2021

UNIVERSITY INSTITUTE OF ENGINEERING AND TECHNOLOGY KANPUR

End Semester Examination (Dec. 2023)
Department of Mechanical Engineering
Subject Name: Workshop Practice (CS AI 1st year)
Subject code: TCA-S102

Time 3:00 Hrs. Marks 50

✓ *Attempt all sections.*

SECTION-A

✓ *Attempt all questions.* (1*10= 10 marks)

1. Process layout is suitable for.....production.

2. Aluminum is the best material for making patterns because it is
(a) A light in weight (b) Easy to work (c) Corrosion resistant (d) All of these

3. The adhesiveness is the property of sand due to which
(a) It evolves a great amount of steam and other gases (b) The sand grains stick together
(c) It cling to the sides of a moulding box (d) None of these

4. The purpose of a riser is to
(a) Deliver molten metal into the mould cavity (b) Act as a reservoir for the molten metal
(c) Feed the molten metal to the casting in order to compensate for the shrinkage
(d) Deliver the molten metal from pouring basin to gate

5. In a hot chamber die casting machine
(a) Melting pot is separate from the machine (b) Melting pot is an integral part of the machine
(c) Melting pot may have any location (d) High temperature and pressure is used

6. Which one of the following processes results in the best accuracy of the hole made?
A) Drilling B) Reaming C) Boring D) Broaching

7. Which of the following is true for extrusion process?
(a) Extrusion is a single pass process (b) Amount of reduction in extrusion is large
(c) Brittle material can also be very easily produced (d) All of the above

8. Which of the following statement is true about cold working?
A. Strain hardening is relieved B. No oxidation occur
C. Only limited amount of reduction can be done D. Cost of machining is high

9. Which of the following sentences is/are correct for casting process?
(a) Casting process is comparatively costly (b) Objects of larges sizes cannot be produced easily by casting process
(c) The time required for the process of making casting is quite long (d) All of the above sentences are correct

10. Which of the following is not a requirement of a good pattern?
(a) It should be light in weight to handle easily (b) It should be smooth to make casting surface smooth
(c) It should have low strength to break it and to remove casting easily (d) none of the above

SECTION-B

✓ ***Attempt all questions.*** . (5*4=20 marks)

Q.2 What do you understand by the CNC machine. Explain the each words used in CNC machine with example.

Q.3 Define powder metallurgy. Explain the procedure for producing any product by powder metallurgy.

Q.4 Define welding technology. Also explain electric arc welding with neat and clean figure.

Q.5 Explain working of Cupola furnace with neat & clean figure.

SECTION-C

Attempt all questions (10*2=20 marks)

Q.5 (a) With cylindrical riser, prove that for a longer solidification time, diameter of riser will be equal to height of riser.

(b) Let $n = 0.5$ and $C = 90$ in the *Taylor* equation for tool wear. What is the percent increase in tool life if the cutting speed is reduced by (a) 50% and (b) 75%?

Q.6 What do you understand by forming process? Explain all the types of extrusion process with neat and clean figure.

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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: Ist Year (2K23)**

End Semester Examination

Time: 3hrs **Total Marks: 50**

Note: All questions are compulsory.

Section (A)

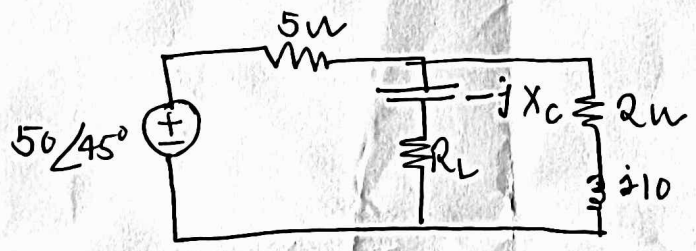
Each question carries 1 mark:

a) What is relation among node, branch and loop?
b) What is the conductivity of semiconductor if freeelectron density = $5x10^{12}/cm^3$ and hole density = $8x10^{13}/cm^3$? [$\mu_e = 2.3$ and $\mu_h = 0.01$ in SI units]
c) At absolute zero, Si acts as conductor (T/F)?
d) The most commonly used semiconductor is Si (T/F)
e) In a semiconductor, current conduction is due to only free electrons (T/F)
f) $(10100101011010 10.10101011)_2 = (?)16$
g) What is the energy band gap of Si semiconductors?
h) When a pure semiconductor is heated, its resistance goes down.(T/F)
i) What is impurity level in an extrinsic semiconductor in pure semiconductor?
j) The random motion of holes and free electrons due to thermal agitation is called .....

