SEMESTER END EXAMINATION, MAY, 2024

Course Name: - B.Tech **Semester:- 2nd**

Paper Name: - Engineering Chemistry **Paper Code:- TBS 203**

Time - 3 Hrs + 20 minutes per hour extra time for V.I. & examinees with writer. **Max Marks-70**

समय– 3 घण्टे + 20 मिनट प्रति घंटे अतिरिक्त–दृष्टिबाधित 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 **3 mark. All questions are compulsory.**
- Section B- Answer any **5 out of 7** given questions in maximum one hundred fifty (150) words. Each question carries **7 marks.**
- Section C- Answer any **2 out of 3** given questions in maximum three hundred (300) words. Each question carries **10 marks.**

निर्देश:

- प्रश्न पत्र में तीन खण्ड अ, ब, व स हैं। सभी खण्ड अनिवार्य हैं।
- खण्ड–अ में प्रत्येक प्रश्न तीन अंक का है। **सभी प्रश्न अनिवार्य हैं।**
- खण्ड–ब में **सात प्रश्नों में से किन्हीं पाँच** प्रश्नों के उत्तर अधिकतम 150 शब्दों में दें। प्रत्येक प्रश्न **सात अंक** का है।
- खण्ड–स में **तीन प्रश्नों में से किन्हीं दो** प्रश्नों के उत्तर अधिकतम (250-300) शब्दों में दें। प्रत्येक प्रश्न **10** अंक का है।

Section – A (खण्ड–अ)

Objective Questions (वस्तुनिष्ठ प्रश्न)

1. Answer all the following questions. 5x3 =15

निम्नलिखित सभी प्रश्न अनिवार्य हैं।

i) The degree of freedom for a reaction N_2 (g) $+3H_2$ (g) $\rightarrow 2NH_3$ (l)

(a) 1 (b) 2 (c) 3 (d) 0

ii) Which of the following species is more satble

(a) O_2 (b) O_2^+ (c) O_2^- (d) O_2^{++}

iii) Which of the following have identical bond orders

(a) CN- (b) NO^+ (c) O_2- (d) CN^+

iv) The no of unpaired electrons in species Cr, Fe^{2+}, Se^{2-}

(a) 6, 4, 0 (b) 5, 3, 2 (c) 6, 3, 2 (d) 5, 4, 0

v) Which of the following is suitable doping impurity for p- type semiconductor with Si

(a) Arsenic (b) Boron (c) Nitrogen (d) Phosphorus

Section – B (खण्ड–ब)

Short Answer Questions (लघुउत्तरीय प्रश्न)

2. Answer any five of the following questions in maximum 150 words. 5x7=35

निम्नलिखित में से किन्हीं पाँच प्रश्नों के उत्तर अधिकतम 150 शब्दों में दें।

i. Draw MO diagrams and calculate Bond order of O_2, F_2, and N_2.

ii. Calculate degree of hardness of a water sample containing 50 mg $MgCO_3$ 100 mg $MgSO_4$ 150 mg $CaCl_2$ and 200 mg $CaSO_4$.

iii. What are metal excess and metal Deficiency defect? Explain with suitable example.

iv. Define linear, branched, cross-linked, homo-polymer and co-polymer with examples.

v. What is adsorption? What are the factors affecting adsorption of gas and liquid on solid?

vi. Discuss various types of corrosion as redox process and factors affecting corrosion.

vii. Define Electromagnetic radiations and derive Lambert's beer law of a UV spectrum.

Section – C (खण्ड–स)
Descriptive Questions (विवरणात्मक प्रश्न)

3. **Answer any two of the following question in maximum 300 words.** **2x10=20**
निम्नलिखित में से किन्हीं दो प्रश्नों के उत्तर अधिकतम 300 शब्दों में दें।

i) With the help of phase diagram, explain equilibrium in sulphur system.

ii) Define liquid crystal and its types with suitable examples and structures of mesogens.

iii) Give detail about the manufacturing, setting and chemical reaction of cement.

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BACK PAPER (ODD SEMESTER) EXAMINATION, JUNE-2024 (HELD IN SEPT. 2024)

Course Name: - B.Tech **Semester:-** 1st

Paper Name: - Engineering Chemistry **Paper Code:-** TBS 103

Time - 3 Hrs + 20 minutes per hour extra time for V.I. & examinees with writer. **Max Marks-70**

समय– 3 घण्टे + 20 मिनट प्रति घंटे अतिरिक्त–दृष्टिबाधित एवं शत 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 **3 mark. All questions are compulsory.**
- Section B- Answer any **5 out of 7** given questions in maximum one hundred fifty (150) words. Each question carries **7 marks.**
- Section C- Answer any **2 out of 3** given questions in maximum three hundred (300) words. Each question carries **10 marks.**

निर्देश:

- प्रश्न पत्र मे तीन खण्ड अ, ब, व स है। सभी खण्ड अनिवार्य है।
- खण्ड–अ मे प्रत्येक प्रश्न तीन अंक का है। सभी प्रश्न अनिवार्य हैं।
- खण्ड–ब में **सात प्रश्नों में से किन्हीं पाँच** प्रश्नों के उत्तर अधिकतम 150 शब्दों में दें। प्रत्येक प्रश्न सात अंक का है।
- खण्ड–स मे **तीन प्रश्नों में से किन्हीं दो** प्रश्नो के उत्तर अधिकतम (250-300) शब्दों में दें। प्रत्येक प्रश्न **10** अंक का है।

Section – A (खण्ड–अ)

Objective Questions (वस्तुनिष्ठ प्रश्न)

1. Answer all the following questions. 5x3 =15

निम्नलिखित सभी प्रश्न अनिवार्य हैं।

i) Most stable molecule according to MOT

a) O_2

b) F_2

c) N_2

d) CO

ii) Degree of freedom for breakdown of $CaCO_3$ is

a) 0

b) 1

c) 2

d) 3

iii) Free radical polymerization occurs in,

a) Natural rubber

b) Bakelite

c) Dacron

d) PVC

iv) Correct Bond dissociation energy increasing order is,

a) $O_2^- < F_2 < N_2 < C_2$

b) $N_2 < O_2^- < C_2 < F_2$

c) $F_2 < O_2^- < C_2 < N_2$

d) $F_2 < C_2 < O_2^- < N_2$

c) $F_2 < O_2^- < C_2 < N_2$

d) $F_2 < C_2 < O_2^- < N_2$

v) The odd one is

a) Triple point, curve, area, freedom

b) Soda, zeolite, brine solution, resin

c) Antibonding, reverse osmosis, co polymer

d) Anode, pitting, reactivity order, moisture

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

2. Answer any five of the following questions in maximum 150 words. **5x7=35**
निम्नलिखित में से किन्हीं पाँच प्रश्नों के उत्तर अधिकतम 150 शब्दों में दें।

i. Give detail characteristics of a good fuel.

ii. Explain the set up and processing of a biogas plant.

iii. What are biodegradable polymers? Give example with structure. Why they are needful in todays industries.

iv. Give detail explanation about the seven factors affecting corrosion.

v. What is cement? What are its composition? Write rotary kiln manufacturing process..

vi. Draw MO diagram and calculate bond order of Ne_2^{++}, C_2^{--}, O_2^{--}

vii. Calculate total hardness of a water sample containing 40 mg $CaCO_3$, 70 mg $MgCl_2$, 100 mg $MgSO_4$ and 20 mg $CaHCO_3$. Express hardness value in degree Clark and degree French.

Section – C (खण्ड–स)
Descriptive Questions (विवरणात्मक प्रश्न)

3. Answer any two of the following question in maximum 300 words. **2x10=20**
निम्नलिखित में से किन्हीं दो प्रश्नों के उत्तर अधिकतम 300 शब्दों में दें।

i) Draw phase diagram of Sulphur system as according to phase rule based on curve and area.

ii) What are defects in solid? Classify them in detail with suitable example and structures of each.

iii) Explain Zeolite and Ion exchange method for softening hard water with detail of softening and regeneration

END SEMESTER EXAMINATION MAY-2024

Course Name: - B.Tech(CSE, CE, EE, ECE, ME) **Semester:- 2^{nd}**

Paper Name: - Engineering Mathematics-II **Paper Code:- TBS-202**

Time - 3 Hrs + 20 minutes per hour extra time for V.I. & examinees with writer. **Max Marks-70**

समय– 3 घण्टे + 20 मिनट प्रति घंटे अतिरिक्त–दृष्टिबाधित 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 3 mark. All questions are compulsory.
- Section B- Answer any 5 out of 6 given questions in maximum hundred (150) words. Each question carries 7 marks.
- Section C- Answer any 2 out of 3 given questions in maximum five hundred (500) words. Each question carries 10 marks.

निर्देश:

- प्रश्न पत्र में तीन खण्ड अ, ब, व स हैं। सभी खण्ड अनिवार्य हैं।
- खण्ड–अ में प्रत्येक प्रश्न तीन अंक का है। सभी प्रश्न अनिवार्य हैं।
- खण्ड–ब में छः प्रश्नों में से किन्हीं पाँच प्रश्नों के उत्तर अधिकतम 150 शब्दों में दें। प्रत्येक प्रश्न सात अंक का है।
- खण्ड–स में तीन प्रश्नों में से किन्हीं दो प्रश्नों के उत्तर अधिकतम (300) शब्दों में दें। प्रत्येक प्रश्न 10 अंक का है।

Section – A (खण्ड–अ)

Objective Questions(वस्तुनिष्ठ प्रश्न)

1. Answer all the following questions. 5×3 =15

निम्नलिखित सभी प्रश्न अनिवार्य हैं।

i) The partial differential equation $y\frac{\partial^2 u}{\partial x^2} + 2x\frac{\partial^2 u}{\partial x \partial y} + y\frac{\partial^2 u}{\partial y^2} = 0$ is elliptic if

a) $x^2 = y^2$
b) $x^2 < y^2$
c) $x^2 + y^2 > 1$
d) $x^2 + y^2 = 1$

ii) Form the partial differential equation of the function $f(x + y + z,\ x^2 + y^2 + z^2)$

a) $(y - z)p + (z - x)q = x - y$
b) $(y + z)p - (z + x)q = x + y$
c) $2z = xp + yq$
d) None of these

iii) Laplace transform of a function F(t) is $\frac{2}{(s-a)^2+4}$ then F(t) is

a) $e^{at}\cos 2t$
b) $e^{at}\sin 2t$
c) $e^{2t}\cos at$
d) $e^{2t}\sin at$

iv) Inverse Fourier transform of a function $F(s)$ is

a) $f(x) = \frac{1}{\sqrt{2\pi}}\int_0^\infty e^{-isx}.F(s)\,ds$
b) $f(x) = \frac{1}{\sqrt{2\pi}}\int_{-\infty}^\infty e^{-isx}.F(s)\,ds$
c) $f(x) = \sqrt{\frac{2}{\pi}}\int_0^\infty e^{-isx}.F(s)\,ds$
d) $f(x) = \sqrt{\frac{2}{\pi}}\int_{-\infty}^\infty e^{-isx}.F(s)\,ds$

v) Which one is wrong recurrence relation for Bessel's function $J_n(x)$

a) $\frac{d}{dx}[x^n J_n(x)] = x^n J_{n-1}(x)$

b) $\frac{d}{dx}[x^{-n} J_n(x)] = -x^{-n} J_{n+1}(x)$

c) $\frac{d}{dx}[x^{-n} J_n(x)] = x^{-n} J_{n+1}(x)$

d) $J_n(x) = \frac{x}{2n}[J_{n-1}(x) + J_{n+1}(x)]$

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

2. Answer any five of the following questions in maximum 150 words. **5×7=35**
निम्नलिखित में से किन्हीं पाँच प्रश्नों के उत्तर अधिकतम 150 शब्दों में दें।

i. Find the Fourier series for $f(x) = 4 - x^2, -2 \le x \le 2$.

ii. Find the Fourier transform of e^{-ax^2}.

iii. Prove that n is integer the Bessel's functions $J_n(x)$ & $J_{-n}(x)$ are linearly dependent & $J_{-n}(x) = (-1)^n J_n$.

iv. Solve $r - 3s + 2t = e^{2x-y} + e^{x+y} + cos(x + 2y)$.

v. The vibrations of an elastic string is governed by the partial differential equation $\frac{\partial^2 u}{\partial t^2} = \frac{\partial^2 u}{\partial x^2}$. The length of string is π and the ends are fixed. The initial velocity is zero and the initial deflection is $u(x, 0) = 2(sinx + sin3x)$. Find the deflection $u(x, t)$ of the vibrating string for $t \ge 0$.

vi. Find the inverse Laplace transform of $\frac{6}{2s-3} - \frac{3+4s}{9s^2-16} + \frac{8-6s}{16s^2+9}$.

vii. Solve $y'' + 3y' + 2y = te^{-t}$, $y(0) = 1$, $y'(0) = 0$ by using Laplace transform.

