Total nos. of printed pages: 02

Roll No: ....

Department of Mathematics
CSJM University, Kanpur
Mathematics-I (MTH-S101)
Branch-ECE
Semester I: 2023-24 (Odd Semester)
2nd Mid Semester Examination

Time: 1.5 Hrs.

M.M: 30

Section A

1. Attempt **all** questions $(1 \times 9 = 9)$

a. If $u = xf(\frac{y}{x})$ then find $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y}$.

b. If $u = x^3 + y^3$, where $x = a\cos t,\ y = b\sin t$, then find $\frac{du}{dt}$.

c. $\lim_{(x,y)\to(0,0)} y\frac{\sin(x^2+y^2)}{x^2+y^2}$ is equal to ....

d. Evaluate $\lim_{n\to\infty} \frac{1+2^{1/2}+3^{1/3}+4^{1/4}+\cdots+n^{1/n}}{n}$.

e. If $x = r\cos\theta,\ y = r\sin\theta$, then find $\frac{\partial(x,y)}{\partial(r,\theta)}$.

f. The series $1 - \frac{1}{2} + \frac{1}{3} - \frac{1}{4} + \frac{1}{5} - \frac{1}{6} + \cdots$ is conditionally convergent. (True or False)

g. Series $\sum\frac{1}{n^{1/2}}$ is convergent. (True or False)

h. The series $1 - \frac{1}{2\sqrt{2}} + \frac{1}{3\sqrt{3}} - \frac{1}{4\sqrt{4}} + \cdots$ is absolutely convergent. (True or False)

i. The Series $\sum\frac{1}{n^p}$ is convergent if ..... , where p is some real number.

Section B

2. Attempt **all** questions $(3 \times 3 = 9)$

a. Prove that $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y} = \frac{5}{2}\tan u$ if $u = sin^{-1}(\frac{x^3+y^3}{\sqrt{x}+\sqrt{y}})$.

b. Test the nature of the series $\frac{x}{x+1} + \frac{x^2}{x+2} + \frac{x^3}{x+3} + \cdots$

c. Test the convergence of the series whose n^{th} term is $\sqrt{n^3+1} - \sqrt{n^3-1}$.

Section C

3. Attempt **all** questions $(2 \times 6 = 12)$

a. If J_1 is the Jacobian of u, v with respect to x, y and J_2 is the Jacobian of x, y with respect to u, v then show that $J_1.J_2 = 1$, i.e. $\frac{\partial(u,v)}{\partial(x,y)} . \frac{\partial(x,y)}{\partial(u,v)} = 1$

b. Show that the function $f(x,y) = \begin{cases} \frac{x^2y}{x^2+y^2}, when\ x^2+y^2 \neq 0 \\ 0 \quad , when\ x^2+y^2 = 0 \end{cases}$ is continuous but not differentiable at (0,0).

Department of Humanities

U. I. E. T., C. J. M. University

Professional Communication (HSS-S 101), Branch: ECE

Semester: 2023 (1st Odd Sem.) **Year: 1st Year (2K23)**

Second Mid Semester Examination

Time: 1.5h Total Marks: 30

Section A

Q1. Fill in the appropriate word, or rearrange the jumbled sentences: (1x9=9)

a. Why/Shabnam Khan/ her post?/ did/ from/ resign
b. the/ Republic Day, /addresses/ President / the/nation/ on the eve of
c. feelings /should/ their /Individuals / their/ with/ family members/ share
d. As/went/ she/ to /eat out /with/ she/ her friends/ was hungry,
e. _____ Sunita has become the CEO; the company has been achieving its sales target_____ the last five years. (for, since)
f. The villain had _____ intentions towards the hero. (malice)
g. The Sales Executive offers a _____ discount. (promote)
h. An old man _____ the house to steal some food yesterday. (break into, break down)
i. Why is it important to _____ words in a dictionary? (look up, look into)

Section B

2. Attempt **any three** of the following: (3x3=9)

i. Explain the use of the " you" approach in writing positive messages.
ii. In business letters, what does concreteness imply? Support with an example.
iii. In business letters, what does cordiality imply? Support with an example.
iv. Why and how should coherence be observed in technical writing?

