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(Please write your Name with Enrollment No. Immediately)

Student Name & Enrollment No.....

Mid Term Examination

Paper Code: ICT-103 (1st Sem)

Subject: Electrical Science

Time: 1:30 hrs

Max Marks: 30

Note: Attempt Q.No. 1 Which is compulsory and any two question from remaining.

Q.No.1

- a) Explain voltage and current divider rule with suitable example? Find the values of different voltages V_1 , V_2 & V_3 that can be obtained from a 12-V battery Fig.1. (4)

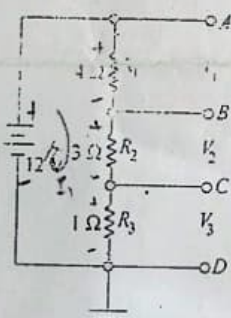


Fig.1

- b) In given circuit Fig. 2, calculate the values of (i) V_{AF} (ii) V_{EA} and (iii) V_{FB} . (3)

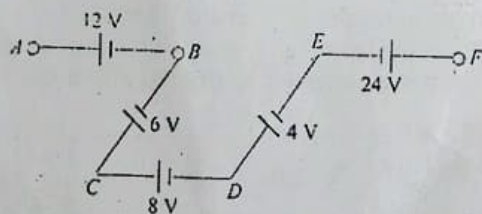


Fig.2

(A) $12 + 6 + 8 + 4 + 24 = 54V$
 $= 54V$
 (B) $12 + 6 + 8 + 4 = 30V$
 $= 30V$
 (C) $-6 + 8 + 4 + 24 = 30V$
 $= 30V$

- c) Define Ohm's law, Kirchhoff's law with suitable example? (3)

Q.No.2

- a) State and explain Superposition theorem? Using Superposition theorem, find the current through the 40 ohm resistor of the circuit shown in Fig.3. All the resistances are in ohms. (8)

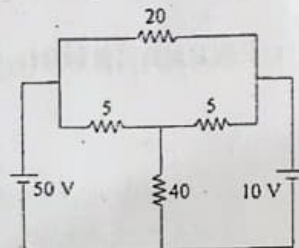


Fig.3

- b) Explain the source transformation with suitable example? (2)

Q.No. 3

- a) Derive the relationship to express three star connected resistances to equivalent delta? (5)
- b) Convert the circuit shown in Fig. 4, to a single voltage source in series with a single resistor. All the resistances are in ohm. (5)

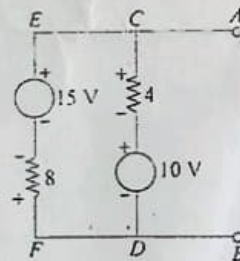


Fig.4

Q.No.4

- a) State and Explain Maximum Power Transfer Theorem? (4)
- b) For the circuit shown below in Fig.5, what will be the value of R_L to get the maximum power? What is the maximum power delivered to the load? (6)

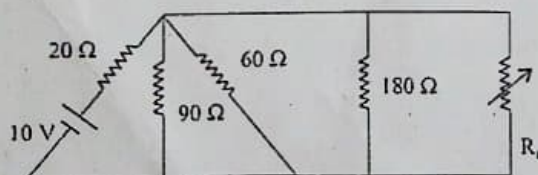


Fig.5

Enrollment number:

GGSIU EAST DELHI CAMPUS
Mid Term Examination-2023

Subject: Engineering Chemistry-I (BS-109)
Time: 1.5 h

Semester: I
MM: 30

Note: Question no. 1 is compulsory. Attempt any four questions from question no. 2 to question no. 6.

1. Attempt any five questions. Each question carries 02 marks. (2 x 5 = 10)

- Derive de-Broglie equation.
- Arrange the following species in order of their increasing size:
 N^{3-}, O^{2-}, F^{-}
- What are the n , l and m values for $3s$ and $3d_{xy}$ electrons?
- What is effective atomic number rule? Calculate effective atomic number for the central metal ion in: (i) $K_4[Fe(CN)_6]$ (ii) $[Ni(NH_3)_6]Cl_2$
- The electron affinity of F is less than that of Cl . Why?
- Write down the electronic configuration of Cu (A.N. 29) and Cr (A.N. 24).
- Discuss the hybridization and the molecular geometries of the following:
(i) H_2O (ii) CH_4 (iii) NH_3 (iv) SiF_4
(Atomic number: $C = 6$, $N = 7$, $O = 8$, $Si = 16$)

- What are the postulates of VSEPR theory? Using this theory, predict the shape of H_2O , NH_3 and SiF_4 . (3)
- Write down the mathematical expression of Schrödinger equation in Cartesian coordinates. Convert it into polar coordinates. (5)
- Write the molecular orbital electronic configuration and draw the molecular orbital energy diagram for O_2^+ molecule. Calculate its bond order and predict its magnetic property. (5)
- Write short notes on:
(a) Kirchhoff's Equation. (2.5+2.5)
(b) Hess's Law

- (a) Define heat of neutralization. amount of heat given or released to neutralize a reaction.

