0, 4

(iv) The type of partial equation  $\frac{\partial^2 z}{\partial x^2} + \frac{\partial^2 z}{\partial y^2} + 3 \frac{\partial^2 z}{\partial x \partial y} + 2 \frac{\partial z}{\partial x} - \frac{\partial z}{\partial y} = 0$  is:

- (A) elliptical
- (B) parabolic
- (C) hyperbolic
- (D) None

(v) The value of  $L^{-1} \left[ \frac{1}{s-3} \right]$  is:

- (A)  $e^{-3t}$
- (B)  $e^{3t}$
- (C)  $e^t$
- (D)  $e^{2t}$

#### Section-B (खण्ड-ब)

**Short Answer Questions (लघुउत्तरीय प्रश्न)**

2. Answer any two of the following questions in maximum 150 words:

निम्नलिखित में से किसी दो प्रश्नों के उत्तर अधिकतम 150 शब्दों में दीजिये.

(i) Verify that the following transformation is a linear transformation:

$$T(a, b) = (a+b, a-b, b) \quad \forall a, b \in R$$

Find the range, rank, null space and nullity.

(ii) Find the Laplace inverse of:

$$\frac{1}{s^4} - \frac{3s}{s^2 + 16} + \frac{s}{s^2 + 4}$$

(iii) Find the Fourier transform of:

$$f(x) = \begin{cases} 1-x^2, & |x| \leq 1 \\ 0, & |x| > 1 \end{cases}$$

$$\frac{1}{3} \lambda$$

2, 3, 3, 2

(iv) Solve  $\frac{\partial^3 z}{\partial x^3} - 4 \frac{\partial^3 z}{\partial x^2 \partial y} + 4 \frac{\partial^3 z}{\partial x \partial y^2} = 2 \sin(3x + 2y)$ .

#### Section-C (खण्ड-स)

Descriptive Questions (विवरणात्मक प्रश्न)

निम्नलिखित में से किसी दो प्रश्नों के उत्तर अधिकतम 250 शब्दों में हीजिये:

- (i) Using Laplace transform, find the solution of the initial value problem  $y'''(t) + y(t) = t$ , Given  
 $y'(0) = 1, y(x) = 0$ .
- (ii) Find the characteristic equation of the matrix:

$$A = \begin{bmatrix} 4 & 3 & 1 \\ 2 & 1 & -2 \\ 1 & 2 & 1 \end{bmatrix}$$

Hence find  $A^{-1}$ .

- (iii) State and prove convolution theorem and find  $L^{-1} \left( \frac{s}{(s^2 + 25)(s^2 + 16)} \right)$



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  - Section C- Answer any **2 out of 3** given questions in maximum two hundred fifty (250) words. Each question carries **15 marks**.
- निर्देशः**
- प्रश्न पत्र में तीन खण्ड अ. ब. व. स हैं। सभी खण्ड अनिवार्य हैं।
  - खण्ड-अ में प्रत्येक प्रश्न **चार** अंक का है। सभी प्रश्न अनिवार्य हैं।
  - खण्ड-ब में चार प्रश्नों में से किसी दो प्रश्नों के उत्तर अधिकतम डेव्हू सौ (150) शब्दों में दें। प्रत्येक प्रश्न 10 अंक का है।
  - खण्ड-स में तीन प्रश्नों में से किसी दो प्रश्नों के उत्तर अधिकतम छार्फ सौ (250) शब्दों में दें। प्रत्येक प्रश्न 15 अंक का है।

**Section - A (खण्ड-अ)****Objective Questions (वर्तुनिष्प्रश्न)**

5×4=20

**1. Answer all the following questions.**

निम्नलिखित सभी प्रश्न अनिवार्य हैं।

- Point of Contraflexure is known as the point...
  - Where shear force changes its sign.
  - Where bending moment changes its sign.
  - Where shear force is maximum.
  - Where bending moment is maximum.
- C.G. of a solid cone lies on the axis at a height ..... of the total height from the base.
  - One-third
  - half
  - one-fourth
  - none of these.
- $S_{n^{\text{th}}} = u + a/2(\dots\dots)$ 
  - $2n-1$
  - $n-1$
  - $2n$
  - $n/2-1$
- The forces P and Q act at right angles to each other, then the value of R will be-
  - $R = \sqrt{P^2 - Q^2}$
  - $R = P+Q$
  - $R = P \cdot Q$
  - $R = \sqrt{P^2 + Q^2}$
- If work output denoted as  $W_o$  and work input is  $W_i$  then mechanical efficiency is-
  - $W_o/W_o$
  - $W_o/W_i$
  - $1/W_i$
  - $W_o * W_i$

