

**1<sup>ST</sup> SEMESTER/COMMON/2021(W) NEW  
TH1-A COMMUNICATIVE ENGLISH**

**Full Marks: 80**

**Time 03 hours**

**Answer all Questions**

**Figures in the righthand margin indicate marks**

Answer all questions

- Q.1. Read the following passage carefully and do as directed.
- My grandmother, like everybody's grandmother, was an old woman. She had been old and wrinkled for the twenty years that I had known her. People said that she had once been young and pretty and had even had a husband, but that was hard to believe. My grandfather's portrait hung above the mantelpiece in the drawing -room. He wore a big turban and loose-fitting clothes. His long white beard covered the best part of his chest and he looked at least a hundred years old. He did not look the sort of person who would have a wife or children. He looked as if he could only have lots and lots of grandchildren. As for my grandmother being young and pretty, the thought was almost revolting. She often told us of the games she used to play as a child. That seemed quite absurd and undignified on her part and we treated it like the fables of the prophets she used to tell us. She had always been short and fat and slightly bent. Her face was a criss-cross of wrinkles running from everywhere to everywhere. No, we were certain she had always been, as we had known her. Old, so terribly old that she could not have grown older, and had stayed at the same age for twenty years. She could never have been pretty; but she was always beautiful. She hobbled about the house in spotless white with one hand resting on her waist to balance her stoop and the other telling the beads of the rosary. Her silver locks were scattered untidily over her pale, puckered face, and her lips constantly moved in inaudible prayer. Yes, she was beautiful. She was like the winter landscape in the mountains, an expanse of pure white serenity breathing peace and contentment.
- A. Answer the following briefly:
- i. How did the grandfather appear in his portrait? 02
  - ii. What sort of a person did he look in his portrait? 02
  - iii. How does the author portray his grandmother? 02
  - iv. Why does he say, "the thought was almost revolting?" 02
- B. Find the words from the passage which have the following meanings:
- i. shelf 02
  - ii. not respectable 02
- C. Make sentences using the following words on your own (any one): 02
- Seem, treat
- D. Supply single word substitute to: 02
- Something which is not logical and sensible
- E. Make a note of the above passage 04
- Q.2. Answer any five of the following: 05×02
- i. What in your opinion was the best lesson that the street taught to the narrator?
  - ii. Explain the expression 'triumphant hatred'.
  - iii. What is the difference between criticizing an idea and criticizing an individual?
  - iv. What is crab mentality?
  - v. Why did Ralph do the wicked act?
  - vi. What does the poet pray for?

- Q.3. Do as directed.
- A. Fill-in the blanks with appropriate choices given in the brackets.
- It -----rain tonight. (may, can) 02
  - He is ---- M.A. in English. (a, an) 02
  - There is -----water in the jug. (little, few) 02
- B. Change the voice
- He reads newspaper every day. 02
  - Close the door. 02
- Q.4. A. Write a paragraph in about 120 words on any one of the following topics: 05×01
- Your college library **or** online class
- B. Answer any of the following. 05×01
- You are the secretary of students' union. Draft a notice regarding the students' picnic to Puri and Konark for information of students.
- Or
- Write a report on the Blood Donation Camp conducted in your college.
- C. Answer any two of the following: 05×02
- Your best friend has won the first prize in the state level debate competition. Write a letter to him/her congratulating him/her on his/her success.
  - You are the owner of Popular Books corner, Grand Road, Puri. You have received a packet of Engineering Mathematics textbooks instead of Communicative English books. Draft a letter of complaint.
  - You are staying in your college hostel. You are facing a lot of difficulties as there is no facilities for drinking water there. Write an application to the superintendent of your hostel requesting him/her to take necessary steps for installing a water purifier in your hostel.
- D. Tata Steel, Kalinga Nagar, Jajpur has invited applications for the post of Junior Engineer from diploma holders in Civil, Electrical and Mechanical Engineering. 10
- (i) Apply for the post (ii) enclose your resume' or C.V. or Bio-data
- Q.5. Answer any two of the following: 05×02
- Write a short note on body language.
  - Discuss the types of formal communication in detail.
  - Communication is a circular process. Justify it.