Section – C (खण्ड–स)
Descriptive Questions (विवरणात्मक प्रश्न)

3. Answer any two of the following question in maximum 300 words. **2×10=20**
निम्नलिखित में से किन्हीं दो प्रश्नों के उत्तर अधिकतम 300 शब्दों में दें।

i) **(a)** Show that $\frac{d}{dx}[xJ_n J_{n+1}] = x[J^2 - J_{n+1}^2]$

(b) Find the solution of wave equation $\frac{\partial^2 y}{\partial t^2} = c^2 \frac{\partial^2 y}{\partial x^2}$ such that $y = P_0 \cos pt$ (P_0 is a constant), when $x = l$ & $y = 0$ when $x = 0$.

ii) **(a)** Find the inverse Laplace transform of $\frac{3}{s-2} + \frac{6}{9s^4} + \frac{2s}{s^2+25}$.

(b) Find the general solution of $x(z^2 - y^2)p + y(x^2 - z^2)q = z(y^2 - x^2)$.

iii) **(a)** Find the Fourier Sine transform of e^{-ax}.

(b) Solve $(mz - ny)p + (nx - lz)q = ly - mx$.

SEMESTER EXAMINATION DECEMBER-2023

Course Name: - B.Tech(CSE, ME, CE, EE, ECE) **Semester:- First**

Paper Name: - Engineering Mathematics-I **Paper Code: - TBS-102**

Time - 3 Hrs + 20 minutes per hour extra time for V.I. & examinees with writer. **Max Marks-70**

समय– 3 घण्टे + 20 मिनट प्रति घंटे अतिरिक्त–दृष्टिबाधित 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 **3 mark. All questions are compulsory.**
- Section B- Answer any **5 out of 7** given questions in maximum one hundred fifty (150) words. Each question carries **7 marks.**
- Section C- Answer any **2 out of 3** given questions in maximum three hundred (300) words. Each question carries **10 marks.**

निर्देश:

- प्रश्न पत्र में तीन खण्ड अ, ब, व स हैं। सभी खण्ड अनिवार्य हैं।
- खण्ड–अ में प्रत्येक प्रश्न तीन अंक का है। **सभी प्रश्न अनिवार्य हैं।**
- खण्ड–ब में **सात प्रश्नों में से किन्हीं पाँच** प्रश्नों के उत्तर अधिकतम 150 शब्दों में दें। प्रत्येक प्रश्न **सात अंक** का है।
- खण्ड–स में **तीन प्रश्नों में से किन्हीं दो** प्रश्नों के उत्तर अधिकतम (250-300) शब्दों में दें। प्रत्येक प्रश्न **10 अंक** का है।

Section – A (खण्ड–अ)

Objective Questions(वस्तुनिष्ठ प्रश्न)

1. Answer all the following questions. **5x3 =15**

निम्नलिखित सभी प्रश्न अनिवार्य हैं।

i) The 4^{th}differential co-efficient of the $sin(ax+b)$

a) $y_4 = a^4 sin(ax+b+\frac{n\pi}{2})$

b) $y_4 = a^4 \cos(ax+b+\frac{n\pi}{2})$

c) $y_4 = a^4 sin(ax+b+2\pi)$

d) $y_4 = a^4 \cos(ax+b+2\pi)$

ii) Find the rank of matrix $A = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 4 & 7 \\ 3 & 5 & 10 \end{bmatrix}$

a) 1

b) 2

c) 3

d) None

iii) The value of $\Gamma\left(\frac{-1}{2}\right)$ is

a) $-2\sqrt{\pi}$

b) $2\sqrt{\pi}$

c) $-\sqrt{\pi}$

d) $\sqrt{\pi}$

iv) If $\vec{r} = x\hat{\imath} + y\hat{\jmath} + z\hat{k}$ then $grad\ r$ is

a) $\frac{\vec{r}}{r}$

b) $\frac{\vec{r}}{r^2}$

c) $-\frac{\vec{r}}{r}$

d) $-\frac{\vec{r}}{r^3}$

v) The degree and order of differential equation $\frac{d^2y}{dx^2} + \left(\frac{dy}{dx}\right)^2 + y = 0$

a) 2, 1

b) 1, 2

c) 1, 3

d) 3, 1

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

2. Answer any five of the following questions in maximum 150 words. **5x7=35**

निम्नलिखित में से किन्हीं पाँच प्रश्नों के उत्तर अधिकतम 150 शब्दों में दें।

i. Find the rank of the matrix $A = \begin{bmatrix} 1 & 1 & 1 \\ a & b & c \\ a^2 & b^2 & c^2 \end{bmatrix}$; a, b, c being all real.

ii. Solve: $(D^2 - 2D + 1)y = xe^x \sin x$.

iii. If $\overrightarrow{F}(x, y, z) = xz^3\hat{\imath} - 2x^2yz\hat{\jmath} + 2yz^4\hat{k}$, find the divergence and curl of $\overrightarrow{F}(x, y, z)$.

iv. State the Rolle's theorem and expand $\tan x$ by Maclaurin's Theorem as for as x^5.

v. Show that $\beta(p, q) = \int_0^1 \frac{x^{p-1}+x^{q-1}}{(1+x)^{p+q}} dx$

vi. Find the eigen values and eigen vectors of the matrix $A = \begin{bmatrix} -2 & 2 & -3 \\ 2 & 1 & -6 \\ -1 & -1 & 0 \end{bmatrix}$.

vii. If $f(x) = \frac{x}{1+e^{1/x}}$, $x \neq 0$ and $f(0) = 0$, then show that the function is continuous but not differentiable at $x = 0$.

Section – C (खण्ड–स)
Descriptive Questions (विवरणात्मक प्रश्न)

3. Answer any two of the following question in maximum 300 words. **2x10=20**

निम्नलिखित में से किन्हीं दो प्रश्नों के उत्तर अधिकतम 300 शब्दों में दें।

i) (a) State and Proof Legendre's duplication formula.

(b) If $y = (\sin^{-1} x)^2$, prove that $(1 - x^2)y_{n+2} - (2n + 1)xy_{n+1} - n^2y_n = 0$.

ii) Verify divergence theorem for $\overrightarrow{F} = 4xz\hat{\imath} - y^2\hat{\jmath} + yz\hat{k}$ taken over the cube bounded by the lines $x = 0, x = 1, y = 0, y = 1, z = 0, z = 1$.

iii) Find the characteristic equation of the symmetric matrix. $A = \begin{bmatrix} 2 & -1 & 1 \\ -1 & 2 & -1 \\ 1 & -1 & 2 \end{bmatrix}$ and verify that is satisfied by A and hence obtain A^{-1}. Express

(a) $A^6 - 6A^5 + 9A^4 - 2A^3 - 12A^2 + 23A - 9I$

(b) $A^5 - 5A^4 + 3A^3 + 6A^2 - 6A + 2I$

as linear polynomial in A.

BACK PAPER (ODD SEMESTER) EXAMINATION, JUNE-2024 (HELD IN SEPT 2024)Course Name: - B.Tech(CSE, ME, CE, EE, ECE) Semester:- First

Paper Name: - Engineering Mathematics-I Paper Code: - TBS-102

Time - 3 Hrs + 20 minutes per hour extra time for V.I. & examinees with writer. Max Marks-70

समय– 3 घण्टे + 20 मिनट प्रति घंटे अतिरिक्त–दृष्टिबाधित एवं साथ लेखक परीक्षार्थियों के लिए। अधिकतम अंक–70

Instructions:

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- Section A- Each question carries **3 mark**. **All questions are compulsory.**
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- Section C- Answer any **2 out of 3** given questions in maximum three hundred (300) words. Each question carries **10 marks**.

निर्देश:

- प्रश्न पत्र में तीन खण्ड अ, ब, व स हैं। सभी खण्ड अनिवार्य हैं।
- खण्ड–अ मे प्रत्येक प्रश्न तीन अंक का है। सभी प्रश्न अनिवार्य हैं।
- खण्ड–ब में सात प्रश्नों में से किन्हीं पाँच प्रश्नों के उत्तर अधिकतम 150 शब्दों में दें। प्रत्येक प्रश्न सात अंक का है।
- खण्ड–स में तीन प्रश्नों में से किन्हीं दो प्रश्नों के उत्तर अधिकतम (250-300) शब्दों में दे। प्रत्येक प्रश्न **10** अंक का है।

Section – A (खण्ड–अ)

Objective Questions(वस्तुनिष्ठ प्रश्न)

1. Answer all the following questions. 5x3 =15

निम्नलिखित सभी प्रश्न अनिवार्य हैं।

i) The 4^{th} differential co-efficient of the $cos(ax+b)$

a) $y_4 = a^4 sin(ax+b+\frac{n\pi}{2})$

b) $y_4 = a^4 \cos(ax+b+\frac{n\pi}{2})$

c) $y_4 = a^4 sin(ax+b+2\pi)$

d) $y_4 = a^4 \cos(ax+b+2\pi)$

ii) A vector field F is solenoidal, if

a) $Div\ F = 0$
b) $Div\ F \neq 0$
c) $Curl\ F = 0$
d) $Curl\ F \neq 0$

iii) The value of $\Gamma\left(\frac{1}{2}\right)$ is

a) $\sqrt{\pi}$
b) $\frac{\sqrt{\pi}}{2}$
c) $\frac{\sqrt{\pi}}{3}$
d) $\frac{\sqrt{\pi}}{4}$

iv) If $\vec{r} = x\hat{i} + y\hat{j} + z\hat{k}$ then $div\ \vec{r}$ is

a) 1

b) 2

c) 3

d) 0

v) The degree and order of differential equation $\left(\frac{d^3y}{dx^3}\right)^2 + \left(\frac{d^2y}{dx^2}\right)^4 + \frac{dy}{dx} + y = 0$

a) 2, 3

b) 3, 2

c) 2, 4

d) 4, 2

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

2. Answer any five of the following questions in maximum 150 words. **5x7=35**
निम्नलिखित में से किन्हीं पाँच प्रश्नों के उत्तर अधिकतम 150 शब्दों में दें।

i. Find the rank of matrix $A = \begin{bmatrix} 2 & 3 & -2 & 4 \\ 3 & -2 & 1 & 2 \\ 3 & 2 & 3 & 4 \\ -2 & 4 & 0 & 5 \end{bmatrix}$

ii. Find $div\ \vec{F}$ and $curl\ \vec{F}$ where $\vec{F} = grad(x^3 + y^3 + z^3 - 3xyz)$.

iii. Evaluate $\int_0^1 \frac{x^{m-1}+x^{n-1}}{(1+x)^{m+n}} dx$.

iv. Solve:- $(D^3 + D^2 - D - 1)y = \cos 2x$.

v. State the Mean Value theorem and expand $\tan x$ by Maclaurin's Theorem as for as x^5.

vi. If $f(x) = \frac{x}{1+e^{1/x}}$, $x \neq 0$ and $f(0) = 0$, then show that the function is continuous but not differentiable at $x = 0$.

vii. If $y = (\sin^{-1} x)^2$, prove that $(1 - x^2)y_{n+2} - (2n + 1)xy_{n+1} - n^2y_n = 0$.

Section – C (खण्ड–स)
Descriptive Questions (विवरणात्मक प्रश्न)

3. Answer any two of the following question in maximum 300 words. **2x10=20**
निम्नलिखित में से किन्हीं दो प्रश्नों के उत्तर अधिकतम 300 शब्दों में दें।

i) (a) State and Proof Legendre's duplication formula.

(b) If $\vec{F}(x, y, z) = xz^3\hat{i} - 2x^2yz\hat{j} + 2yz^4\hat{k}$, find the divergence and curl of $\vec{F}(x, y, z)$.

ii) Verify Stoke's theorem for $F = (x^2 + y^2)\hat{i} - 2xy\hat{j}$ taken round the rectangle bounded by the lines $x = \pm a, y = 0, y = b$.

iii) Find the characteristic equation of the symmetric matrix. $A = \begin{bmatrix} 2 & -1 & 1 \\ -1 & 2 & -1 \\ 1 & -1 & 2 \end{bmatrix}$ and verify that is satisfied by A and hence obtain A^{-1}. Express

(a) $A^6 - 6A^5 + 9A^4 - 2A^3 - 12A^2 + 23A - 9I$

(b) $A^5 - 5A^4 + 3A^3 + 6A^2 - 6A + 2I$

as linear polynomial in A.

Back paper.