**Section - B (खण्ड-ब)****Short Answer Questions (लघुउत्तरीय प्रश्न)**

2×10=20

**2. Answer any two of the following questions in maximum 150 words.**

निम्नलिखित में से किसी दो प्रश्नों के उत्तर अधिकतम 150 शब्दों में दें।

$$\text{State and prove with diagram- } \frac{P}{\sin a} = \frac{Q}{\sin b} = \frac{R}{\sin c}.$$

Two forces of magnitudes  $3P$ ,  $2P$  respectively acting at a point have a resultant  $R$ . If the first force is doubled, the magnitude of the resultant is doubled. Find the angle between the forces.

- ii) Determine the forces in all members of truss shown in Fig. 1.

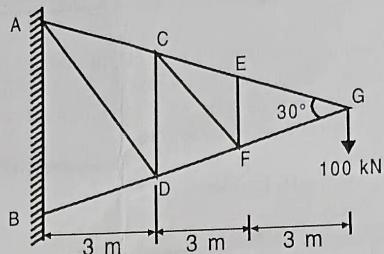


Fig. 1

- iii) Draw the Shear force diagram and bending moment diagram for given beam in Fig. 2. Determine the point of contraflexure also.

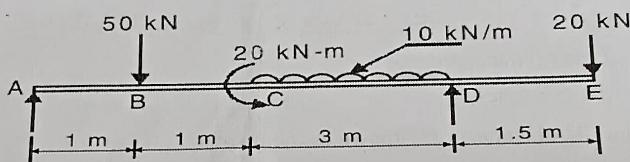


Fig. 2

- iv) A ladder of length  $L$  rests against a wall, the angle of inclination being  $45^\circ$ . If the coefficient of friction between the ladder and the ground and that between ground and the wall is 0.5 each, what will be the maximum distance on ladder to which a man whose weight is 1.5 times the weight of ladder may ascend before the ladder begins to slip?

#### Section – C (खण्ड–स)

#### Descriptive Questions (विवरणात्मक प्रश्न)

3. Answer any two of the following question in maximum 250 words.

$$2 \times 15 = 30$$

निम्नलिखित में से किन्हीं दो प्रश्नों के उत्तर अधिकतम 250 शब्दों में दें।

i) What is impulse and impulsive force? State and prove Law of conservation of momentum.

A body has an initial velocity of  $10\text{m/sec}$  and is being accelerated at a constant rate of  $5\text{m/sec}^2$ . What will be the velocity after 2 seconds? What distance does it travel during this time?

ii) Define Beam, support and their types.

Solve for the reactions at L, M, N and S on the two cylinders shown in Fig. 3, assuming all surfaces to be smooth.

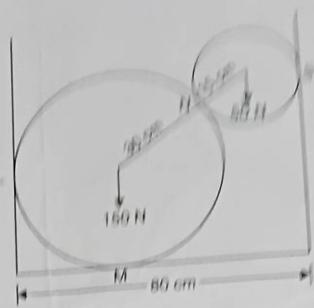


Fig. 3

- iii) Find out the centre of gravity of a solid hemisphere. And Find  $I_{xx}$  of the channel section shown in Fig. 4.

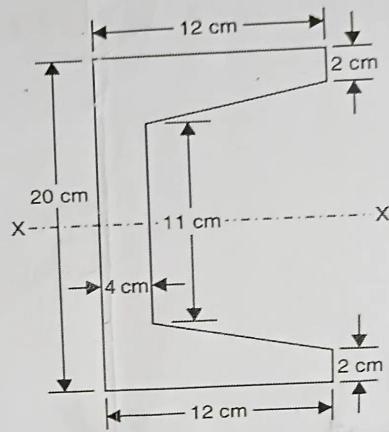


Fig.4

$$I_{xx} = I_{yy1} + I_{yy2}$$

join  
3d  
Find the angle between the  
the first

- iii) Find out the centre of gravity of a solid hemisphere. And Find  $I_{xx}$  of the channel section shown in Fig. 4.