(b) Calculate the lattice energy in kJ/mol when solid MgF_2 is formed from its elements: $Mg(s) + F_2(g) \rightarrow MgF_2(s)$. Sketch a Born-Haber cycle for the process.

$$\Delta H_{\text{sublimation}} = 147.7 \text{ kJ/mol}$$

$$E_1 = 737.7 \text{ kJ/mol}$$

$$E_2 = 1450.7 \text{ kJ/mol}$$

$$\text{Bond Dissociation Energy, } D(F_2(g)) = 158 \text{ kJ/mol}$$

$$E_{ea} = -328 \text{ kJ/mol}$$

$$\text{Formation of } MgF_2: Mg(s) + 2F(g) \rightarrow MgF_2(s) \\ -2957 \text{ kJ/mol}$$

Roll No. 07619011922

GGS Indraprastha University
Mid term-I
B.Tech. 1st semester
Engineering Mathematics-I
BS-111

Time: 1.5 Hr

Max. Marks: 30

Note: Attempt any five questions including question number 1, which is compulsory.

1. (a) If $u = x^2 - y^2$, $v = 2xy$ and $x = r \cos \theta$, $y = r \sin \theta$, find $\frac{\partial(u, v)}{\partial(r, \theta)}$. (2)

(b) Solve $\frac{y}{x} \frac{dy}{dx} = \sqrt{(1 + x^2 + y^2 + x^2 y^2)}$. (2)

(c) Solve $\left(\frac{e^{-2\sqrt{x}}}{\sqrt{x}} - \frac{y}{\sqrt{x}} \right) \frac{dx}{dy} = 1$. (2)

(d) Find integrating factor for $(xy^3 + y) dx + 2(x^2 y^2 + x + y^4) dy = 0$. (2)

(e) Solve $(D^4 - 4D^2 + 4)y = 0$. (2)

2. Transform the equation $\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = 0$ into polar coordinates. (5)

3. Evaluate $\int_0^1 \frac{\log(1+ax)}{1+x^2} dx$ and hence show that

$$\int_0^1 \frac{\log(1+x)}{1+x^2} dx = \frac{\pi}{8} \log_e 2.$$

(4+1)

4. Solve $(D^2 + a^2)y = \tan ax$. (5)

5. Solve by the method of variation of parameters,

$$\frac{d^2 y}{dx^2} - y = \frac{2}{1+e^x}.$$

(5)

6. Solve in series the equation

$$x \frac{d^2 y}{dx^2} + \frac{dy}{dx} + xy = 0.$$

(5)

University School of Automation and Robotics

Max Marks: 30

Subject: Programming for Problem Solving

Time: 90 Minutes

Paper Code: ICT101

Question number 1 is compulsory. Attempt any 4 questions from Q2 - Q6.

Q1. Attempt any five from the following:

2*5 = 10 Marks

- List and describe the components of a computer system.
- What are tokens in C? List any 4 tokens.
- What are operator Precedence and Associativity?
- What are loop control statements in C?
- Explain the difference between Break and Continue statements.
- What are storage classes in C?

Q2.

- Draw a flowchart/write pseudocode to check whether a number is even or odd. 3 Marks
- Explain increment and decrement operators in C with examples. 2 Marks

Q3.

- What is implicit and explicit type conversion? Give an example of each. 3 Marks
- Evaluate the expression: $2 * 3 \% 5 - 12 \mid \mid 10 + 5$ 2 Marks

Q4.

- Write a code snippet to print a 2D array. 3 Marks
- Explain recursion with the help of an example. 2 Marks

Q5.

- Write a function that swaps 2 numbers. 3 Marks
- Explain the memory size and length of the string: "GGSIPU". 2 Marks

Q6.

