

Priatal Sir

**DEPARTMENT OF CSE(AI) ENGINEERING**  
UNIVERSITY INSTITUTE OF ENGINEERING AND TECHNOLOGY, CSJM UNIVERSITY,  
KANPUR

Physics (PHY-S101)

Semester: 2022-23 (Odd Semester).

Year: Ist Year (2K22)

1<sup>st</sup> Mid Semester Examination

Time: 1.5 h

Maximum mark: 30

All questions are compulsory

**Section A**

Each question has 01 mark.

1. The Curl of the gradient of Scalar Function is \_\_\_\_\_.
2. The divergence of the curl of a vector function is \_\_\_\_\_.
3. Solenoidal field is characterised by zero \_\_\_\_\_.
4. A solenoidal Vector can always be expressed as the \_\_\_\_\_ of another vector.
5. The dot product of two vectors is a \_\_\_\_\_.
6. Cross product of two vectors is \_\_\_\_\_.
7. If  $|\vec{A} + \vec{B}| = |\vec{A} - \vec{B}|$ , Angle between  $\vec{A}$  and  $\vec{B}$  will be \_\_\_\_\_.
8. If  $|\vec{A} \times \vec{B}| = \vec{A} \cdot \vec{B}$ , Angle between  $\vec{A}$  and  $\vec{B}$  will be \_\_\_\_\_.
9. If  $\vec{\nabla} \cdot \vec{A} = 0$ , then  $\vec{A}$  is, (i) solenoid (ii) vector (iii) both (iv) none

**Section B**

Each question have 03 marks.

10. The vector  $\vec{A}$  makes equal angle with coordinate axis. Its magnitude is  $\sqrt{3}$  units, obtain its Cartesian components.
11. If  $\phi(x, y, z) = x^2yz - 4xyz^2$ , find max value of directional derivative of  $\phi(x, y, z)$  at point (1, 3, 1) in direction,  $2\hat{i} - \hat{j} - 2\hat{k}$ .
12. If  $\alpha, \beta$  be the direction cosine of a vector with respect to X and Y axis and if C is its components. Find the magnitude of the vector.

**Section C**

Each question have 06 marks.

Each question have 06 marks. Attempt any one.

13. Define vector  $\vec{A} = (x + 2y + az)\hat{i} + (bx - 3y - z)\hat{j} + (4x + cy + 2z)\hat{k}$  is rotational or irrotational. If it rotational, Find the value of constant a, b and c.
14. If  $\vec{A} = (2x^2y - x^4)\hat{i} + (e^{xy} - y \sin x)\hat{j} + (x^4 \cos y)\hat{k}$ , Find-  
(a)  $\frac{\partial \vec{A}}{\partial x}$     (b)  $\frac{\partial \vec{A}}{\partial y}$     (c)  $\frac{\partial \vec{A}}{\partial z}$     (d)  $\frac{\partial^2 \vec{A}}{\partial x^2}$     (e)  $\frac{\partial^2 \vec{A}}{\partial y^2}$     (f)  $\frac{\partial^2 \vec{A}}{\partial x \partial y}$

Free! Ma'am

DEPARTMENT OF CSE-AI  
UNIVERSITY INSTITUTE OF ENGINEERING AND TECHNOLOGY, CSJM UNIVERSITY,  
KANPUR

Subject Name: Basic Electrical & Electronics Engg. (Subject code: ESC S-101)  
Semester: I Sem

Year: 1<sup>st</sup> Year (2K22)

First Mid Semester Examination

Time: 1.5h

Total Marks: 30

Note: All questions are compulsory.

Section (A)

Each question carries 1 mark:

[1X9=9]

- $(10101010010111101010, 1011)_2 = (\dots)_{16}$
- $(ABF, 125C)_h = (\dots)_8$
- $(345)_{10} = (531)_x$ , value of  $x = \dots$
- $(4562)_{10} = (?)_h$
- In ohm's law when the resistance is increased current voltage will ...
- In which circuits, voltage divider is applied.....
- Ohm's law is not applicable to \_\_\_\_\_
  - dc circuits
  - high currents
  - small resistors
  - semi-conductors
- Which type of networks allows the physical separability of the network elements (resistors, inductors & capacitors) for analysis purpose?
  - Lumped Networks
  - Distributed Networks
  - Unilateral Networks
  - Bilateral Networks
- What happens to voltage when current is zero?

Section (B)

Each question carries 3 marks:

[3X3=9]

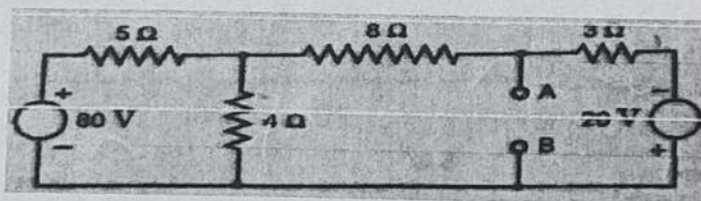
- Write down the statement of maximum power transfer theorem and prove that  $R_{th} = R_L$ .
- What do you understand by unilateral and bilateral components.
- Write down the statement of Superposition and norton theorem.