Section (B)

Each question carries 4 marks:

1) Explain about CRT.
2) Derive the relation between Form factor and Ripple Factor
3) Write down the statement of Superposition and norton theorem.
4) A resistance of 20Ω, an inductance of 0.2 H and a capacitance of 100 microfarad are connected in series across 220 V,50Hz mains.Determine the following(i)Impedance (ii)current(iii)Voltage across R,L.
5) In the network shown in below fig.find the value of load to be connected across terminals AB consisting of variable resistance R_L and capacitive reactance X_c which would result in maximum power transfer.

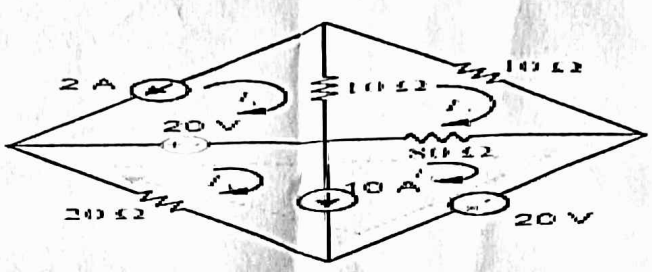


Section (C)

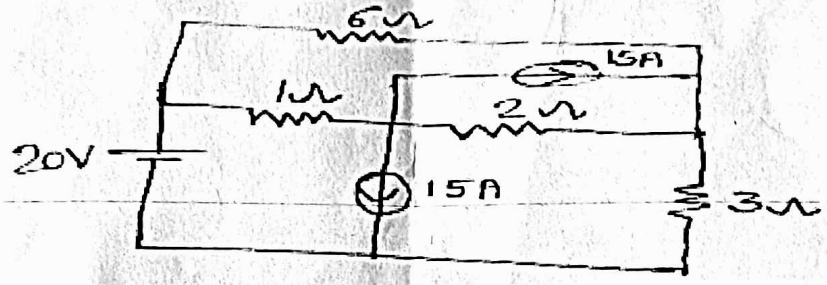
Each question carries 5 marks:

1) (a)Using mesh analysis find the current I_1, I_2, I_3, I_4 for the given network:

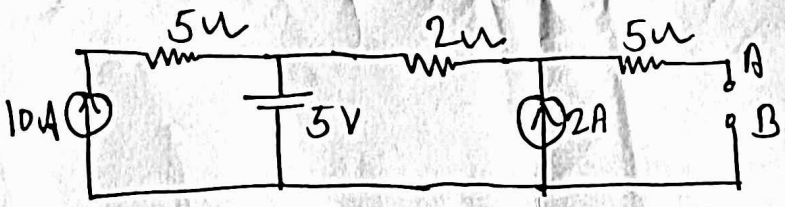
*******All the best******



1) (b) Using Nodal analysis find out voltage across 2Ω resistor



2) (a) Obtain Norton's equivalent circuits at AB as shown in below fig.



2) (b) Explain the diffusion capacitance and Transition capacitance.

*******All the best******

DEPARTMENT OF CHEMISTRY

UNIVERSITY INSTITUTE OF ENGINEERING AND TECHNOLOGY, CSJM UNIVERSITY, KANPUR

CHEMISTRY CHM-S101, CSAI, End Semester Examination

Year: 1st year — Time: 3h

Semester: 2023-24 — Maximum Marks: 50

All questions are compulsory

Section-A

1. What is mesomeric effect?
2. Write any cell reactions.
3. Explain bending vibrations.
4. Explain structure of water molecule, showing hydrogen bonding.
5. What is hyper conjugation?
6. What is de-Broglie concept?
7. Explain bimolecular elimination reaction.
8. Write stability order of carbocations.
9. Explain hybridization, shape and geometry of carbenes.
10. Explain nucleophilic substitution reaction proceeded via addition to elimination mechanism.