**1<sup>st</sup> Sem / COMMON/ 2021(W) New**

**Th1(b) Computer Application**

Full Marks: 80

Time- 3 Hrs

Answer any five Questions including Q No.1& 2  
Figures in the right hand margin indicates marks

1. Answer **All** questions 2 x 10
  - a. Define algorithm?
  - b. What do you mean by GFLOPS
  - c. Write about escape sequence character constant
  - d. Define protocol and give two example of protocol
  - e. Draw the symbols used for I/O statements, decision and general processing to draw a flow chart
  - f. Write two rules for naming a variable in C programming language
  - g. Define CPS
  - h. Write four example of antivirus software
  - i. What do you mean by www
  - j. Define pointer
2. Answer **Any Six** Questions 6 x 5
  - a. Give an account of application software and system software
  - b. Write on star and ring topology
  - c. Describe on types of network
  - d. Compare between time sharing and multi programming operating system
  - e. Draw a flow chart to get smallest number among three numbers
  - f. Explain on register and cache memory
  - g. Write on various types of method of data processing
3. Give an account of generation of computer generation 10
4. What do you mean by operating system? Write the functions of OS 10
5. Define file and folder? Describe about different types of file access method 10
6. Define topology? Write on various types of connecting media used to form a network 10
7. Write a program in C and draw a flow chart to get factorial of a given number 10

**1st Sem./ COMMON /2021(W)**  
**Th2 A      ENGINEERING PHYSICS**

Full Marks: 80

Time- 3 Hrs

Answer any five Questions including Q No.1& 2  
Figures in the right hand margin indicates marks

1. Answer All questions 2 x 10
  - a. Write down the SI units of work, angular velocity, electric potential and acceleration
  - b. What are ultrasonics?
  - c. State laws of reflection.
  - d. What is the condition for maximum horizontal range?
  - e. State Newton's law of gravitation.
  - f. State Lenz's law.
  - g. Define specific heat.
  - h. State Fleming's right hand thumb rule.
  - i. Write down the properties of LASER.
  - j. If two capacitors with capacities 2 farad and 3 farad are connected in series connection then, find out the total capacity.
2. Answer Any Six Questions 5X6
  - a. Differentiate between **G** & **g** with example
  - b. State Laws of limiting friction.
  - c. State Kepler's laws of planetary motion.
  - d. Define critical angle and total internal reflection with a diagram.
  - e. Distinguish between longitudinal and transverse wave.
  - f. State and explain Coloumb's Law of electrostatic
  - g. Define lines of force and write down its properties.
3. A projectile fired with an initial velocity 'u' by making an angle 'θ' with the horizontal. Derive expressions for equation of trajectory, maximum height, horizontal range and time of flight. 10
4. Derive an expression for force acting on a current carrying conductor placed in a uniform magnetic field. Distinguish between Fleming's left hand rule & Fleming's right hand rule. 10
5. Find expressions for displacement, velocity and acceleration of a particle executing in S.H.M 10
6. Calculate the total amount of heat required to convert 2.5 Kg of ice from -30°C, to a steam at 200°C. 10
7. State Kirchoff's laws. Apply it to find out balanced condition of the wheatstone bridge. 10

**Th2B/Th2 Engineering Chemistry**

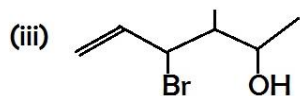
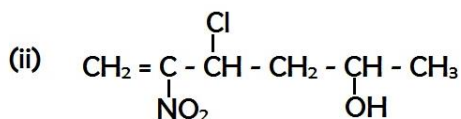
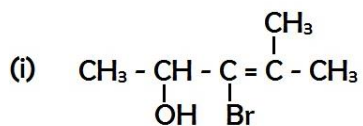
Full Marks: 80