BACK PAPER EXAMINATION JUNE, 2024 HELD IN SEPTEMBER-2024

Course Name: - B.Tech
Semester: - I
Paper Name: - Basic Electrical Engineering
Paper Code: - TES 102
Time - 3 Hrs + 20 minutes per hour extra time for V.I. & examinees with writer.
Max Marks-70
समय– 3 घण्टे + 20 मिनट प्रति घंटे अतिरिक्त–दृष्टिबाधित एवं राह 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 **3 mark. All questions are compulsory.**
- Section B- Answer any **5 out of 7** given questions in maximum one hundred fifty (150) words. Each question carries **7 marks.**
- Section C- Answer any **2 out of 3** given questions in maximum three hundred (300) words. Each question carries **10 marks.**

निर्देश:
- प्रश्न पत्र में तीन खण्ड अ, ब, व स हैं। सभी खण्ड अनिवार्य हैं।
- खण्ड–अ में प्रत्येक प्रश्न तीन अंक का है। सभी प्रश्न अनिवार्य हैं।
- खण्ड–ब में सात प्रश्नों में से किन्हीं पाँच प्रश्नों के उत्तर अधिकतम 150 शब्दों में दें। प्रत्येक प्रश्न सात अंक का है।
- खण्ड–स में तीन प्रश्नों में से किन्हीं दो प्रश्नों के उत्तर अधिकतम (250-300) शब्दों में दें। प्रत्येक प्रश्न **10** अंक का है।

Section – A (खण्ड–अ)
Objective Questions (वस्तुनिष्ठ प्रश्न)

1. Answer all the following questions. 5x3 =15
निम्नलिखित सभी प्रश्न अनिवार्य हैं।

i) All Meshes are loops but loop are not meshes
   a. Loops, Meshes
   b. Branches, loops
   c. Meshes, loops
   d. Nodes, Branches

C

ii) Materials in which magnetization persists even after the field has been removed are called _____
   a. Diamagnetic
   b. Paramagnetic
   c. Soft Ferro magnets
   d. Hard Ferro magnets

d a c a

iii) Magnitude of current at resonance in R-L-C circuit
   a. Depends upon the magnitude of R
   b. Depends upon the magnitude of L
   c. Depends upon the magnitude of C
   d. Depends upon the magnitude of R, L and C

iv) Form Factor is the ratio of
   a. Average value/ r.m.s. value
   b. Average value/ peak value
   c. r.m.s. value/ average value
   d. r.m.s. value/ peak value

.....

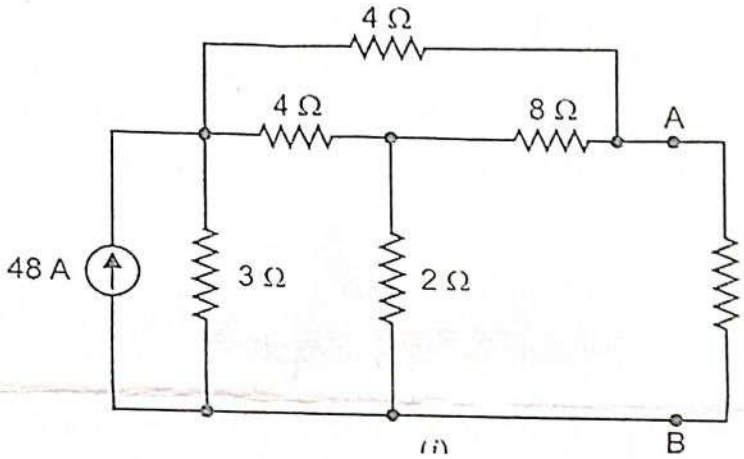
v) If the torque induced is zero in the dc machine, it can be said that _____

a. current is zero
b. flux can be zero
c. current or flux=0
d. None of above

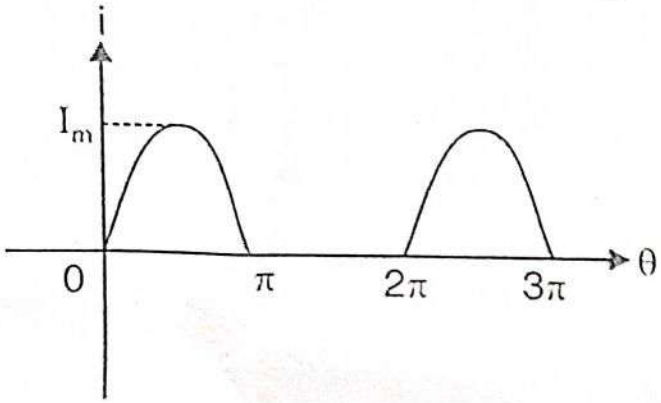
Section – B (खण्ड–ब)
Short Answer Questions (लघुउत्तरीय प्रश्न)

2. Answer any five of the following questions in maximum 150 words. **5x7=35**
निम्नलिखित में से किन्हीं पाँच प्रश्नों के उत्तर अधिकतम 150 शब्दों में दें।

i. In the network shown in below figure, find the Norton equivalent circuit at terminals AB .



ii. In below figure, find the average value, r.m.s. value, form factor and peak factor for (i) half-wave rectified alternating current and (ii) full-wave rectified alternating current.



A coil having a resistance of 7 W and an inductance of 31·8 mH is connected to 230 V, 50 Hz
Calculate (i) the circuit current (ii) phase angle (iii) power factor (iv) power consumed
tage drop across resistor and inductor.

iv. Determine the parameters of a R-L-C series circuit that will resonate at 10 kHz, has a bandwidth of 1 kHz and draws 15.3 W from a 200 V generator operating at the resonant frequency of the circuit.

v. Explain the B-H hysteresis curve point by point with proper figure. Write the difference between soft and hard magnetic materials.

vi. Explain the equivalent circuit of transformer in both conditions (i) when primary circuit referred to secondary and (ii) when secondary circuit referred to primary.

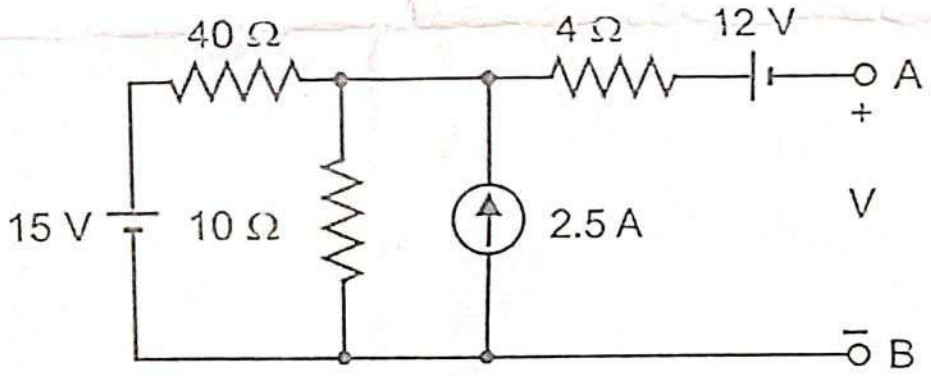
vii. Explain the working principle and operation of Miniature Circuit Breaker (MCB). Also, write advantages of MCB.

Section - C (खण्ड–स)

Descriptive Questions (विवरणात्मक प्रश्न)

3. Answer any two of the following question in maximum 300 words. **2x10=20**
निम्नलिखित में से किन्हीं दो प्रश्नों के उत्तर अधिकतम 300 शब्दों में दें।

i) Use superposition theorem to find the voltage V in Fig.



ii) Three coils, each having a resistance of 20 W and an inductive reactance of 15 W, are connected in star to a 400 V, 3-phase, 50 Hz supply. Calculate (i) the line current (ii) power factor and (iii) power supplied. Also, draw phasor diagram.

iii) Explain the Single Loop DC Generator along with all proper diagrams. Also, write down the EMF Equation of a DC Generator.

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SEMESTER END EXAMINATION, MAY, 2024

Course Name: - B.Tech (ME) **Semester: - 2nd**

Paper Name: - Engineering Mechanics **Paper Code: - TES-203**

Time - 3 Hrs + 20 minutes per hour extra time for V.I. & examinees with writer. **Max Marks-70**

समय– 3 घण्टे + 20 मिनट प्रति घंटे अतिरिक्त–दृष्टिबाधित 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 **3 mark. All questions are compulsory.**
- Section B- Answer any **5 out of 7** given questions in maximum one hundred fifty (150) words. Each question carries **7 marks.**
- Section C- Answer any **2 out of 3** given questions in maximum three hundred (300) words. Each question carries **10 marks.**

निर्देश:

- प्रश्न पत्र में तीन खण्ड अ, ब, व स हैं। सभी खण्ड अनिवार्य हैं।
- खण्ड–अ में प्रत्येक प्रश्न तीन अंक का है। सभी प्रश्न अनिवार्य हैं।
- खण्ड–ब में सात प्रश्नों में से किन्हीं पाँच प्रश्नों के उत्तर अधिकतम 150 शब्दों में दें। प्रत्येक प्रश्न सात अंक का है।
- खण्ड–स में तीन प्रश्नों में से किन्हीं दो प्रश्नों के उत्तर अधिकतम (250-300) शब्दों में दें। प्रत्येक प्रश्न 10 अंक का है।

Section – A (खण्ड–अ)

Objective Questions (वस्तुनिष्ठ प्रश्न)

1. Answer all the following questions.
निम्नलिखित सभी प्रश्न अनिवार्य हैं। **5×3 =15**

i) What is the relationship between each force, if three concurrent forces acting on a body according to Lami's theorem?
   a) Directly proportional to the sine of the angle between the other two forces
   b) Inversely proportional to the cosine of the angle between the other two forces
   c) Directly proportional to the cosine of the angle between the other two forces
   d) Inversely proportional to the sine of the angle between the other two forces

ii) If a body weighing 100 N rests on a plane inclined at 75° to the horizontal , the component parallel to the plane is
   a) 25.88 N
   b) 57.7 N
   c) 60 N
   d) 50 N

iii) The moment of inertia of a triangle of base width b and height h about is base is
   a) $bh^3/36$
   b) $bh^3/12$
   c) $bh^3/6$
   d) $bh^3/3$

iv) A simply supported beam of length 4 meters carries a uniformly distributed load of 10 KN/m. What are the reactions at the supports?
   a) 10 KN and 30 KN
   b) 20 KN and 20 KN
   c) 25 KN and 15 KN
   d) 15 KN and 25 KN

v) A block weighing 100 N is placed on a horizontal surface. The coefficient of static friction between the block and the surface is 0.5. What is the maximum horizontal force that can be applied to the block before it starts to move?

a) 50 N
b) 100 N
c) 150 N
d) 200 N

Section – B (खण्ड–ब)
Short Answer Questions (लघूत्तरीय प्रश्न)

2. Answer any five of the following questions in maximum 150 words. 5×7=35
निम्नलिखित में से किन्हीं पाँच प्रश्नों के उत्तर अधिकतम 150 शब्दों में दें।

i. Determine the resultant of the system of forces acting on a beam as shown in Fig.1.

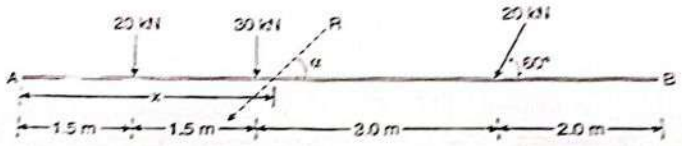

Fig.1

ii. Find the forces in all the members of the truss shown in Fig.2.

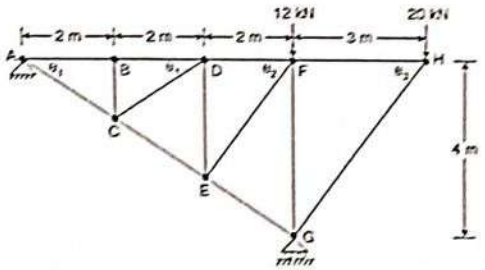

Fig.2

iii. Block A weighing 1000 N rests over block B which weighs 2000 N as shown in Fig.3. Block A is tied to wall with a horizontal string. If the coefficient of friction between blocks A and B is 0.25 and between B and floor is 1/3, what should be the value of P to move the block (B), if

(a) P is horizontal. (b) P acts at 30° upwards to horizontal

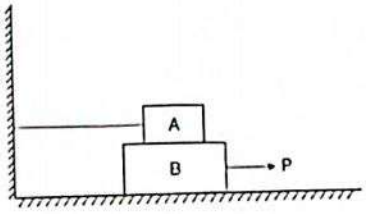

Fig.3

iv. The simply supported beam AB of span 5m is subjected to a concentrated load and external moment as shown in Fig.4. Determine the reaction at B.

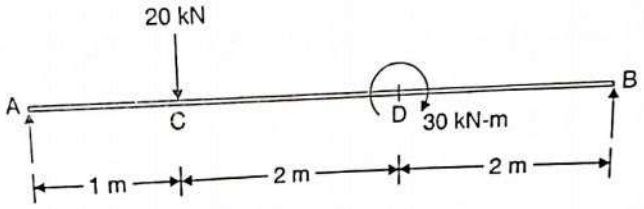

Fig.4

v. A roller of weight 500 N rests on a smooth inclined plane and is kept free from rolling down by a string as shown in Fig.5. Work out tension in the string and reaction at the point of contact B.

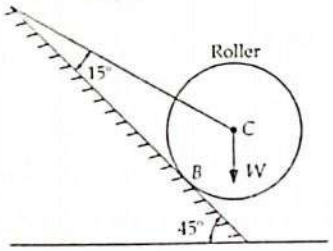

Fig.5

vi. State and prove triangle law and polygon law of forces.

vii. State and prove Lami's theorem. Describe angle of friction, angle of repose and cone of friction with neat sketch.