Section-B

20 marks (5 question of 4 marks each)

1. Plot the graph between PE versus different angles of conformers of n-butane.
2. Derive an expression for first order reaction.
3. Calculate CFSE for octahedral and tetrahedral complex of d^7 and d^6 in case of high spin complex.
4. Explain Co-Ordination and linkage isomerism with examples.
5. Draw the MO diagram of NO and O_2. 2

Section-C

20 marks (2 questions of 10 marks each, each question should have two parts)

1(a). Differentiate between molecularity and order of reaction.

(b). Prove that $t_{1/2} = 0.693/K$ for first order reaction.

2(a). An organic compound has molecular formula, $C_6H_{12}O$ shows following ^{1}H-NMR data;

i. δ= 1.1 doublet (6H)

ii. δ= 1.3 septet (1H)

iii. δ= 1.2 triplet (3H)

iv. δ= 2.1 quartet (2H), on the basis of above information, deduce the structure of compound.

(b) Discuss Norrish type I & II reactions with suitable examples.

Department of Computer Sciences Engineering (CS Ai)

University Institute of Engineering and Technology CSJM University, Kanpur

MATHEMATICS-II (MTH-S101)

Semester: 2023-24 (Odd Semester)

(2K23)

End Semester Examination

Time: 3h Maximum Marks: 50

All questions are compulsory

Section A

10 marks (10 question of 1 marks each)

1. $\lim_{(x,y)\to(0,0)} \frac{2xy}{3x^2+y^2}, x \neq 0,\ y \neq 0.$
2. Test for the continuity $f(x,y) = \begin{cases} \frac{x^2-y^2}{x^2+y^2}, & when\ x \neq 0,\ y \neq 0 \\ 0, & when\ x = 0,\ y \neq 0 \end{cases}$.
3. Find the value of $\int_0^1 dx \int_0^x e^{\frac{y}{x}} dy$.
4. Evaluate $\Gamma\left(-\frac{5}{2}\right)$.
5. Find a unit normal to $x^2 + y^2 + z^2 = 5\ at\ (0,1,2)$.
6. Relation between Line integral and surface integral gives.....
7. Show that the $f(x) = 3x^2$ is the probability density function between the interval [0, 1].
8. Test the series convergence of the series $1 - \frac{1}{2} + \frac{1}{3} - \cdots$
9. Write the standard form of Normal distribution.
10. The curve $x^{\frac{2}{3}} = a^{\frac{2}{3}}$ is symmetrical about ...

Section B

20 marks (5 questions of 4 marks each)

1. Assuming that half the population is vegetarian so that the chance of an individual being a vegetarian is ½ and assuming that 100 investigators can take sample of 10 individuals to see whether they are vegetarians, how many investigators would you expect to report that three people or less were vegetarians?
2. Use Green Theorem to evaluate $\oint (x^2 + xy)dx + (x^2 + y^2)dy$ where c is the square formed by the line $y = \pm 1, x = \pm 1$.

3. Show that the series $1+\frac{1}{2^2}+\frac{2^2}{3^3}+\frac{3^3}{4^4}+\frac{4^4}{5^5}+\cdots$

4. Discuss the maximum and minimum of $x^2+y^2+6x+12$.

5. If $u=\frac{y-x}{1+xy}$ and $v=\tan^{-1}y-\tan^{-1}x$, find $\frac{\partial(u,v)}{\partial(x,y)}$.

Section C

20 marks (2 questions of 10 marks each, each question should have two parts)

1.(a) By using Liouville's extansion of Dirichlet Theorem show that $\iiint\frac{dxdydz}{(x+y+z+1)^3}=\frac{1}{2}log2-\frac{5}{16}$, the integral being take throughout the volume bounded by the planes $x=0,y=0,z=0,x+y+z=1$.

1 (b) Apply the stokes theorem to calculate $\int 4y\,dx+2zdy+6ydz$ where c is the curve of intersection of $x^2+y^2+z^2=6z$ and $z=x+3$.