Time- 3 Hrs

Answer any five Questions including Q No.1& 2

Figures in the right hand margin indicates marks

1. Answer **All** questions 2 x 10
- a. What is copolymer? Give an example of it.
  - b. What are the components of Brass?
  - c. What are the conjugate acid and conjugate base of H<sub>2</sub>O?
  - d. Give the bond-line representation of 2-Methylbuta-1,3-diene.
  - e. Write down the electronic configurations of Cu and Ni<sup>2+</sup> ion.
  - f. Define calcination.
  - g. Which chemical substance is added to LPG in order to detect the leakage of the gas?
  - h. Define electrolyte. Give example of a weak electrolyte.
  - i. Define equivalent weight. Find the equivalent weight of Na<sub>2</sub>CO<sub>3</sub>.
  - j. Define lubricant. Mention the conditions under which solid lubricants are preferred.
2. Answer **Any Six** Questions 6 x 5
- a. Explain in brief the organic ion-exchange process of removal of hardness of water.
  - b. Explain waterline corrosion.
  - c. Give the IUPAC names/structural formulae of the following.



(iv) 4-Bromo-4-chloro-3-methylpent-2-en-2-ol

(v) 3-Chloro-4-nitrohex-3-en-2-ol

- d. Define electrovalent bonding. Explain the formation of NaCl.
  - e. Give a brief note on Bio-fertilizer.
  - f. Define and explain Hund's Rule.
  - g. Describe smelting process in metallurgical operation.
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- |   |   |                                                                                                                        |   |
|---|---|------------------------------------------------------------------------------------------------------------------------|---|
| 3 | a | 500 ml of an aqueous solution contains 27.75 gm of $\text{CaCl}_2$ . Calculate molarity and normality of the solution. | 5 |
|   | b | Distinguish between aliphatic and aromatic hydrocarbons.                                                               | 5 |
| 4 | a | Explain the composition and uses of PVC.                                                                               | 5 |
|   | b | Discuss the purpose of lubrication                                                                                     | 5 |
| 5 | a | Define and explain Bronsted-Lowry theory of acids and bases.                                                           |   |
|   | b | How many grams of KOH are required to prepare 2 lit. of its solution having $\text{p}^{\text{H}}$ 10?                  | 5 |
| 6 | a | Explain the drawbacks of natural rubber.                                                                               | 5 |
|   | b | What are the advantages of hot lime soda process over cold lime soda process?                                          | 5 |
| 7 | a | Explain froth floatation process of concentration of ores.                                                             | 5 |
|   | b | Define and explain Huckel's rule of aromaticity.                                                                       | 5 |

**1<sup>st</sup> SEMESTER/COMMON/2021(W)(NEW)**  
**Th3 ENGINEERING MATHEMATICS - I**

Full Marks: 80

Time- 3 Hrs

Answer any five Questions including Q No.1& 2  
Figures in the right hand margin indicates marks