Section – C (खण्ड–स)

Descriptive Questions (विवरणात्मक प्रश्न)

3. Answer any two of the following question in maximum 300 words. **2×10=20**
निम्नलिखित में से किन्हीं दो प्रश्नों के उत्तर अधिकतम 300 शब्दों में दें।

i) (a) A ladder weighing 100 N is to be kept in the position shown in Fig.6 resting on a smooth floor and leaning on a smooth wall. Determine the horizontal force required at floor level to prevent it from slipping when a man weighing 700 N is at 2 m above floor level.

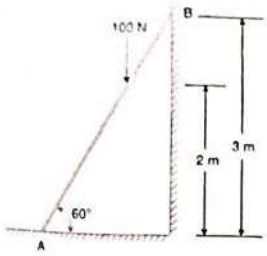

Fig.6

(b) Determine the reactions at A, B and D of the compound beam shown in Fig.7. Neglect the self-weight of the members.

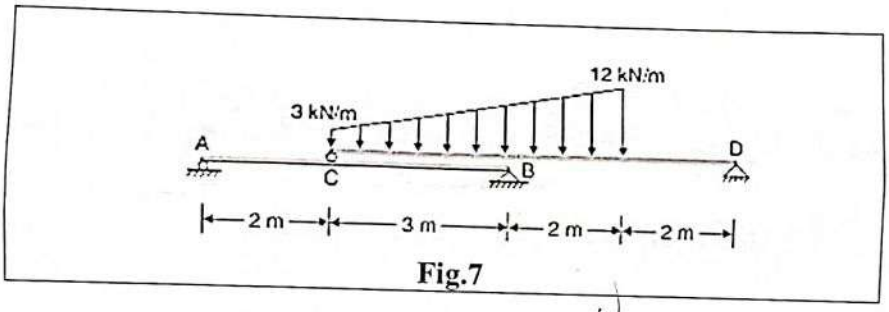

Fig.7

ii) **(a)** Explain the behaviour of stress-strain curve for the mild steel specimen by describing various points and its practical importance.

(b) Find the second moment of the shaded portion shown in Fig.8 about its centroidal axis.

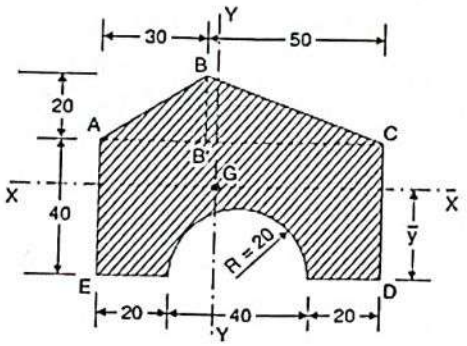

Fig.8

iii) **(a)** A circular rod of diameter 16 mm and 500 mm long is subjected to a tensile force 40 KN. The modulus of elasticity for steel may be taken as 200 KN/mm^2. Find stress, strain and elongation of the bar due to applied load.

(b) The bar shown in Fig.9 is tested in universal testing machine. It is observed that at a load of 40 KN and the total extension of the bar is 0.280 mm. Determine the Young's modulus of the material.

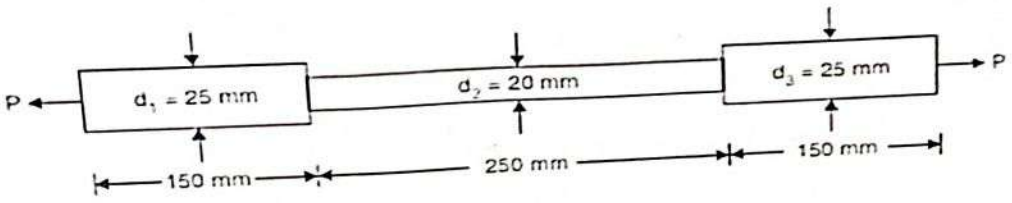

Fig.9

v) In a simply supported beam of 5m span a 30 KN-m moment is acting at a distance 2 m from support A. In this beam reaction at support A is

a) 15 KN
b) 6 KN
c) 12 KN
d) 75 KN

Section - B (खण्ड–ब)

Short Answer Questions (लघुउत्तरीय प्रश्न)

5×7=35

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

i. Find the reactions developed at supports A and B of the loaded beam shown in Fig.1.

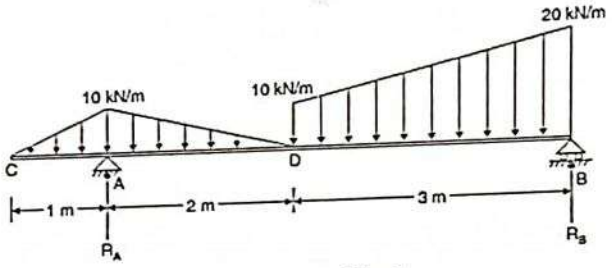

Fig.1

ii. Find the forces in all the members of the truss shown in Fig.2.

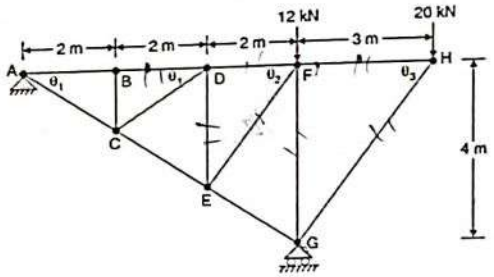

Fig.2

iii. Determine the resultant magnitude and angle of the three forces acting on a hook as shown in Fig.3

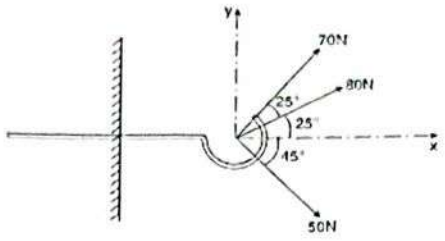

Fig.3

iv. Differentiate between center of gravity and centroid. Under what condition these will coincide? State triangle law and polygon law of forces.

v. Block A weighing 1000 N rests over block B which weighs 2000 N as shown in Fig.4. Block A is tied to wall with a horizontal string. If the coefficient of friction between blocks A and B is 0.25 and between B and floor is 1/3, what should be the value of P to move the block (B), if

(a) P is horizontal. (b) P acts at 30° upwards to horizontal

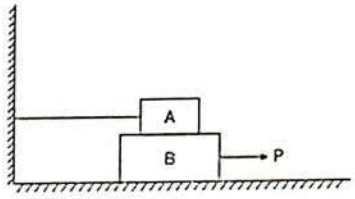

Fig.4

vi. A ladder weighing 100 N is to be kept in the position shown in Fig.5, resting on a smooth floor and leaning on a smooth wall. Determine the horizontal force required at floor level to prevent it from slipping when a man weighing 700 N is at 2m above floor level.

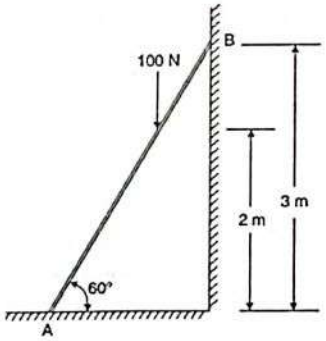

Fig.5

Section – C (खण्ड–स)

Descriptive Questions (विवरणात्मक प्रश्न)

2×10=20

3. **Answer any two of the following question in maximum 300 words.**
निम्नलिखित में से किन्हीं दो प्रश्नों के उत्तर अधिकतम 300 शब्दों में दें।

i) **(a)** Explain the behaviour of stress-strain curve for the mild steel specimen by describing various points and its practical importance with neat sketch.

(b) Determine the forces in the members FH, HG and GI in the truss shown in Fig.6. Each load is 10 kN and all triangles are equilaterals with sides equal to 4 m.

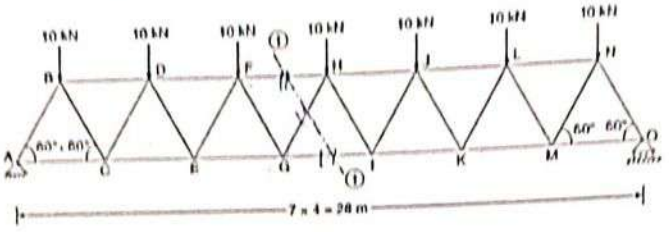

Fig.6

ii) **(a)** Find the second moment of the shaded portion shown in Fig.7 about its centroidal axis.

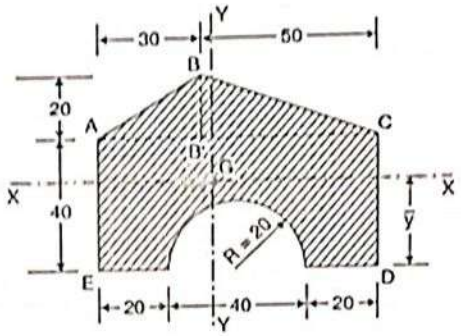

Fig.7

(b) Explain the type of loads supports and beams with neat sketch. State and prove Lami's theorem.

iii) **(a)** A circular rod of diameter 16 mm and 500 mm long is subjected to a tensile force 40 KN. The modulus of elasticity for steel may be taken as 200 KN/mm^2. Find stress, strain and elongation of the bar due to applied load.

(b) The bar shown in Fig.8 is tested in universal testing machine. It is observed that at a load of 40 KN and the total extension of the bar is 0.280 mm. Determine the Young's modulus of the material.

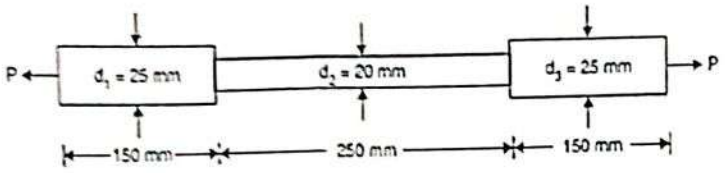

Fig.8

(c) Describe the angle of friction, angle of repose and cone of friction with neat sketch.

SEMESTER END EXAMINATION, MAY, 2024

Course Name: - B. TECH **Semester: - II**

Paper Name: - Professional Communication **Paper Code: - THS-201**

Time - 3 Hrs + 20 minutes per hour extra time for V.I. & examinees with writer. **Max Marks-70**

समय– 3 घण्टे + 20 मिनट प्रति घंटे अतिरिक्त–दृष्टिबाधित एवं राह 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 **3 mark. All questions are compulsory.**
- Section B- Answer any **5 out of 7** given questions in maximum one hundred fifty (150) words. Each question carries **7 marks.**
- Section C- Answer any **2 out of 3** given questions in maximum three hundred (300) words. Each question carries **10 marks.**

निर्देश:

- प्रश्न पत्र में तीन खण्ड अ, ब, व स हैं। सभी खण्ड अनिवार्य हैं।
- खण्ड–अ मे प्रत्येक प्रश्न **तीन अंक** का है। **सभी प्रश्न अनिवार्य हैं।**
- खण्ड–ब में **सात प्रश्नों में से किन्हीं पाँच** प्रश्नों के उत्तर अधिकतम 150 शब्दों में दें। प्रत्येक प्रश्न **सात अंक** का है।
- खण्ड–स में **तीन प्रश्नों में से किन्हीं दो** प्रश्नों के उत्तर अधिकतम (250-300) शब्दों में दें। प्रत्येक प्रश्न **10 अंक** का है।

Section – A (खण्ड–अ)

Objective Questions(वस्तुनिष्ठ प्रश्न)

1. Answer all the following questions. **5x3 =15**

निम्नलिखित सभी प्रश्न अनिवार्य हैं।

i) The synonym of the word "progress" is–
   a) Sturdy b) Advancement
   c) Lift d) Support

ii) The antonym of the word "beneficial" is–
   a) Devil. b) harmful
   b) Worse d) Rejection

iii) The reading style which is fast reading? a)
   a) Scanning b) Skimming
   c) Intensive reading d) Churning

iv) How many syllables does this word have– "gigantic"?
   a) 1 syllable b) 2 syllable
   c) 3 syllable d) syllable

v) What are the four communication styles?
   a) Verbal, visual, text, non-verbal b) Email, sound, body language, text
   C) Non-verbal, verbal written, visual D) Written, visual, sound, email

Section – B (खण्ड–ब)

Short Answer Questions (लघुउत्तरीय प्रश्न)

2. Answer any five of the following questions in maximum 150 words. **5x7=35**

निम्नलिखित में से किन्हीं पाँच प्रश्नों के उत्तर अधिकतम 150 शब्दों में दें।

i. What is Listening? Differentiate between active and passive listening. Write different steps engaged in the process of listening and methods to improve Listening skills

ii. Define the following-
   a) Extrapersonal communication b) Haptic

iii. What is a sentence and its types? Explain with examples.

iv. What are different barriers to communication? Elaborate.

v. What is a Precis' Writing? Write the basic requisites of a good Precis'.
vi. What is Job application letter and its different parts?
vii. What are punctuations and its kind?

Section – C (खण्ड–स)
Descriptive Questions (विवरणात्मक प्रश्न)

3. Answer any two of the following question in maximum 300 words. 2x10=20
निम्नलिखित में से किन्हीं दो प्रश्नों के उत्तर अधिकतम 300 शब्दों में दें।

i. What are Letters and different types of letters? Explain with examples.

ii. Write a Precis' of the following passage by reducing it to one third of its length. Failure to adhere to the word limit may result in deduction of marks.