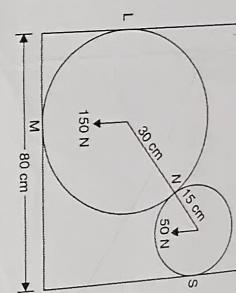


Fig. 3

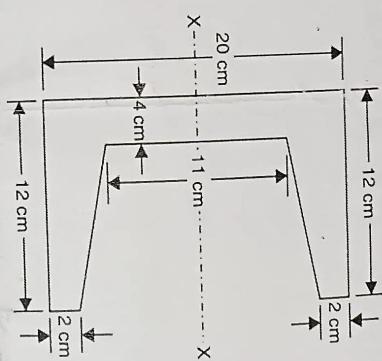


Fig. 4

## SEMESTER END EXAMINATION, JULY 2022

Course Name:-B.Tech

Paper Name:-PROFESSIONAL COMMUNICATION

Semester:-II<sup>ND</sup>

Paper Code:-THS-201

Time - 2Hrs + 20 minutes per hour extra time for V.I. & examinees with writer.

समय— 2 घण्टे+ 20 मिनट प्रति घण्टे अतिरिक्त—दृष्टिबाधित एवं सहलेखक परीक्षार्थियों के लिए।

Max Marks-70

अधिकतम अंक-70

### Instructions:

- The question paper consists of three sections namely A, B, C. All sections are compulsory.
- Section A- Each question carries 04 marks. All questions are compulsory.
- Section B- Answer any 2 out of 4 given questions in maximum one hundred fifty(150) words. Each question carries 10 marks.
- Section C- Answer any 2 out of 3 given questions in maximum two hundred fifty (250) words. Each question carries 15 marks.

### Section – A (खण्ड-अ)

### Objective Questions (वस्तुनिष्ठप्रश्न)

5×4=20

1. Answer all the following questions.

निम्नलिखित सभी प्रश्न अनिवार्य हैं।

- \_\_\_\_\_ means communication without words.
  - Object communication
  - Written communication
  - Oral communication
  - Non-verbal communication
- The person who transmits the message is called \_\_\_\_\_.
  - channel
  - sender
  - receiver
  - response
- \_\_\_\_ aims at making people work together for the common good of the organization.
  - communication
  - conversation
  - combination
  - connection
- At each stage in the process of communication, there is a possibility of interference which may hinder the process. Such interference is known as \_\_\_\_\_.
  - sender
  - receiver
  - barrier
  - none of them
- \_\_\_\_ describes all forms of human communication that are not verbal.
  - prosody
  - vocalics
  - haptics
  - paralanguage

Section - B (खण्ड-ब)  
Short Answer Questions (लघुउत्तरीय प्रश्न)

2. Answer any two of the following questions in maximum 150 words.  
निम्नलिखित में से किन्हीं दो प्रश्नों के उत्तर अधिकतम 150 शब्दों में दें।

2×10=20

- i) What are the common barriers that hinder effective listening?
- ii) Differentiate between a Resume, CV and Bio-Data
- iii) Write an email to send to your class teacher and HoD explaining why you will be missing online classes for a week due to health issues, that are not related to Covid.
- iv) Differentiate between definite, indefinite and distributive numerical adjectives.

Section - C (खण्ड-स)  
Descriptive Questions (विवरणात्मकप्रश्न)

3. Answer any two of the following question in maximum 250 words.  
निम्नलिखित में से किन्हीं दो प्रश्नों के उत्तर अधिकतम 250 शब्दों में दें।

2×15=30

- i. With reference to Intrapersonal Barriers to communication explain Wrong Assumption and Differing Background.
- ii. How is it important to have good presentation skills? Give at least five points.
- iii. What is a Sales Letter? As a Sale Executive draft a sales letter for promoting sales of i-pad launched by Samsung.