1. Answer all questions 2 x 10
  - a. Find  $M_{23}$  and  $C_{32}$  of the determinant  $\begin{vmatrix} 4 & 3 & 8 \\ 6 & 7 & 5 \\ 9 & 0 & 6 \end{vmatrix}$ .
  - b. Find k for which the following lines are perpendicular to each other  $2x+3y-1=0$  and  $kx-4y+2=0$ .
  - c. Find  $\sin(\tan^{-1} x + \cot^{-1} x)$ .
  - d. Find the centre and radius of the sphere  $(x-2)(x+2) + y^2 + (z-3)(z+3) = 0$
  - e. If  $\begin{bmatrix} 3 & 4 & 2 \end{bmatrix} \times B = \begin{bmatrix} 2 & 1 & 0 & 3 & 6 \end{bmatrix}$ . Find order of B
  - f. What is ASTC Rule in Trigonometry?
  - g. If the equation  $3x^2 - \frac{k}{2}y^2 - 6x + 9y - 3 = 0$  represents a circle, find k.
  - h. A line makes angle  $\alpha, \beta, \gamma$  with X,Y,Z axes, then find  $\sin^2 \alpha + \sin^2 \beta + \sin^2 \gamma$ .
  - i. Find the multiplicative inverse of the matrix  $\begin{pmatrix} 4 & 3 \\ 5 & 4 \end{pmatrix}$ .
  - j. Find the intercepts cut off by the plane  $2x+3y-z=6$  on the axes.
2. Answer **Any Six** Questions 5X6
  - a. Find the angle between two lines whose direction ratios are  $\langle 1, 2, 1 \rangle$  and  $\langle 2, -3, 4 \rangle$ .
  - b. Find the equation of the circle whose diameter is the portion of the line  $3x+4y-12=0$  intercepted between the coordinate axes.
  - c. Prove without expanding 
$$\begin{vmatrix} a & a^2 & a^3 \\ b & b^2 & b^3 \\ c & c^2 & c^3 \end{vmatrix} = abc(a-b)(b-c)(c-a).$$
  - d. Find the maximum and minimum value of the following  $6 \cos x - 8 \sin x - 3$
  - e. Find the equation of the line which passes through  $(-3, 7)$  and makes intercepts on the axes equal in magnitude but opposite in sign.

- f. In a triangle ABC if  $m\angle A = 90^\circ$ , prove that  
 $\tan^{-1} \frac{b}{a+c} + \tan^{-1} \frac{c}{a+b} = \frac{\pi}{4}$ , where a, b, c are sides of the triangle.
- g. If  $A = \begin{pmatrix} 3 & 2 \\ 2 & 3 \end{pmatrix}$ , evaluate  $A^2 - 6A + 8I$ , where  $I$  is the Identity matrix of the given order.

Answer any **three** questions

- 3 a. Find the equation of the line passing through intersection of the lines  $x + 3y - 7 = 0$  and  $3x - y - 11 = 0$  and centroid of the triangle whose vertices are the points (3,-1), (1, 3) and (2, 4). 5
- b. Evaluate  $\sin 18^\circ$ . 5
- 4 a. Find the equation of the plane passing through the point (-1, 3, 2) and perpendicular to the planes  $x+2y+2z=5$  and  $3x+3y+2z=8$ . 7
- b. Solve by Cramer's Rule  
 $2x+3y=1$  and  $-x+y=-3$  3
- 5 If  $A + B + C = \pi$ , prove that  
 $\sin^2 A + \sin^2 B + \sin^2 C = 2 + 2 \cos A \cos B \cos C$  10
- 6 Find the equation of a sphere whose centre lies on the plane  $x + y + z = 0$  and which passes through the points (1,-3,4), (1,-5,2) and (1,-3,0). 10
- 7 a. Evaluate  $\tan^{-1} \left[ \frac{\sqrt{1-\sin x} + \sqrt{1+\sin x}}{\sqrt{1-\sin x} - \sqrt{1+\sin x}} \right]$  6
- b. Find the value of 'a' so that the points (1, 4), (2,7), (3,a) are collinear. 4

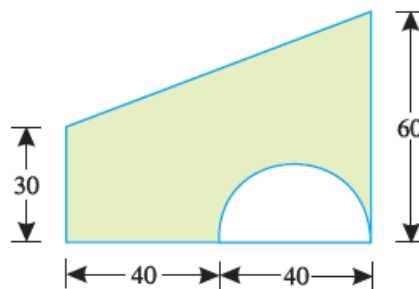
Answer any five Questions including Q No.1& 2  
Figures in the right hand margin indicates marks

1. Answer **All** questions 2 x 10

- a. Define force and state its unit ?
- b. State the principle of transmissibility ?
- c. Define FBD with suitable sketch ?
- d. Define Couple and write its unit ?
- e. Define angle of repose ?
- f. What is coefficient of friction?
- g. Differentiate between Centroid and Centre of Gravity ?
- h. Define Mechanical advantage and Velocity ratio by considering a lifting machine ?
- i. Define momentum and impulse ?
- j. Define coefficient of restitution ?