Section C

3. Attempt **any two** of the following: (2x6=12)

1. You have completed an internship program at IIT Mumbai. But you have not received the certificate yet. Write a letter to the Head of Department for the same. Invent the necessary details.

2. Assume you are the Regional Sales Head of Dell, UP, India. Write a letter to an academic institution offering to set up advanced computer labs.

3. Why is the AIDA strategy important for writing effective Sales letters?

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

UNIVERSITY INSTITUTE OF ENGINEERINGAND TECHNOLOGY, CSJM UNIVERSITY, KANPUR

(Subject Name: Basic Electrical & Electronics Engineering)
(Subject Code: ESC-S101) [Branch: ECE]

Semester: 2023-24 (Odd Semester) **Year: 1st Year (2K23)**

Second mid Semester Examination October - 2023

Time: 1.5 h **Maximum marks: 30**

All questions are compulsory

Section A

Note: 9 marks (9 questions of 1 mark each)

1. Define Power Factor?
2. What is the difference between active power and reactive power?
3. Define resonance frequency.
4. Define Bandwidth and quality factor?
5. Define frequency and time period of alternative quantity?
6. Explain peak Factor and Form Factor?
7. Define Iron losses and Copper losses in single phase transformer?
8. Write EMF Equation of single phase transformer.
9. Explain Instantaneous value of alternative quantity.

Section B

Note: 9 marks (3 questions of 3 marks each)

1. Explain the disadvantages of low power factor?

2. Write short note on Active, Reactive and Apparent Power.

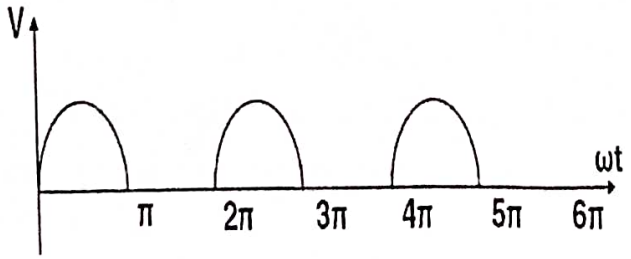
3. Define Efficiency of single phase transformer. Derive the condition for maximum efficiency of single phase transformer?

Section C

Note: 12 marks (2 questions of 6 marks each)

1. Draw and explain the circuit diagram and phasor diagram of R-L-C series circuit. Also derive the expression of resonance frequency?

2. Determine the RMS Value, Average Value, Form Factor and Peak Factor of the voltage waveform shown in below Figure.



Department of Electronics and Communication Engineering

UIET, CSJM University, Kanpur

Semester: 1st, Year: 1st Year (2023)

Subject Name : Physics - I, Subject: Code : PHY-S101- ECE

2nd Mid Semester Examination

Time : 1.5 hours Maximum Marks-20

Note :

All questions are compulsory.

Section - A

8 marks (Each question carries 1 mark) (Fill in the blanks)

1. The central force field is attractive if $f(r) =$ .....
2. The necessary and sufficient condition for a particle to be in stable equilibrium if its potential energy is .....
3. The centre of mass of a semicircular plate of radius R is at $X_{cm} = 0$ and $Y_{cm} =$ .....
4. The final velocity of a rocket in free space is given by $\vec{V}_f =$ ..... where u is the exhaust velocity.
5. In conic section when $\epsilon < 1$, the equation of the curve is $r =$ .....
6. For perfectly elastic collision the value of the coefficient of restitution $e =$ .....
7. The reduced mass (μ) of a two body system is defined as $\mu =$..... where m_1 and m_2 are the two masses of the system.
8. The torque acting on a particle in central force field is .....

Section B

6 marks (Each question carries 2 marks)

1. A rocket set for vertical firing weighs 50 kg and contains 450 kg of fuel. It can have a maximum exhaust velocity 2×10^3 m/sec. What should be its minimum rate of fuel consumption just to lift the rocket off the launching pad.

2. For the conic section, prove the equation $r = \frac{p}{1+e\cos\theta}$.

3. Draw the diagram and calculate the gravitational potential energy of a teeter toy when it is given a tilt in the plane of a paper through a small angle θ.

– Section C

6 marks (Each question carries 3 marks)

1. Find out the centre of mass of a uniform semicircular wire of mass M and radius R.

2. Write down the Kepler's laws of planetary motion.