We live in the era of specialisation of knowledge, thanks to the prodigious development of science and technology and to the consequent fragmentation of knowledge into innumerable parcels and compartments. This cultural trend is if anything, likely to be accentuated in years to come. To be sure, specialisation brings many benefits. It allows for deeper exploration and greater experimentation; it is the very engine of progress. Yet it also has negative consequences, for it eliminates those common intellectual and cultural traits that permit men and women to coexist, to co-communicate, to feel a sense of solidarity.

Specialisation leads to a lack of social understanding, to a division of human being into ghettos of technicians and specialist. The specialisation of knowledge requires specialised language languages and increasingly arcane codes as information becomes more and more specific and compartmentalised. This is the particularism and the division against which an old proverb warms us: do not focus too much on the branch or the leaf, less you forget that you are part of a tree, or too much on the tree, less you forget that it is part of a forest. in our time, science and technical technology cannot play an interesting role, precisely because of the infinite richness of knowledge and the speed of its evolution, which have led to the specialisation and its securities. But literature has been, and will continue to be, as long as it exists, one of the common denominators of human experience through which human beings may recognise themselves and converse with each other, no matter how different their professions, their life plans, their geographical and cultural locations, their personal circumstances. It has enabled individuals, in all the particularity of their lives, the transit history: as readers of Cervantes, Shakespeare, Dante and Tolstoy, we understand each other across space and time, and we feel ourselves to be members of the same species because, in the works of these writers created, we learn that we share as human beings, what remains, in all of us under the broad range of differences that separates us.

Nothing better protects a human being against the stupidity of prejudice, racism, religious or political sectarianism, and exclusivist nationalism than this truth that invariably appears in great literature: that men and women of all nations and places are essentially equal, and that only injustice among them discrimination, fear and exploitation. Nothing teaches us better than literature to see, in ethnic and cultural differences, the richness of the human patrimony, and to praise those differences as the manifestation of humanities multifaceted creativity. Reading good literature is an experience of pleasure, of course; but it is also an experience of learning what and how we are, in our human integrity and our human imperfection, with our actions, our dreams, and our ghosts, alone and in relationships that link us to others in our public image and in the secret risk of our consciousness.

iii. Read the following passage carefully and answer the questions given below.

To many people, Switzerland is the country of the Alps, though not all of it is mountainous. Northern Switzerland, like neighbouring regions of eastern France and south-west Germany, is a land of Hills and Woods but also of cities and industries. Basel is world famous for pharmaceuticals and Zürich and its suburbs of electrical engineering and machinery. It is non-Alpine Switzerland that produces the cheese, chocolates, the clocks and the watches for which the country is renowned.

The Alps occupy the Southern half of the country. They form two main east West chains, divided by the straight line of the upper Valley of Rhone and Rhine. The northern chain only in Switzerland contains Eiger and Jungfran peaks.

The Alps also influence Swiss life through their impact on its climate. They divide the Mediterranean word from the central European. There are many regional variations in climate. But generally, the mountain air is clear and clean – affected that has result in Switzerland attracting the ailing from all over the world to its hospitals and clinics.

i) Switzerland's climate which attracts the ailing from all over the world can be described as–
A) salacious
B) Salubrious
C) Felicitous
D) Boisterous

ii) Replace the word impact in the passage without changing the meaning of the sentence using one from the following.
A) change
B) alteration
C) influence
D) evolution

iii) In the first sentence the word it in the phrase not all of it is mountainous refers to –
A) Mountains
B) Neighbouring countries
C) Switzerland
D) Alps

iv) According to the passage which reason has the major share of mountains to the exclusion of other landforms.
A) Southern Switzerland
B) Eastern France
C) South-west Germany
D) Northern Switzerland

v) Cheese, chocolates, clocks etc. are produced-
A) all over Switzerland
B) only two cities in Switzerland
C) in the mountain regions of Switzerland
D) in the non-mountainous regions of Switzerland

BACK PAPER (ODD SEMESTER) EXAMINATION, JUNE-2024 (HELD IN SEPT. 2024)

Course Name: -B.TECH **Semester:- I**

Paper Name: -PROFESSIONAL COMMUNICATION **Paper Code:- THS-101**

Time - 3 Hrs + 20 minutes per hour extra time for V.I. & examinees with writer. **Max Marks-70**

समय– 3 घण्टे + 20 मिनट प्रति घंटे अतिरिक्त–दृष्टिबाधित 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 **3 mark. All questions are compulsory.**
- Section B- Answer any **5 out of 7** given questions in maximum one hundred fifty (150) words. Each question carries **7 marks.**
- Section C- Answer any **2 out of 3** given questions in maximum three hundred (300) words. Each question carries **10 marks.**

निर्देश:

- प्रश्न पत्र मे तीन खण्ड अ, ब, व स हैं। सभी खण्ड अनिवार्य हैं।
- खण्ड–अ मे प्रत्येक प्रश्न तीन अंक का है। **सभी प्रश्न अनिवार्य हैं।**
- खण्ड–ब में **सात प्रश्नों में से किन्हीं पाँच** प्रश्नों के उत्तर अधिकतम 150 शब्दों में दें। प्रत्येक प्रश्न **सात अंक** का है।
- खण्ड–स में **तीन प्रश्नों में से किन्हीं दो** प्रश्नों के उत्तर अधिकतम (250-300) शब्दों में दें। प्रत्येक प्रश्न **10 अंक** का है।

Section – A (खण्ड–अ)

Objective Questions (वस्तुनिष्ठ प्रश्न)

1. Answer all the following questions. **5x3 =15**

i) It's OK to use that phone, it's_____.
   a) me
   b) mine
   c) my
   d) their

ii) Phonetics refers to
   a) Paralinguistic features
   b) Sound production
   c) Intonation
   d) All of these

iii) Synonym of 'magnanimous'
   a) Greedy
   b) Generous
   c) Magnify
   d) Magnificent

iv) Which one is not a part of the 7c's?
   a) Clarity
   b) Courtesy
   c) Consideration
   d) Cliché

v) Taj Mahal is build of _____ marble.
   a) a
   b) an
   c) the
   d) no article

Section – B (खण्ड–ब)

Short Answer Questions (लघुउत्तरीय प्रश्न)

2. Answer any five of the following questions in maximum 150 words. **5x7=35**

निम्नलिखित में से किन्हीं पाँच प्रश्नों के उत्तर अधिकतम 150 शब्दों में दें।

i. What is the difference between Eutress and Distress? How it can affect the process of communication?

ii. Write 5 prefixes of (i) pre- (ii) non-
Write 5 suffixes of (i) -ism (ii) -ment

iii. What is proxemics? Explain.

iv. What is the difference between formal and informal communication?

v. What is the process of Communication? Explain its process and other details?

vi. What is a precis' and how is it different from an essay? Write the requisites of writing a good precis'.

vii. What is the process of word formation? Explain the process with examples - compounding HW Blending -> new words Back - by removing suffix & prefix

Section – C (खण्ड–स)

Descriptive Questions (विवरणात्मक प्रश्न)

3. Answer any two of the following question in maximum 300 words. **2x10=20**

निम्नलिखित मे से किन्हीं दो प्रश्नों के उत्तर अधिकतम 300 शब्दों में दें।

i) Read the following passage and answer the questions:

If India is the macrocosm that represents unity in diversity, Nagaland is the microcosm of that philosophy. A melting pot of different tribal culture and cuisines, Nagaland is place where primeval landscapes, ancient people can leave you floored. At the Hornbill Festival held from December 1 to 10 in the state capital Kohima. I discovered that the concept of *Athithi Devo Bhava-'Guest is God'*, came naturally to the Nagas, the indigenous people of the region.

The Hornbill Festival showcases a mélange of cultural displays under one roof, attracting visitors from across the world. It usually takes place in the first week of December at the Naga Heritage Village called Kisama, located 12 km from Kohima. The village gets its name from the two villages Kigwema (Ki) and Phesama (Sa), where the village is now established. The suffix 'Ma' means village. Seventeen major tribes including Ao, Angami, Chang, Konyak, Lotha, Sum and Chakhesang take part in the festival. Besides reviving and protecting the rich culture of Nagaland, it helps visitors have a closer understanding of the people and their culture.

According to Banuo Z Jamir, Nagaland's first woman chief secretary, the festival is named after the hornbill, the bird eulogized in Naga tribal folklore. "Hornbill is central to the Naga tradition, finding symbolic representation in their faith and costumes," She said.

For Nagas, the bird exudes qualities of nobility, beauty and bravery and because of its roar-like call, its strength is believed to equal that of a tiger which personifies the quintessential Naga warrior. It is also a symbol of fertility-reproduction and agriculture-and is perceived to possess social values similar to those of humans.

1. What is the philosophy being referred to?
2. Why Nagaland is considered a 'melting pot'?
3. The Hornbill Festival 'showcases a mélange of cultural displays under one roof'. Discuss this statement in the light of the passage.
4. What does the Hornbill represent to the Nagas?
5. Give a suitable title to the passage.

ii) Write an essay in around 250 words on the topic:
ENVOIRNMENT AND TECHNOLOGY: EXPLORING THE SUSTAINABLE DYNAMICS.

iii) What is Listening? Explain the process, barriers which hinder effective listening and the methods to improve listening.

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SEMESTER EXAMINATION DECEMBER-2023

Course Name: - B.Tech **Semester:- 1**

Paper Name: - Engineering Physics **Paper Code:- TBS101**

Time - 3 Hrs + 20 minutes per hour extra time for V.I. & examinees with writer. **Max Marks-70**

समय– 3 घण्टे + 20 मिनट प्रति घंटे अतिरिक्त–दृष्टिबाधित 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 **3 mark. All questions are compulsory.**
- Section B- Answer any **5 out of 7** given questions in maximum one hundred fifty (150) words. Each question carries **7 marks.**
- Section C- Answer any **2 out of 3** given questions in maximum three hundred (300) words. Each question carries **10 marks.**

निर्देश:

- प्रश्न पत्र मे तीन खण्ड अ, ब, व स हैं। सभी खण्ड अनिवार्य हैं।
- खण्ड–अ मे प्रत्येक प्रश्न तीन अंक का है। **सभी प्रश्न अनिवार्य हैं।**
- खण्ड–ब मे **सात प्रश्नों में से किन्हीं पाँच** प्रश्नो के उत्तर अधिकतम 150 शब्दों में दें। प्रत्येक प्रश्न **सात अंक** का है।
- खण्ड–स मे **तीन प्रश्नों में से किन्हीं दो** प्रश्नों के उत्तर अधिकतम (250-300) शब्दों में दें। प्रत्येक प्रश्न **10 अंक** का है।

Section – A (खण्ड–अ)

Objective Questions(वस्तुनिष्ठ प्रश्न)

1. Answer all the following questions. **5x3 =15**

निम्नलिखित सभी प्रश्न अनिवार्य हैं।

i) **As the speed of a particle approaches the speed of light, the mass of the particle-**

a) Increases

b) Decreases

c) Remains the same

d) Approaches Zero

ii) **In Young's double slit experiment if the slit separation is doubled. This result in**

a) An increase in fringe intensity

b) Decrease in fringe intensity

c) Fringe width will become half

d) Fringe width will become double

iii) **What happens to the de Broglie wavelength of an electron if its momentum is doubled?**

a) The wavelength decreased by a factor of 4

b) The wavelength increased by a factor of 4

c) The wavelength decreased by a factor of 2

d) The wavelength increased by a factor of 2

iv) **"A time-varying electric field produces magnetic field" This phenomenon is called-**

a) Gauss's Law

b) Kirchhoff Law

c) Hertz's Law

d) Ampere-Maxwell Law

v) **Which of the following is not a characteristic of LASERS?**

a) Coherent

b) Divergent

c) Monochromatic

d) Intense

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

2. Answer any five of the following questions in maximum 150 words. **5x7=35**
निम्नलिखित में से किन्हीं पाँच प्रश्नों के उत्तर अधिकतम 150 शब्दों में दें।

i. Discuss experimental evidence that shows time dilation is a real effect

ii. Give any five differences between interference and diffraction.

iii. Give the physical significance of wave function ψ.

iv. In Newton's ring experiment, the diameter of the 20th dark ring is 5.82 mm and the 10th ring is 3.36mm. If the radius of the plano convex lens is 1m, calculate the wavelength of light used.

v. Using the Heisenberg Uncertainty relation show that an electron cannot exist inside the nucleus.

vi. Give the Integral form of Maxwell's equation for EM waves and discuss its physical significance.

vii. Define the Acceptance angle and Numerical aperture and find expressions for them.

Section – C (खण्ड-स)
Descriptive Questions (विवरणात्मक प्रश्न)

3. Answer any two of the following question in maximum 300 words. **2x10=20**
निम्नलिखित में से किन्हीं दो प्रश्नों के उत्तर अधिकतम 300 शब्दों में दें।

i) Discuss Michelson Morley Experiment. Find Expression for fringe width in the Michelson Morley Experiment and discuss its consequences.

ii) How Laser light is dissimilar from ordinary light? Give construction and working of Ruby Laser with a neat energy level diagram. Give some applications of Laser Light.

iii) What do you understand by Pointing Vector? State and prove the Poynting theorem.