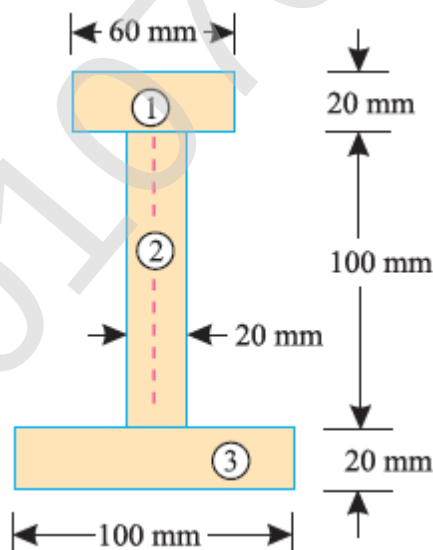
2. Answer **Any Six** Questions 6 x 5

- a. State and prove Lami's theorem.
- b. The resultant of two concurrent forces is perpendicular to the smaller force and angle between the forces is  $120^\circ$ . if the bigger force is 60 N, find the smaller one?
- c. State the laws of static friction ?
- d. A certain weight lifting machine of velocity ratio 40 can lift a load of 2000 N, with the help of 150 N effort. Determine the efficiency of the machine ?
- e. A smooth circular cylinder of radius 1.5 meter is lying in a triangular groove, one side of which makes  $15^\circ$  angle and the other  $40^\circ$  angle with the horizontal. Find the reactions at the surfaces of contact, if there is no friction and the cylinder weights 100 N.
- f. A semicircular area is removed from a trapezium as shown in Fig.(dimensions in mm)



Determine the centroid of the remaining area (shown hatched).

- g A body of mass 40 kg is moving with a constant velocity of 2.5 m/s. Now a force of 100 N is applied on the body in its direction of motion. What will be its velocity after 2 second.
- 3 The following forces act at a point : 10  
 (i) 20 N inclined at  $30^\circ$  towards North of East,  
 (ii) 25 N towards North,  
 (iii) 30 N towards North West, and  
 (iv) 35 N inclined at  $40^\circ$  towards South of West.  
 Find the magnitude and direction of the resultant force
- 4 A uniform ladder of length 3.25 m and weighing 250 N is placed against a 10  
 smooth vertical wall with its lower end 1.25 m from the wall. The coefficient of friction between the ladder and floor is 0.3. What is the frictional force acting on the ladder at the point of contact between the ladder and the floor? Show that the ladder will remain in equilibrium in this position.
- 5 (a) What is reversible machine? State the condition of reversibility. 5  
 What load can be lifted by an effort of 120 N, if the velocity ratio is 18 and  
 (b) efficiency of the machine at this load is 60% ? Determine the law of the 5  
 machine, if it is observed that an effort of 200 N is required to lift a load of 2600 N
- 6 (a) Define Collision .state the law of conservation of linear momentum. 5  
 (b) 5  
 A ball of mass 1 kg moving with a velocity of 2 m/s impinges directly on a ball of mass 2 kg at rest. The first ball, after impinging, comes to rest. Find the velocity of the second ball after the impact and the coefficient of restitution
- 7 An I-section is made up of three rectangles as shown in Fig. Find the moment of 10  
 inertia of the section about the horizontal axis passing through the centre of gravity of the section.