Section (C)

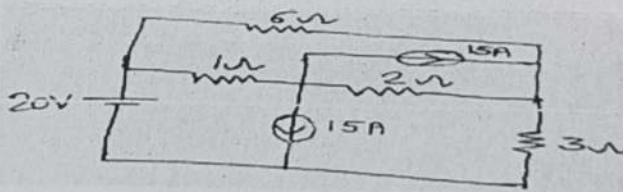
Each question carries 6 marks:

[2X6=12]

- Obtain Thevenin's equivalent Circuit at A,B as shown in below fig.



- Using Nodal analysis find out voltage across 2Ω resistor





Yashwanti Siro

DEPARTMENT OF MECHANICAL ENGINEERING  
UNIVERSITY INSTITUTE OF ENGINEERING AND TECHNOLOGY, CSJM UNIVERSITY, KANPUR

Subject Name: **Workshop Concepts** (TCA-S102)

Semester: 2022-23 (Odd Semester)

Branch- CSAI

Year: I<sup>st</sup> Year

Mid Semester Examination -I

Time: 1.5 h

Maximum marks: 30

All questions are compulsory

Section A

1. Projection welding is..... 1  
(a) Multi-spot welding process (b) Continuous spot welding process  
(c) Used to form mesh (d) Used to make cantilevers
2. TIG welding is best suited for welding..... 1  
a). Silver b). Stainless steel c). Carbon steel d). Aluminium
3. Electrodes used in spot welding are made up of which material? 1  
a) Only Copper b) Copper and tungsten c) Copper and chromium d) Copper and aluminium
4. How are the metals to be welded connected to each other in spot welding? 1  
a) Electric contact b) Magnetic field c) Mechanical pressure d) Direct contact
5. Which of the following welding process is used for welding of sheet metals in automobile and air craft industries? 1  
a) Shield metal arc welding b) Gas tungsten arc welding c) Thermit welding d) Resistance welding
6. Sprue in casting refers to..... 1  
a). Gate b). Runner c). Riser d). Vertical passage
7. Centrifugal method of casting is used to..... 1  
a) Ensure purity and density at extremities of a casting b) Cast symmetrical objects  
c) Obtain high density and pure castings d) Use heavy cast iron mould to act as chill
8. Which of the following is the component of foundry sand? 1  
a) river sand b) clay c) moisture d) all of the mentioned
9. Investment casting is used for..... 1  
a) Shapes which are made by difficulty using complex patterns in sand casting  
b) Mass production  
c) Shapes which are very complex and intricate and can't be cast by any other method  
d) Stainless steel

Section B

1. Write the all types of welding. 3
2. What is the working of Ultrasonic welding. 3
3. explain : 3  
Pattern, Runner and Shrinkage allowance

Section C

1. Explain Die casting with figure. 6
2. Explain working of MIG welding and designation of MIG Welding Electrode. 6

Raghavendra Sir

**SCHOOL OF BASIC SCIENCES, CSJMU KANPUR**  
I- Mid Term Examination, (Odd- Semester) 2022-23  
B. Tech. (CS-AI) I- Semester

Subject- Mathematics-I

Subject Code-MTH-S101

Time: 1:30 Hours

Marks: 30

INSTRUCTIONS:

- i) Answer all the questions.
- iii) Mathematical symbols have their usual meanings

**Q. 1. All questions are compulsory, each carries 1 mark.**

a) Which of the following series converges?

(i)  $\sum_{n=1}^{\infty} \frac{x^n}{n!} \forall x$  (ii)  $\sum_{n=1}^{\infty} \frac{1}{n + \sin(n)}$ , (iii)  $\sum_{n=1}^{\infty} (-1)^n n^{\infty}$

b) Find the area bounded between the curve  $y^2 = 2y - x$  and Y-axis.

c) Find the value of  $\lim_{n \rightarrow \infty} \left(1 + \frac{2}{n}\right)^n$ .

d) Evaluate  $\int_3^{\infty} \frac{dx}{(x-2)^2}$ .

e) The value of n for which integral  $\int_a^b \frac{dx}{(x-a)^n}$  is convergent?

f) Find the area bounded by the parabola  $y^2 = 4x$  and its latus rectum.

g) Write D'Alembert's ratio test.

h) "The series is convergent then it is absolutely convergent" Is this statement is true?

i) Write a series which is conditionally convergent but not absolutely.

**SECTION- B**

Attempt all questions, each carries 3 marks.

Q. 2. Test the convergence of series  $\frac{1}{3.7} + \frac{1}{4.9} + \frac{1}{5.11} + \frac{1}{6.13} + \dots$

Q. 3. Test the convergence of  $\int_2^{\infty} \frac{dx}{(x^2 - x - 1)}$ .

\* Q. 4. Find the area of the ellipse  $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ .

**SECTION- C**

Attempt all questions, each carries 6 marks.

Q. 5. Show that the series  $\sum \frac{3.6.9 \dots 3n}{7.10.13 \dots (3n+4)} x^n$ ,  $x > 0$  is converges for  $x \leq 1$ , and diverges  $x > 1$ .

Q. 6. Show that the series  $\sum_{n=1}^{\infty} \frac{1}{n^p}$  ( $p > 0$ ) is converges if  $p > 1$  and divergent if  $p \leq 1$ .

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