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SEMESTER EXAMINATION DECEMBER-2023

Course Name: - B.Tech **Semester:- 1**

Paper Name: - Engineering Physics **Paper Code:- TBS101**

Time - 3 Hrs + 20 minutes per hour extra time for V.I. & examinees with writer. **Max Marks-70**

समय– 3 घण्टे + 20 मिनट प्रति घंटे अतिरिक्त–दृष्टिबाधित एवं राइट 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 **3 mark. All questions are compulsory**.
- Section B- Answer any **5 out of 7** given questions in maximum one hundred fifty (150) words. Each question carries **7 marks**.
- Section C- Answer any **2 out of 3** given questions in maximum three hundred (300) words. Each question carries **10 marks**.

निर्देश:

- प्रश्न पत्र में तीन खण्ड अ, ब, व स हैं। सभी खण्ड अनिवार्य हैं।
- खण्ड–अ में प्रत्येक प्रश्न तीन अंक का है। **सभी प्रश्न अनिवार्य हैं।**
- खण्ड–ब में **सात प्रश्नों में से किन्हीं पाँच** प्रश्नों के उत्तर अधिकतम 150 शब्दों में दें। प्रत्येक प्रश्न **सात अंक** का है।
- खण्ड–स में **तीन प्रश्नों में से किन्हीं दो** प्रश्नों के उत्तर अधिकतम (250-300) शब्दों में दें। प्रत्येक प्रश्न **10 अंक** का है।

Section – A (खण्ड–अ)

Objective Questions (वस्तुनिष्ठ प्रश्न)

1. Answer all the following questions. **5x3 =15**
निम्नलिखित सभी प्रश्न अनिवार्य हैं।

i) As the speed of a particle approaches the speed of light, the mass of the particle-

a) Increases

b) Decreases

c) Remains the same

d) Approaches Zero

ii) In Young's double slit experiment if the slit separation is doubled. This result in

a) An increase in fringe intensity

b) Decrease in fringe intensity

c) Fringe width will become half

d) Fringe width will become double

iii) What happens to the de Broglie wavelength of an electron if its momentum is doubled?

a) The wavelength decreased by a factor of 4

b) The wavelength increased by a factor of 4

c) The wavelength decreased by a factor of 2

d) The wavelength increased by a factor of 2

iv) "A time-varying electric field produces magnetic field" This phenomenon is called-

a) Gauss's Law

b) Kirchhoff Law

c) Hertz's Law

d) Ampere-Maxwell Law

v) Which of the following is not a characteristic of LASERS?

a) Coherent

b) Divergent

c) Monochromatic

d) Intense

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

2. Answer any five of the following questions in maximum 150 words. 5x7=35

निम्नलिखित में से किन्हीं पाँच प्रश्नों के उत्तर अधिकतम 150 शब्दों में दें।

i. Discuss experimental evidence that shows time dilation is a real effect

ii. Give any five differences between interference and diffraction.

iii. Give the physical significance of wave function ψ.

iv. In Newton's ring experiment, the diameter of the 20th dark ring is 5.82 mm and the 10th ring is 3.36mm. If the radius of the plano convex lens is 1m, calculate the wavelength of light used.

v. Using the Heisenberg Uncertainty relation show that an electron cannot exist inside the nucleus.

vi. Give the Integral form of Maxwell's equation for EM waves and discuss its physical significance.

vii. Define the Acceptance angle and Numerical aperture and find expressions for them.

Section – C (खण्ड-स)
Descriptive Questions (विवरणात्मक प्रश्न)

3. Answer any two of the following question in maximum 300 words. 2x10=20

निम्नलिखित में से किन्हीं दो प्रश्नों के उत्तर अधिकतम 300 शब्दों में दें।

i) Discuss Michelson Morley Experiment. Find Expression for fringe width in the Michelson Morley Experiment and discuss its consequences.

ii) How Laser light is dissimilar from ordinary light? Give construction and working of Ruby Laser with a neat energy level diagram. Give some applications of Laser Light.

iii) What do you understand by Pointing Vector? State and prove the Poynting theorem.

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SEMESTER EXAMINATION DECEMBER-2023

Course Name: - B.Tech **Semester:- 1st**

Paper Name: - Energy Science & Engineering **Paper Code:- TMC-102**

Time - 3 Hrs + 20 minutes per hour extra time for V.I. & examinees with writer. **Max Marks-70**

समय–3 घण्टे+ 20 मिनट प्रति घंटे अतिरिक्त–दृष्टिबाधित एवं राइटर 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 **3 mark. All questions are compulsory.**
- Section B- Answer any **5 out of 7** given questions in maximum one hundred fifty (150) words. Each question carries **7 marks.**
- SectionC- Answer any **2 out of 3** given questions in maximum three hundred (300) words. Each question carries **10 marks.**

निर्देश:

- प्रश्न पत्र में तीन खण्ड अ, ब, व स हैं। सभी खण्ड अनिवार्य हैं।
- खण्ड–अ में प्रत्येक प्रश्न तीन अंक का है। **सभी प्रश्न अनिवार्य हैं।**
- खण्ड–ब में सात प्रश्नों में से किन्हीं पाँच प्रश्नों के उत्तर अधिकतम 150 शब्दों में दें। प्रत्येक प्रश्न सात अंक का है।
- खण्ड–स में तीन प्रश्नों में से किन्हीं दो प्रश्नों के उत्तर अधिकतम (250-300) शब्दों में दें। प्रत्येक प्रश्न **10** अंक का है

Section – A (खण्ड–अ)

Objective Questions(वस्तुनिष्ठ प्रश्न)

1. Answer allthe following questions. 5x3 =15

निम्नलिखित सभी प्रश्न अनिवार्य हैं।

i) In ocean energy which of the following chemical/component act as fluid?
   a) Ammonia
   b) Mercury
   c) Water
   d) Propane

ii) What is Carbon sequestration?
   a) The process of converting carbon dioxide into oxygen
   b) The process of releasing carbon dioxide
   c) The process of capturing and storing carbon dioxide
   d) The process of using carbon dioxide to produce energy

iii) The less insolation occurs when the sun is _____
   a) At night
   b) Low in the sky
   c) High in the sky
   d) None of the above

iv) Which type of solar cell gives the highest efficiency?
   a) Monocrystalline
   b) Polycrystalline germanium
   c) Thin film
   d) Amorphous

v) Light water reactors (LWR) are nuclear reactors
   a) Which use heavy water as a coolant
   b) Which use graphite rod as moderator.
   c) Which use steam as moderator.
   d) Which use ordinary water as moderator

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

2. Answer any five of the following questions in maximum150 words. **5x7=35**
निम्नलिखित में से किन्ही पाँच प्रश्नों के उत्तर अधिकतम 150 शब्दों में दें।

i. What is the current Energy scenario in India? Explain in Brief.

ii. Explain the different biomass conversion process.

iii. What do you understand by the Carbon credit and Carbon reduction emission(CER) certificate?

iv. Give general layout and working of Francis, Kaplan and Pelton types of turbines.

v. Outline the working principle of the tidal power plant. Discuss their advantages and limitations.

vi. Calculate Local Apparent time corresponding to 16:00 hours Indian standard time on 10th June, a location Ahmedabad (72.5714 E longitude). Also calculate the hour angle for the same. Take EOT=1.15 and Standard time longitude for IST is 82.5° E.

vii. What do you understand by LEED certification in green building concept?

Section – C (खण्ड–स)
Descriptive Questions (विवरणात्मक प्रश्न)

3. Answer any two of the following question in maximum 300 words. **2x10=20**
निम्नलिखित में से किन्हीं दो प्रश्नों के उत्तर अधिकतम 300 शब्दों में दें।

i) Explain the advantages and disadvantage of the Surface mines and underground mines.

ii) Illustrate the concept of nuclear fission. Explain PWR and fast neutron type of fission reactor.

iii) What are the concepts behind the construction of a Green building?

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SEMESTER END EXAMINATION, MAY, 2024

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

Paper Name: - Engineering Physics **Paper Code:- TBS 201**

Time - 3 Hrs + 20 minutes per hour extra time for V.I. & examinees with writer. **Max Marks-70**

समय–3 घण्टे+ 20 मिनट प्रति घंटे अतिरिक्त–दृष्टि बाधित 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 3 mark. **All questions are compulsory.**
- Section B- Answer any **5 out of 7** given questions in maximum one hundred fifty (150) words. Each question carries **7 marks.**
- SectionC- Answer any **2 out of 3** given questions in maximum three hundred (300) words. Each question carries **10 marks.**

निर्देश:

- प्रश्न पत्र मे तीन खण्ड अ, ब, स है।सभी खण्ड अनिवार्य हैं।
- खण्ड–अ मे प्रत्येक प्रश्न तीन अंक का है।**सभी प्रश्न अनिवार्य हैं।**
- खण्ड–ब मे **सात प्रश्नों में से किन्हीं पाँच** प्रश्नों के उत्तर अधिकतम 150 शब्दों में दें। प्रत्येक प्रश्न **सात अंक** का है।
- खण्ड–स मे **तीन प्रश्नों में से किन्हीं दो** प्रश्नों के उत्तर अधिकतम (250-300) शब्दोंमेंदें। प्रत्येक प्रश्न **10 अंक** का है।

Section - A (खण्ड–अ)

Objective Questions(वस्तुनिष्ठप्रश्न)

1. Answer allthe following questions. **5x3 =15**

निम्नलिखित सभी प्रश्न अनिवार्य है।

i) A particle of rest mass m_0 moves with speed $c/\sqrt{2}$. Its momentum will be:

(a) $m_0c/\sqrt{2}$

(b) m_0c

(c) 0

(d) ∞

ii) Michelson-Morley experiment showed that:

(a) Newtonian Mechanics is correct for all low and high velocities.

(b) There is an absolute ether frame.

(c) There is no absolute ether frame, but all frame are relative.

(d) Velocity of light is relative in all cases.

iii) The Young's experiment established that

(a) Light consists of waves

(b) Light consists of particles

(c) Light is neither wave nor particle

(d) Light is both wave and particle

iv) The Maxwell's equation $\oint \vec{E}.\vec{dl} = -\oint \frac{\partial \vec{B}}{\partial t}.\vec{ds}$ is a statement of

(a) Gauss's Law

(b) Ampere's Law

(c) Faraday's Law

(d) Modified Ampere's Law

v) If the Kinetic energy of a particle is doubled, then its de-Broglie wavelength:

(a) 2 times

(b) $\frac{1}{2}$ times

(c) $\sqrt{2}$ times

(d) $\frac{1}{\sqrt{2}}$ times

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

2. Answer any five of the following questions in maximum 150 words. **5x7=35**

निम्नलिखित में से किन्हीं पाँच प्रश्नों के उत्तर अधिकतम 150 शब्दो में दें।

i. Deduce the relativistic velocity addition theorem. Show that it is consistent with Einstein's second postulate.

ii. Derive the formula $E^2=p^2c^2 + m_0^2c^4$, where symbol's have their usual meanings.

iii. State Heisenberg uncertainty relation. Using Heisenberg uncertainty relation find an expression for Bohr's radius of atomic orbit.

iv. What do you understand by orthogonality condition, normality condition, probability function and expectation value of wave function ψ? Find an expression for total energy and momentum operator.

v. How Laser Light is dissimilar with ordinary light? Give any 5 applications of Laser Light.

vi. Give differential form of Maxwell's equation of EM waves. Show that EM waves in free space moves with speed of light.

vii. Discuss Newton's ring experiment. Using Newton's ring experiment how can we determine the refractive index of a given liquid?

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

3. Answer any two of the following question in maximum 300 words. **2x10=20**

निम्नलिखित में से किन्हीं दो प्रश्नों के उत्तर अधिकतम 300 शब्दों में दें।

i) Describe Fraunhofer diffraction due to single slit and deduce the position of Maxima and minima. Show that the relative Intensities of successive maxima are nearly $1:\frac{4}{9\pi^2}:\frac{4}{25\pi^2}:\frac{4}{49\pi^2}:\cdots\cdots$

ii) Show that the Electromagnetic waves are transverse in nature. Also find an expression for the impedance of Electromagnetic waves.

iii) What do you understand by induced absorption, spontaneous emission and stimulated emission? Give construction and working of He-Ne Laser with neat energy level diagram.

SEMESTER EXAMINATION DECEMBER-2023

Course Name: - B.Tech (CSE/CE) **Semester: - Ist**

Paper Name: - Manufacturing Process **Paper Code: - TES-104**

Time - 3 Hrs + 20 minutes per hour extra time for V.I. & examinees with writer. **Max Marks-70**

समय– 3 घण्टे + 20 मिनट प्रति घंटे अतिरिक्त–दृष्टिबाधित 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 **3 mark**. **All questions are compulsory**.
- Section B- Answer any **5 out of 7** given questions in maximum one hundred fifty (150) words. Each question carries **7 marks**.
- Section C- Answer any **2 out of 3** given questions in maximum three hundred (300) words. Each question carries **10 marks**.