- Write a program that prints the greatest of three numbers. 3 Marks
- Predict the output of the following code snippet: 2 Marks

```
void fun ()
{
    for (int i = 5 ; i > 0 ; i--) {
        if ( i == 3)
        {
            goto ABC;
        }
        printf (" %d ", i );
    }
    ABC : printf ( " Somehow, loop has terminated " );
}
```


Time: 1.5 Hours

Max Marks: 30

ICT105: Engineering Mechanics

NOTE: Section 1 is compulsory. Attempt any 2 questions from section 2. Assume suitable missing data, if any. Don't write any thing except roll no on the question paper. Mention your roll number on the answer sheet. **Exchange of calculator is strictly prohibited.**

SECTION 1

- 1 (a) Find the unknown force 'F' if resultant is 40 N inclined at an angle of 60° with the second force 30 N force. 3 Marks
- 1 (b) Schematically show the different type of supports and write down the equilibrium equation for each support. 2 Marks
- 1 (c) Find The net moment at 'A' for the cantilever beam shown in Figure 1. 3 Marks

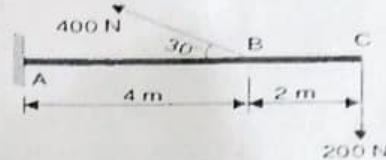


Figure 1

- 1 (d) While designing a Truss some of the members are included which doesn't participate in load bearing. What are those members called? What are the conditions for those members? 2 Marks

SECTION 2

2. (a) A wire is fixed at two points A and D as shown in Figure 2. Two weights 20 kN and 25 kN are supported at B and C, respectively. When equilibrium is reached it is found that inclination of AB is 30° and that of CD is 60° to the vertical. Determine the tension in the segments AB, BC and CD of the rope and also the inclination of BC to the vertical. 5 Marks

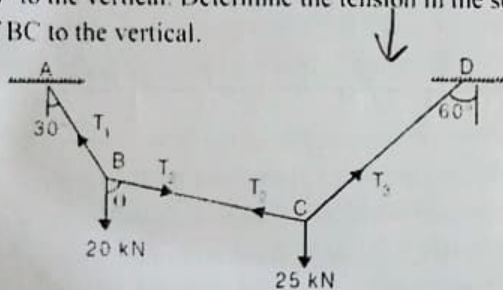


Figure 2

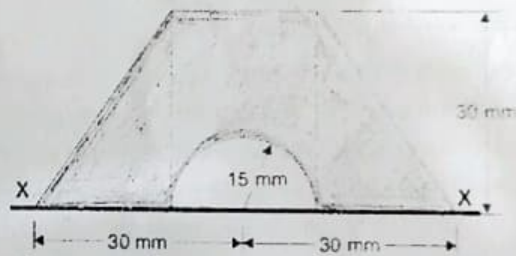


Figure 3

- 2 (b). Find the centroid and moment of inertia about the XX axis of the section shown in Figure 3. 5 Marks

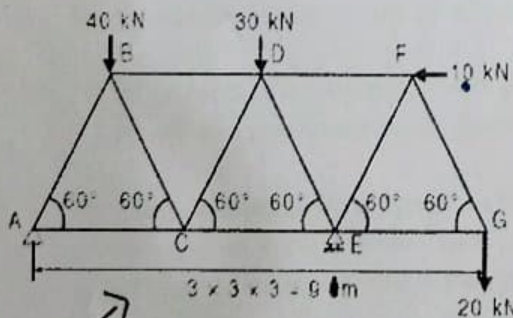


Figure 4

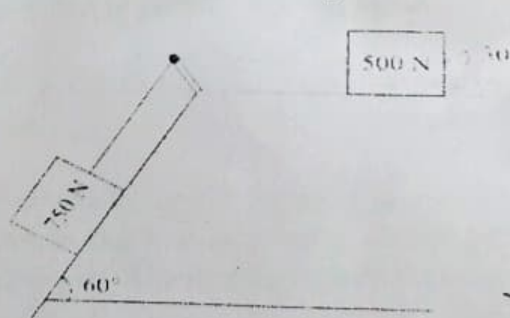


Figure 5

3. The truss shown in Figure 4 having all the members of 3 m length. Find the magnitude and direction of force in each member. 10 Marks
4. (a) What is the value of P in the system shown in Figure 5 to cause the motion to impend? Assume the pulley is smooth and coefficient of friction between the other contact surfaces is 0.2 7 Marks
- 4 (b) Explain the Coulomb's law of dry friction. Schematically show the static, limiting and kinetic friction. 3 Marks

Roll No.

GGS INDRAPRASTHA UNIVERSITY
MID-TERM-I EXAMINATION
B. TECH. 1st SEMESTER
COMMUNICATION SKILLS (HS107)

Time Allowed: 1.5 hours

Maximum Marks: 30

Instructions: Attempt Question-1 compulsorily and any four of the remaining questions.

Q.1: "India's G20 Presidency is a chance to showcase its capabilities to the world. This is crucial because India has established that accelerated inclusive and resilient growth & progress on sustainable development goals will also be the priorities for the G20. The nation's social sector has been contributing towards the advancement of Sustainable Development Goals by using path-breaking innovations. The social sector – which include social innovators, entrepreneurs, cooperatives, self-help groups & foundations – has pioneered distinct business models & prioritised equity & social environmental benefits. These organisations have explicit social objectives & inclusive governance models and work with groups that face gender, race, ability & economic barriers.