**SEMESTER END EXAMINATION, JULY-AUGUST - 2022**

**Course Name:-B.Tech.**

**Paper Name: ENGINEERING CHEMISTRY**

Semester-II  
Paper Code: TBS-213

Time – 2 Hrs + 20 minutes per hour extra time for V.L. & Pa

May 2000

समय-2घण्टे+20 मिनट प्रति घंटे अतिरिक्त-दृष्टिवाधित एवं सह लैखक परीक्षायिद्दों के लिए

अधिकारी अंक-70

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## निर्देशः

- प्रश्न पत्र में तीन खण्ड अ, ब, व स हैं। सभी खण्ड अनिवार्य हैं।
  - खण्ड-अ में प्रत्येक प्रश्न चार अंक का है। सभी प्रश्न अनिवार्य हैं।
  - खण्ड-ब में चार प्रश्नों में से किन्हीं दो प्रश्नों के उत्तर अधिकतम डेढ़ सौ (150) शब्दों में दृष्टि प्रश्न 10 अंक का है।
  - खण्ड-स में तीन प्रश्नों में से किन्हीं दो प्रश्नों के उत्तर अधिकतम छाइ सौ (250) शब्दों में दृष्टि प्रत्येक प्रश्न 15 अंक का है।

### Section – A (ਖਣਡ-ਅ)

### Multiple Choice Questions (वहविकल्पीय प्रश्न)

$$5 \times 4 = 20$$

- 1.** Answer all the following questions.  
विभूलिखित सभी प्रश्न अनिवार्य हैं।





- (c) An example is oxygen molecule.

(iii) Which of the following metal salt is not responsible for permanent hardness in water:

(a)  $\text{CaSO}_4$       (b)  $\text{MgSO}_4$       (c)  $\text{Mg}(\text{HCO}_3)_2$       (d)  $\text{CaCl}_2$

... condensation between  $\text{H}_2\text{N}-\text{(CH}_2\text{)}_6-\text{NH}_2$  with

- (iv) Which polymer is produced by polycondensation between  $\text{H}_2\text{N}-\text{CH}_2-\text{COOH}$  and  $\text{COOH}-(\text{CH}_2)_4-\text{COOH}$

(a) PVC      (b) Nylon 6,6      (c) Nylon 6,10      (d) Buna-N

- (a) Shift of  $\lambda_{(max)}$  to shorter wavelength  
 (c) Shift of  $\lambda_{(max)}$  to longer wavelength
- (b) Increase in intensity of  $\lambda_{(max)}$   
 (d) Decrease in intensity of  $\lambda_{(max)}$

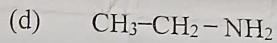
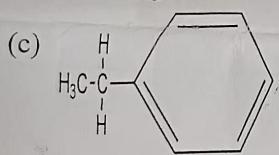
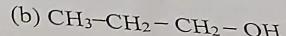
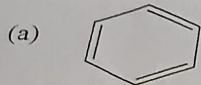
**Section - B (खण्ड - ब)**

**Short Answer Questions (लघु उत्तरीय प्रश्न)**

निम्नलिखित में से किन्हीं दो प्रश्नों के उत्तर अधिकतम डेंड सौ (150) शब्दों में दें।

2x10=20

- (i) Calculate the bond order of  $O_2^+$ ,  $O_2^{2-}$ ,  $O_2$  and arrange them in increasing order of their stability.
- (ii) Discuss the application of Infrared (IR) Spectroscopy and what is the importance of finger print region in IR-spectroscopy.
- (iii) Predict the NMR signals in the following compounds along with explanation:



- (iv) Explain vulcanization of rubber and its advantages.

**Section - C (खण्ड - स)**

**Long Answer Questions (दीर्घउत्तरीयप्रश्न)**

3. Answer any two of the following question in maximum 250 words. 2x15=30  
 निम्नलिखित में से किन्हीं दो प्रश्नों के उत्तर अधिकतम ढाई सौ (250) शब्दों में दें।

- (i) Define primary fuel and discuss in detail about Gross Calorific value and Net Calorific value. Find the Gross Calorific Value of the fuel from the following data, obtained in a bomb calorimeter experiment:

Weight of Coal burnt = 0.994 gm

Weight of Water in calorimeter = 2592 gm

Weight of bomb, calorimeter, stirrer = 3940 gm

Rise in temperature of water =  $2.732^\circ C$

Mean Specific heat of the apparatus = 0.098

- (ii) Describe preparation, properties and application of:
- (a) Buna-N Rubber
  - (b) Nylon - 6
  - (c) Polyvinyl Chloride (PVC)
- (iii) Distinguish between permanent hardness and temporary hardness of water. Discuss role of Zeolite for water treatment process.