निर्देश:

- प्रश्न पत्र में तीन खण्ड अ, ब, व स हैं। सभी खण्ड अनिवार्य हैं।
- खण्ड–अ में प्रत्येक प्रश्न तीन अंक का है। **सभी प्रश्न अनिवार्य हैं।**
- खण्ड–ब में **सात प्रश्नों** में से किन्हीं **पाँच** प्रश्नों के उत्तर अधिकतम 150 शब्दों में दें। प्रत्येक प्रश्न **सात अंक** का है।
- खण्ड–स में **तीन प्रश्नों में से किन्हीं दो** प्रश्नों के उत्तर अधिकतम (250-300) शब्दों में दें। प्रत्येक प्रश्न **10 अंक** का है।

Section – A (खण्ड–अ)

Objective Questions(वस्तुनिष्ठ प्रश्न)

1. Answer all the following questions. **5x3 =15**

निम्नलिखित सभी प्रश्न अनिवार्य हैं।

i) Brass is an alloy of-

a) copper and zinc
b) tin and zinc
c) copper and tin
d) copper and Al.

ii) A "die" is used in-

a) casting process
b) extrusion process
c) forging process
d) all of these.

iii) What is 'swing' of a centre lathe?

a) It is the length of the bed
b) It denotes the diameter of the job being machined
c) It is the length of cross slide movement
d) None of these.

iv) For machining a mild steel work piece using carbide tool, the maximum material will be removed at a temperature of-

a) 50°C
b) 100°C
c) 175°C
d) 275°C

v) Thermit welding is a form of-

a) fusion welding
b) gas welding
c) arc welding
d) resistance welding

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

2. Answer any five of the following questions in maximum 150 words. **5x7=35**
निम्नलिखित में से किन्हीं पाँच प्रश्नों के उत्तर अधिकतम 150 शब्दों में दें।

i) Draw stress-strain curve for a ductile material and brittle material. Describe all the terms of both curve.

ii) Define the following terms:
(*i*) Stiffness, (*ii*) Toughness, (*iii*) Hardness, (*iv*) Creep, and (*v*) Fatigue

iii) What is steel? How is it different from iron? Differentiate between plain carbon steels and alloy steels.

iv) Describe hot working and cold working with their advantage and Disadvantage.

v) Describe different types of welding joints and welding positions with neat sketch.

vi) What do you understand by the term 'Pattern'? Describe pattern allowances and their types.

vii) Define the term 'Machining' and also classify machining process. Describe machine tool and their types.

Section – C (खण्ड–स)
Descriptive Questions (विवरणात्मक प्रश्न)

3. Answer any two of the following question in maximum 300 words. **2x10=20**
निम्नलिखित में से किन्हीं दो प्रश्नों के उत्तर अधिकतम 300 शब्दों में दें।

i) Describe Construction of lathe machine with neat sketch. Write different operations that can perform on lathe machine.

ii) Define casting and explain the term used in casting with neat sketch. Write advantage and application of casting.

iii) Explain soldering and brazing methods with neat sketch. Also write seven difference between soldering and brazing methods.

SEMESTER EXAMINATION DECEMBER-2023

Course Name: - B.TECH **Semester:- I**

Paper Name: - Programming for Problem Solving **Paper Code:- TES-101**

Time - 3 Hrs + 20 minutes per hour extra time for V.I. & examinees with writer. **Max Marks-70**

समय– 3 घण्टे + 20 मिनट प्रति घंटे अतिरिक्त–दृष्टिबाधित 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 **3 mark. All questions are compulsory.**
- Section B- Answer any **5 out of 7** given questions in maximum one hundred fifty (150) words. Each question carries **7 marks.**
- Section C- Answer any **2 out of 3** given questions in maximum three hundred (300) words. Each question carries **10 marks.**

निर्देश:

- प्रश्न पत्र में तीन खण्ड अ, ब, व स हैं। सभी खण्ड अनिवार्य हैं।
- खण्ड–अ में प्रत्येक प्रश्न तीन अंक का है। **सभी प्रश्न अनिवार्य हैं।**
- खण्ड–ब में **सात प्रश्नों में से किन्हीं पाँच** प्रश्नों के उत्तर अधिकतम 150 शब्दों में दें। प्रत्येक प्रश्न **सात अंक** का है।
- खण्ड–स में **तीन प्रश्नों में से किन्हीं दो** प्रश्नों के उत्तर अधिकतम (250-300) शब्दों में दें। प्रत्येक प्रश्न **10 अंक** का है।

Section – A (खण्ड–अ)

Objective Questions (वस्तुनिष्ठ प्रश्न)

1. Answer all the following questions. 5x3 =15

(i) C language was invented in which laboratories.

(a) Uniliver Labs
(b) IBM Labs
(c) AT&T Bell Labs
(d) Verizon Labs

(ii) **An Identifier can start with.?**

(a) Alphabet

(b) Underscore (_) sign

(c) Any character that can be typed on a keyboard

(d) Option A & Option B

(iii) What is the default C Storage Class for a variable.?

(a) static

(b) auto

(c) register

(d) extern

(iv) What is the priority of operators *, / and % in C language.?

(a) * > / > %

(b) % > * > /

(c) Both % = / , * are same

(d) All three operators *, / and % are same.

(v).A function which calls itself is called a ___ function.

(a) Self Function

(b) Auto Function

(c) Recursive Function

(d) Static Function

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

2. Answer any five of the following questions in maximum 150 words. **5x7=35**
निम्नलिखित में से किन्हीं पाँच प्रश्नों के उत्तर अधिकतम 150 शब्दों में दें।

(i) .Write a program to find Factorial of a number?

(ii). What is the difference between Compiler and Interpreter and also explain the concept of assembler?

(iii). Explain Data Types in C?

(iv).What do you mean by array? Explain the types , advantages and Limitations of Array?

(v).Write short notes on Storage class in c ?

(vi).Write Difference between the For ,While and do-While loop .?

(vii).Explain headers files in c ?

Section – C (खण्ड–स)
Descriptive Questions (विवरणात्मक प्रश्न)

3. Answer any two of the following question in maximum 300 words. **2x10=20**
निम्नलिखित में से किन्हीं दो प्रश्नों के उत्तर अधिकतम 300 शब्दों में दें।

(i).Explain the concept of pointers?

(ii).Explain the concept of Flow chart and symbol used in flow chart? Also draw the flow chart to check the number is positive or negative.

iii).Explain dynamic memory allocation concept with proper example.

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SEMESTER END EXAMINATION, MAY, 2024

Course Name: - B.Tech. (C.S.E. +C.E.) Semester: - II[nd]

Paper Name: - Fundamentals of Electronics Engineering Paper Code: - TES-205

Time - 3 Hrs + 20 minutes per hour extra time for V.I. & examinees with writer. Max Marks-70

समय– 3 घण्टे + 20 मिनट प्रति घंटे अतिरिक्त–दृष्टिबाधित 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 3 mark. **All questions are compulsory.**
- Section B- Answer any **5 out of 7** given questions in maximum one hundred fifty (150) words. Each question carries **7 marks.**
- Section C- Answer any **2 out of 3** given questions in maximum three hundred (300) words. Each question carries **10 marks.**

निर्देश:

- प्रश्न पत्र में तीन खण्ड अ, ब, व स है। सभी खण्ड अनिवार्य हैं।
- खण्ड–अ में प्रत्येक प्रश्न तीन अंक का है। **सभी प्रश्न अनिवार्य हैं।**
- खण्ड–ब में **सात प्रश्नों में से किन्हीं पाँच** प्रश्नो के उत्तर अधिकतम 150 शब्दो में दें। प्रत्येक प्रश्न सात अंक का है।
- खण्ड–स में **तीन प्रश्नों में से किन्हीं दो** प्रश्नो के उत्तर अधिकतम (250-300) शब्दो में दें। प्रत्येक प्रश्न **10** अंक का है।

Section – A (खण्ड–अ)

Objective Questions (वस्तुनिष्ठ प्रश्न)

1. Answer all the following questions. 5x3 =15

निम्नलिखित सभी प्रश्न अनिवार्य हैं।

i) **What is the primary advantage of using Gallium Arsenide (GaAs) over Silicon (Si) in certain applications?**

A) Lower cost
B) Higher electron mobility
C) Greater abundance
D) Easier fabrication

ii) **Which of the following materials is commonly used as an insulator in semiconductor devices?**

A) Silicon (Si)
B) Germanium (Ge)
C) Gallium Arsenide (GaAs)
D) Silicon Dioxide (SiO_2)

iii) **Which of the following is not a characteristic of a Zener diode?**

A) Operates in reverse breakdown region
B) Designed to have a specific breakdown voltage
C) Used primarily in rectifier circuits
D) Has a sharp breakdown voltage

iv) **Which of the following regions in a BJT is responsible for its amplification properties?**

A) Cut-off region
B) Saturation region
C) Active region
D) Breakdown region

v) **Which terminal of a BJT is typically used to control the device operation?**

A) Collector
B) Emitter
C) Base
D) Substrate

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

2. **Answer any five of the following questions in maximum 150 words.** 5x7=35
निम्नलिखित में से किन्ही पाँच प्रश्नों के उत्तर अधिकतम 150 शब्दों में दें।

i. Write down properties and applications of Silicon (Si) as a semiconductor material?
ii. What factors influence the electrical resistivity of a semiconductor material?
iii. Explain the principle of operation of a junction diode in reverse bias with its circuit diagram and VI characteristics?
iv. Describe the Clipper, clamper with its types in electronic circuits?
v. Explain the function of the base terminal in a BJT?
vi. What is primary advantage of the using a MOSFET over a JFET?
vii. What is reason behind manufacturer mostly prefer n-type Silicon semiconductor? Write down Einstein relationship between mobility and diffusion constant?

Section - C (खण्ड–स)
Descriptive Questions (विवरणात्मक प्रश्न)

3. **Answer any two of the following question in maximum 300 words.** 2x10=20
निम्नलिखित में से किन्हीं दो प्रश्नों के उत्तर अधिकतम 300 शब्दों में दें।

i) a) What is base in binary number system? Draw and explain the truth table, symbols of AND, OR and NOT and draw its diode and transistor circuit?

b) A piece of silicon at room temperature is doped with $8x10^{16}/cm^3$ Concentration of boron atoms and $20x10^{15}/cm^3$ of phosphorous atoms.

(a) Find the hole & electron concentration in this material?

(b) Is the silicon p or n type?

ii) (a) Write down about Conduction Band, Valence Band, Energy band gap, Diffusion, Concentration gradient, Doping, Mobility, drift velocity, Depletion width and Potential barrier?

(b) Write down about a diode mechanism, draw and Draw forward and reverse Voltage-current characteristics and its applications? Also write diode equations?

iii) (a) Write down about Hall Effect and its applications? Define charge neutrality principle?

(b) What do you understand about semiconductor, explain advantage and disadvantage of semiconductor? Classify it's based on conductivity and energy band gap with suitable example?

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SEMESTER END EXAMINATION, MAY, 2024

Course Name: - B.Tech Semester:- 2nd

Paper Name: - Energy Science & Engineering Paper Code:- TMC-202

Time - 3 Hrs + 20 minutes per hour extra time for V.I. & examinees with writer. Max Marks-70

समय–3 घण्टे+ 20 मिनट प्रति घंटे अतिरिक्त–दृष्टिबाधित एवं सहलेखक 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 **3 mark. All questions are compulsory.**
- Section B- Answer any **5 out of 7** given questions in maximum one hundred fifty (150) words. Each question carries **7 marks.**
- SectionC- Answer any **2 out of 3** given questions in maximum three hundred (300) words. Each question carries **10 marks.**

निर्देश:

- प्रश्न पत्र मे तीन खण्ड अ, ब, व स है।सभी खण्डअनिवार्यहै।
- खण्ड–अ मे प्रत्येक प्रश्न तीन अंक का है। सभी प्रश्न अनिवार्य है।
- खण्ड–ब मे सात प्रश्नों में से किन्ही पाँच प्रश्नो के उत्तर अधिकतम 150 शब्दो मे दे। प्रत्येक प्रश्न सात अंक का है।
- खण्ड–स मे तीन प्रश्नोंमें से किन्हीं दो प्रश्नो के उत्तर अधिकतम (300) शब्दो मे दे। प्रत्येक प्रश्न 10 अंक का है।

Section - A (खण्ड–अ)

Objective Questions(वस्तुनिष्ठप्रश्न)

1. Answer allthe following questions. 5x3 =15

निम्नलिखित सभी प्रश्न अनिवार्य हैं।

i) _____ is made by combining alcohol with vegetable oil, animal fat or recycled cooking grease.

(a) Biodiesel (b) Biomass

(c) Bioelectricity (d) Syngas

ii) Angle made by plane surface with horizontal is called _____

(a) Altitude angle (b) Slope

(c) Zenith angle (d) Hour Angle

iii) Which is the type of energy where the energy is harnessed by the heat accumulated on the surface of water?

(a) Wind energy (b) Wave energy Industrial waste

(c) Ocean thermal energy conversion (d) Solar energy

iv) Which parts function is to reduce the energy of fast neutrons to thermal neutrons in nuclear power plant?