2 (a) State and Prove Euler Homogenous theorem with the suitable example.

2 (b) Change the order of integration and evaluate:

$$\sqrt{\int_0^2\int_{\sqrt{2y}}^2\frac{x^2dxdy}{\sqrt{x^4-4y^2}}}.$$

DEPARTMENT OF *CSE (AI) and MEE* ENGINEERING

UNIVERSITY INSTITUTE OF ENGINEERING AND TECHNOLOGY, CSJM UNIVERSITY, KANPUR

Physics (PHY-S101)

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

End Semester Examination

Time: 3h Maximum mark: 40

All questions are compulsory

Section A

Each question have 1 mark. (1×8= 8)

1. Heisenberg's uncertainty principle is-
   (i)$\Delta E\Delta x \geq \frac{h}{4\pi}$. (ii) $\Delta p\Delta t \geq \frac{h}{4\pi}$ (iii) -(i)$\Delta p\Delta x \geq \frac{h}{4\pi}$ (iv) -$\Delta E\Delta p \geq \frac{h}{4\pi}$.
2. Smallest unit of light is_____.
3. Earth is-
   (i) an inertial frame (ii) a non-inertial frame (iii) Inertial frame during day (iv) inertial -frame during night.
4. $|\varphi|^2$ is called_____.
5. The Reference frames, where fundamental laws of physics are invariant, are called-
   (i) Rotational frames (ii) inertial frames (iii) accelerated frames (iv) frame attached to earth.
6. Total energy in the simple harmonic motion is- (i) Ka^2 (ii) ½ ka^2 (iii) 1/ka (iv) none of these
7. If $\vec{\nabla}.\vec{A} = 0, than\ \vec{A}$ is , (i) solenoid (ii) vector (iii) both (iv) none
8. The differential equation of SHM is:
   (i) $\frac{d^2x}{dt^2} + \omega^2 x = 0$ (ii)) $\frac{d^2x}{dt^2} + \omega x = 0$ (iii)) $\frac{d^2x}{dt^2} + \omega^2 x^2 = 0$ (iv)) $\frac{dx}{dt} + \omega^2 x = 0$

Section B

Each question have 02 marks. (2×6=12)

9. Locate the C.M. of a system of three particles of mass 1.0kg, 2.0kg and 3.0kg placed at the corner of an equilateral triangle of 1.00 metre side.
10. If $\vec{A} = (2x^2y - x^4)\hat{i} + (e^{xy} - y\,sinx)\hat{j} + (x^4\,cosy)\hat{k}$, Find- (a) $\frac{\partial A}{\partial x}$ (b) $\frac{\partial A}{\partial y}$
11. A Uniform sphere, a spherical shell are released from rest at the top of an inclined plane. If the spherical shell reaches the bottom with speed 42 cm/sec. calculate the speeds with which the sphere reach the bottom.
12. If $\vec{F} = (2xy + z^2)\hat{i} + x^2\hat{j} + 2xz\hat{k}$, force is conservative or non-conservative.
13. A force $\vec{F} = 25\hat{i} + 6\hat{j}$ newton acts on a particle of mass 2.5kg for 5 sec. If the initial position of the particle is $\vec{r}_0 = 6\hat{j} + 8\hat{k}$ meter and the initial velocity $\vec{U} = 2.5\hat{i} + 3k$ m/sec. calculate, work done by force.
14. What is cycloid motion? Find the kinetic energy for of rolling body.

Section C

Each question have 04 marks. (4×5=20)

15. Derive Schrodinger's time dependent and time independent wave equations.
16. Find differential equation of SHM and also derive the solution of differential equation of SHM.
17. What is meant by Moment of inertia? State and prove theorem of parallel and perpendicular axis.
18. Write down Kepler's laws of planetary motion. Prove that the force acting on a planet proportional to the square of its distance from the sun.
19. A particle of mass M, moving with a velocity U, makes a head on collision with a particle of mass m initially at rest, so that their final velocities V and v are along the same line. Assuming an elastic collision prove that-

$$V = \frac{2U}{1+\frac{m}{M}}$$

.....