India's social innovators & entrepreneurs are doing remarkable work at the bottom of pyramid with extraordinary challenges. Despite the significant contribution of social economy in terms of Gross Domestic Product (GDP) & employment, their contributions have not been recognized. They work on shoestring budgets and one would be amazed at their zeal, tenacity & value system.

With its complex socio-economic-environmental challenges, India is a fertile ground for social innovations and offers a unique opportunity to demonstrate leadership. Government initiatives, such as Skill India and Digital India have provided social enterprises multiple avenues & support to accelerate their work, impact & reach. However, they need the Government support & encouragement to showcase them on the International platforms to catapult to the next level of global operations.

Under India's presidency, India's social sector should be an integral part of G20 agenda, since they are forerunners in some of the priority areas identified by India during its presidency."

A) Write a summary of the above passage..... (05 marks).

B) Write a paraphrase of the above passage. (05 marks).

Q.2: Write a descriptive paragraph on the current situation at a Delhi Metro Station, buzzing with huge, swelling crowds & serpentine queues, especially at peak hours & given the impending Republic Day's security checks there, weaving-in the conversations about handling the situation in a better way. (05 marks).

Q.3: Prepare minutes of the first meeting held by the Organising Committee of the University for organising Cultural-cum-Sporting Festival, covering the major aspects. (05 marks)

No. of participants: Seven (7).

Issues discussed:-

- What all cultural activities & sporting events may be incorporated?
- How the funds for the event would be arranged (Grants, sponsorship, etc.)?
- What all lessons from previous such experience could be incorporated?
- How maximum participation could be achieved & the marketing strategies to be adopted?

~~Q.4~~ Prepare agenda of a meeting to be held on tackling Delhi's Air Pollution. (05 marks)

~~Q.5~~ Convert the following sentences according to the rule mentioned in the brackets. (05 marks)

- (a) The horse reared. The rider was thrown. (Simple to compound.)
- (b) This is the house where I live. (Complex to simple.)
- (c) We watched a movie. The movie was wonderful. (Simple to complex.)
- (d) He left the town. It is still a mystery. (Simple to complex.)
- (e) We know him. He is a good boy. (Simple to compound.)

~~Q.6~~ Fill in the blanks with the correct option. (05 marks)

- (a) Neither he or his family (is / are) going to the party.
- (b) Each of the scholars (has / have) done well.
- (c) Three parts of the business (is / are) left for me to do.
- (d) He and I (was / were) playing.
- (e) The guidance, as well as the love of the mother (was / were) wanting.

Guru Gobind Singh Indraprastha University – East Delhi Campus
Mid- Term Test (AI-DS/AI-ML/IIOT/AR)-I Semester (Jan-2023)

Course Code: BS113

Subject: Engineering Physics - I

Max. Marks: 30

Duration: 1.5 Hrs

Note: Attempt any FOUR parts from Question 1. Questions 2-4 are compulsory.

1. Attempt any FOUR parts from (a) to (e).

4x3 = 12

(a) Calculate the thickness of quarter wave plate for light of wavelength 589.6 nm. Given that the refractive index for ordinary and extra ordinary waves are 1.48 and 1.65 respectively.

(b) In Newton's ring experiment the diameters of 4th and 12th dark rings are 0.4 and 0.7 cm respectively. Calculate the diameter of 16th dark ring.

(c) In a Young's double slit experiment, the angular width of a fringe formed on a distant screen is 0.15°. The wavelength of light used is 632nm. What is the spacing between the slits. $\lambda = \frac{D}{\theta}$

(d) The light is incident normally on a grating 0.5 cm wide with 2500 lines. Calculate the angles of diffraction for the principal maxima of the two sodium lines in the first order spectrum. Given that $\lambda_1 = 589$ nm and $\lambda_2 = 589.6$ nm.

(e) The two sodium lines are known to have wavelength $\lambda_1 = 589$ nm and $\lambda_2 = 589.6$ nm. To resolve these lines, what must be the resolving power of a diffraction grating. To resolve these lines in second order spectrum, how many slits of the grating must be illuminated?

2. Describe the construction of a Nicol prism. Explain how it can be used as a polariser and as an analyser? (6)

3. What do you understand by division of wavefront and division of amplitude? Give example of each. Derive an expression for maxima and minima in interference due to a thin film. (6)

4. Show that, for Fraunhofer diffraction at a single slit, the relative intensities of the successive maxima are approximately $1 : 4/9\pi^2 : 4/25\pi^2 : 4/49\pi^2$ (6)