(a) Shielding (b) Coolant

(c) Control rods (d) Moderator

v) GRIHA means that

(a) Green Rating for Indian Habitat Assessment

(b) Green Rating for Integrated Habitat Assessment

(c) Green Rating for International Habitat Assessment

(d) Green Rating for Information Habitat Assessment

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

2. Answer any five of the following questions in maximum150 words. **5x7=35**
निम्नलिखित में से किन्हीं पाँच प्रश्नों के उत्तर अधिकतम 150 शब्दों में दें।

i. Classify the different forms of renewable and non-renewable forms of energy.

ii. Give in detail about the Present energy scenario of India.

iii. Explain the different types of OTEC plant.

iv. Explain the structural difference and application between the Pelton, Francis and Kaplan turbine.

v. What is the local solar time and declination corresponding to 10:00 am IST on Feb 8 for location India at 87.5° east longitude, with the given Equation of Time correction=(-14.37) min and Standard time longitude for IST is 82.5°E.

vi. Discuss in brief about Energy storage system.

vii. What do you understand by Net Zero Concept building, Near Zero Energy Building and Energy Plus Building?

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

3. Answer any two of the following question in maximum 300 words. **2x10=20**
निम्नलिखित में से किन्हीं दो प्रश्नों के उत्तर अधिकतम 300 शब्दों में दें।

i) What do you understand by Carbon credit? Explain its importance in environment also discuss its advantages and disadvantages.

ii) Explain the working of the Pressurized water nuclear reactor and Pressurized heavy water nuclear reactor.

iii) Discuss the advantages and disadvantages of opencast and underground mining.

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SEMESTER END EXAMINATION, MAY, 2024

Course Name: - B.Tech **Semester:- 2nd**

Paper Name: - Environmental Science **Paper Code:- TMC-201**

Time - 3 Hrs + 20 minutes per hour extra time for V.I. & examinees with writer. **Max Marks-70**

समय–3 घण्टे+ 20 मिनट प्रति घंटे अतिरिक्त–दृष्टिबाधित एवं राहलेखक 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 **3 mark. All questions are compulsory.**
- Section B- Answer any **5 out of 7** given questions in maximum one hundred fifty (150) words. Each question carries **7 marks.**
- SectionC- Answer any **2 out of 3** given questions in maximum three hundred (300) words. Each question carries **10 marks.**

निर्देश:

- प्रश्न पत्र में तीन खण्ड अ, ब, व स हैं। सभी खण्ड अनिवार्य हैं।
- खण्ड–अ में प्रत्येक प्रश्न तीन अंक का है। सभी प्रश्न अनिवार्य हैं।
- खण्ड–बमे सात प्रश्नों में से किन्हीं पाँच प्रश्नों के उत्तर अधिकतम 150 शब्दों में दें। प्रत्येक प्रश्न सात अंक का है।
- खण्ड–स में तीन प्रश्नों में से किन्हीं दो प्रश्नों के उत्तर अधिकतम (300) शब्दों में दें। प्रत्येक प्रश्न **10** अंक का है।

Section – A (खण्ड–अ)

Objective Questions (वस्तुनिष्ठप्रश्न)

1. Answer allthe following questions. 5x3 =15

निम्नलिखित सभी प्रश्न अनिवार्य हैं।

i) The estimated percentage of the forest land that ideally India should have is:

(a) 50% (b) 15%

(c) 33% (d) 44%

ii) Brackish water ecosystems are found in which of the following:

(a) Streams (b) Wetlands

(c) Coastal shallows (d) Deltas

iii) What phenomenon occurs due to the accumulation of certain pollutants that increase in concentration along the food chain?

(a) Bio-magnification (b) Eutrophication

(c) Extinction (d) Pollution

iv) Which of the following is a secondary treatment for water pollution?

(a) Sedimentation (b) By the action of microbes

(c) Removal of nitrates (d) Filtration

v) Air pollution and control act came into force on

(a) 1980 (b) 1981

(c) 1972 (d) 1986

Section - B (खण्ड–ब)

Short Answer Questions (लघुउत्तरीय प्रश्न)

2. Answer any five of the following questions in maximum150 words. **5x7=35**
निम्नलिखित में से किन्हीं पाँच प्रश्नों के उत्तर अधिकतम 150 शब्दों में दें।

i. What are the different types of Natural Resources? Explain the associated problem with it and the conservation methods.

ii. Discuss the composition and formation of soil.

iii. Describe in brief the structure and function of an Ecosystem.

iv. What is Biodiversity? Discuss the different types and scales of Biodiversity.

v. Give in detail about the Sulphur and Phosphorus cycle.

vi. Describe the process of ozone construction and destruction.

vii. What is a Greenhouse gas? Discuss the advantages and disadvantages of Green house gases.

Section - C (खण्ड–स)

Descriptive Questions (विवरणात्मकप्रश्न)

3. Answer any two of the following question in maximum 300 words. **2x10=20**
निम्नलिखित में से किन्हीं दो प्रश्नों के उत्तर अधिकतम 300 शब्दों में दें।

i) What are the objectives, functions and powers of Wildlife Protection Act.

ii) Discuss in brief about the Project Tiger.

iii) Explain the waste water treatment method in detail.

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SEMESTER END EXAMINATION, MAY, 2024

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

Paper Name: - Basic Electrical Engineering **Paper Code: - TES 202**

Time - 3 Hrs + 20 minutes per hour extra time for V.I. & examinees with writer. **Max Marks-70**

समय– 3 घण्टे + 20 मिनट प्रति घंटे अतिरिक्त–दृष्टिबाधित एवं साह 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 **3 mark. All questions are compulsory.**
- Section B- Answer any **5 out of 7** given questions in maximum one hundred fifty (150) words. Each question carries **7 marks.**
- Section C- Answer any **2 out of 3** given questions in maximum three hundred (300) words. Each question carries **10 marks.**

निर्देश:

- प्रश्न पत्र मे तीन खण्ड अ, ब, स है। सभी खण्ड अनिवार्य हैं।
- खण्ड–अ मे प्रत्येक प्रश्न तीन अंक का है। **सभी प्रश्न अनिवार्य हैं।**
- खण्ड–ब मे **सात प्रश्नों में से** किन्हीं पाँच प्रश्नों के उत्तर अधिकतम 150 शब्दों में दें। प्रत्येक प्रश्न **सात अंक** का है।
- खण्ड–स मे **तीन प्रश्नों में से** किन्हीं दो प्रश्नों के उत्तर अधिकतम (250-300) शब्दों में दें। प्रत्येक प्रश्न **10 अंक** का है।

Section – A (खण्ड–अ)

Objective Questions (वस्तुनिष्ठ प्रश्न)

1. Answer all the following questions. **5x3 =15**

निम्नलिखित सभी प्रश्न अनिवार्य हैं।

i) Mesh analysis employs the method of KVL

a. KVL
b. KCL
c. Both KVL and KCL
d. Neither KCL nor KVL

ii) Which of the following is a correct representation of peak value in an AC Circuit?

a. RMS value / Peak factor
b. RMS value × Form factor
c. RMS value / Form factor
d. RMS value × Peak factor

iii) Which of the following conditions are desired in the core of an electromagnet?

a. High permeability and High retentivity
b. Low permeability and High retentivity
c. High permeability and Low retentivity
d. Low permeability and Low retentivity

iv) The current drawn by the armature of DC motor is directly proportional to _____

a. Torque
b. Speed
c. The voltage across the terminals
d. Cannot be determined

v) Earthing switch is used for

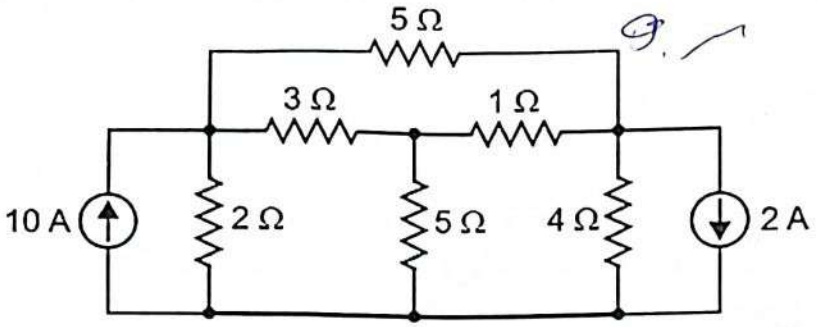
a. protection of equipment from ground faults
b. discharging residual energies

c. All of these
d. measuring of safety voltage

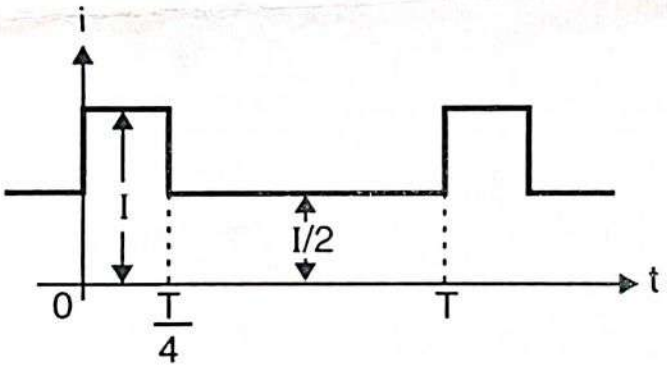
Section – B (खण्ड–ब)
Short Answer Questions (लघुउत्तरीय प्रश्न)

2. Answer any five of the following questions in maximum 150 words. **5x7=35**
निम्नलिखित में से किन्हीं पाँच प्रश्नों के उत्तर अधिकतम 150 शब्दों में दें।

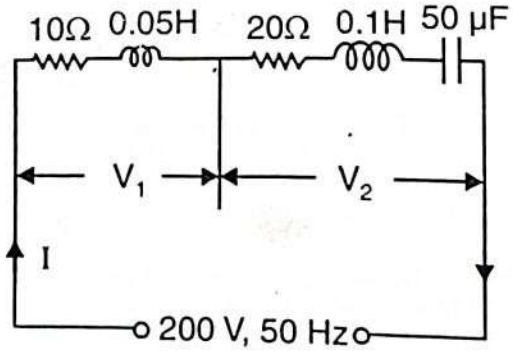
i. Use nodal analysis to find the currents in various resistors of the circuit shown in Fig.



ii. Determine (i) the average value and (ii) r.m.s. value of the current wave shown in Fig.



iii. In the circuit shown in figure (i), find the values of (i) the current I (ii) V_1 and V_2 and (iii) power factor. Draw the phasor diagram



iv. A series RLC circuit has R = 5 W, L = 0.2 H and C = 50 μF. The applied voltage is 200 V. Find, (i) resonant frequency (ii) Q-factor (iii) bandwidth (iv) upper and lower half-power frequencies (v) current at resonance (vi) current at half-power points (vii) voltage across inductance at resonance.

v. Differentiate the properties of diamagnetic, paramagnetic, and ferromagnetic substances. Also explain the B-H hysteresis curve point by point with proper figure.

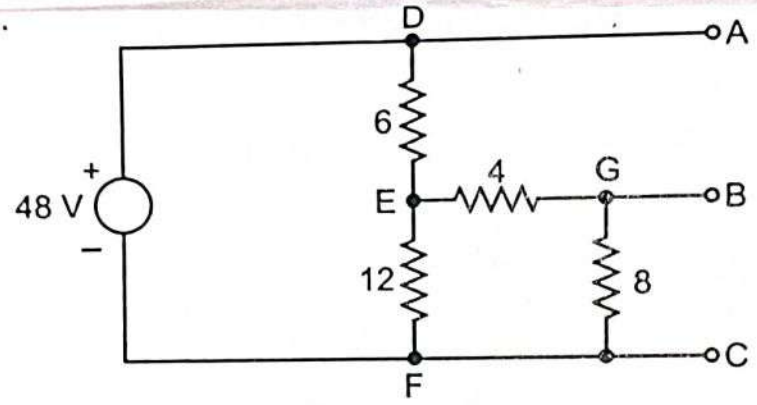
vi. Explain the equivalent circuit of a transformer in a condition when the secondary circuit is referred to as the primary. Also, explain the concept of leakage reactance and the Shunt branch.

vii. What is Circuit Breaker? Describe Earth leakage circuit's breakers (ELCB) in respect of working principle, operation, and advantages.

Section – C (खण्ड–स)
Descriptive Questions (विवरणात्मक प्रश्न)

3. Answer any two of the following question in maximum 300 words. **2x10=20**
निम्नलिखित में से किन्हीं दो प्रश्नों के उत्तर अधिकतम 300 शब्दों में दें।

i) Calculate the values of V_{Th} and R_{Th} between terminals A and B in Fig. All resistances are in ohms.



ii) A 3-phase, 400 V, 50 Hz a.c. supply is feeding a 3-phase delta-connected load with each phase having a resistance of 25 W, an inductance of 0.15 H and a capacitor of 120 μF in series. Find line current, volt-amp, active power and reactive volt-amp.

iii) Explain the function of all parts of DC machine. Also, explain how a DC machine works and derive an equation for EMF in a DC machine.