1st Sem./COMMON TO ALL BRANCHES/ 2021(W)  
Th4(A&B) Basic Electrical & Electronics

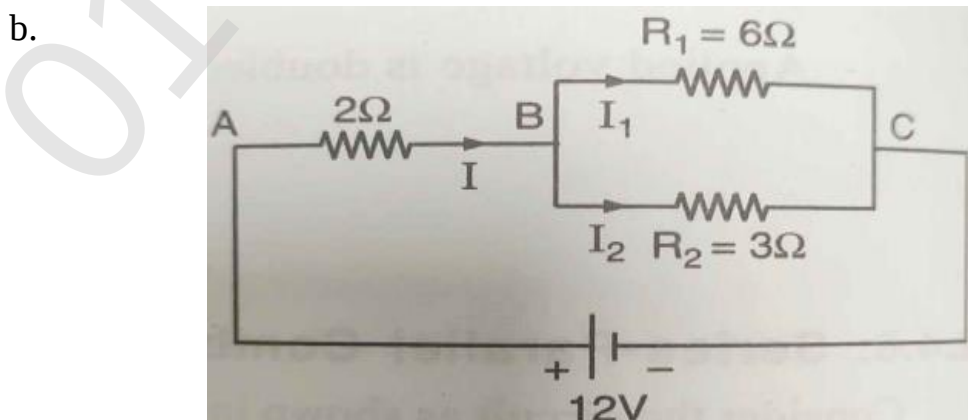
Full Marks: 80

Time- 3 Hrs

Answer any five Questions including Q No.1& 2  
Figures in the right hand margin indicates marks

1. Answer **All** questions 2 x 10
- a. What is the function of economiser in thermal power plant?
  - b. Write down basic protective device used in house hold wiring.
  - c. What is the function of commutator in a D.C generator?
  - d. Sketch connection diagram of :-
    - (i) Watt meter
    - (ii) Energy meter
  - e. What is the total resistance of the resistances  $2\Omega$ ,  $4\Omega$ ,  $6\Omega$ ,  $8\Omega$  and  $10\Omega$  connected in parallel?
  - f. Write down the difference between conductor and semiconductor.
  - g. What is the need of biasing?
  - h. Write down the difference between oscillator and amplifier?
  - i. What is modulation and state different types of modulation?
  - j. What is passive transducer? Write down 2 example of it.

2. Answer **Any Six** Questions 6 x 5
- a. Explain different types of wiring used in Electrical installation.



- Find the value of  $I_1$  and  $I_2$ .
- c. Derive the expression for instantaneous current when A.C voltage

- passed through a pure capacitor only.
- d. Define Electronic Emission & explain different types of Emission.
  - e. Explain the working principle of full wave bridge rectifier.
  - f. Explain the concept of transducer and sensor and state the difference between them.
  - g. Explain the working principle of single-phase CE amplifier.
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- |   |                                                                                                                                                                                                                                                                                                                                                                                                                                                          |    |
|---|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| 3 | A resistance of $1\Omega$ , inductance $0.1H$ and capacitance $50\mu F$ are connected in series across a $230V$ , $50\text{ Hz}$ supply. Find (a) $X_L$ (b) $X_C$ (c) $Z$ (d) $I$ (e) p.f. (f) active power (g) reactive power (h) apparent power (i) phase angle and Draw impedance and power triangle of Series RLC circuit.                                                                                                                           | 10 |
| 4 | Explain the working of a hydro power plant with block diagram.                                                                                                                                                                                                                                                                                                                                                                                           | 10 |
| 5 | A house is connected with following electrical loads (i) 2 bulbs $100\text{ watt}$ each running $6\text{hrs}$ daily (ii) 2 tube light $40\text{watt}$ each running $5\text{hrs}$ daily (iii) one heater $1.5\text{KW}$ running $2\text{hrs}$ daily (iv) 4 fans $60W$ each running $10\text{hrs}$ daily (v) One motor $1.5\text{HP}$ running $2\text{hrs}$ daily. Calculate monthly electric bill for August, 2021 if the unit cost is $\text{Rs.}4.20$ . | 10 |
| 6 | What is CRO? Explain working principle of CRO with simple Block diagram?                                                                                                                                                                                                                                                                                                                                                                                 | 10 |
| 7 | Explain the working principle and use of PN junction diode with neat circuit diagram.                                                                                                                                                                                                                                                                                                                                                                    | 10 |