

2ND SEM./COMMON TO ALL /2022(S)

TH1 A COMMUNICATIVE ENGLISH

Full Marks: 80

Time 03 hours

Answer ALL Questions

Figures in the right hand margin indicate marks

Answer All questions.

Q.1.

Read the following passage carefully and do as directed.

It was the summer of 1936. The Olympic Games were being held in Berlin. Because Adolf Hitler childishly insisted that his performers were members of a "master race", nationalistic feelings were at an all-time high.

Jesse Owens wasn't too worried about all this. He had trained, sweated and disciplined himself for six years, with the Games in mind. While he was going over on the boat, all he could think about was taking home one or two of those gold medals. He had his eye especially on the long jump. A year before, as a university student, he'd set the world record of 26 feet 8 ¼ inches. Everyone kind of expected him to win that Olympic event hands down.

He was in for a surprise. When the time came for the long-jump trials, he was startled to see a tall boy hitting the pit at almost 26 feet on his practice leaps! He turned out to be a German named Luz Long. He was told that Hitler had kept Long under wraps, evidently hoping he would win the jump. He supposed that if Long won, it would add some new support to the Nazis' Aryan-superiority theory. After all, he is a Negro. A little hot under the collar about Hitler's ways, he determined to go out there and really show Der Fuhrer and his master race who was superior and who was not.

A Answer the following briefly:

- | | | |
|------|---|----|
| i. | Why were nationalistic feelings running high during the 1936 Summer Olympics in Berlin? | 02 |
| ii. | Why was Owens not worried? | 02 |
| iii. | What was the surprise that awaited Jesse Owens in Berlin? | 02 |
| iv. | What made Owens determined to beat Luz Long? | 02 |

B. Find the words from the passage which have the following meanings:

- | | | |
|----|-----------------------------|----|
| i | Superior to all other races | 02 |
| ii | Secrets | 02 |

C. Make sentences using the following words on your own (any one):
Perform, insist 02

D. Supply a single-word (from the passage) substitute to:
Greatly shocked and surprised 02

E Make a note of the above passage 04

Q.2.

Answer **Any FIVE** of the following: 05×02

- i. What does "my education was left to the street" mean here?
- ii. What lesson did the narrator learn during his encounter with a bully like Red?
- iii. "If this were happening in India"- What does the author mean by this?
- iv. How did the author handle inefficient employees in C-DOT and why?
- v. Why did Sir Ralph curse himself?
- vi. How did the friend inspire self-confidence in the poet?

- Q.3. Do as directed.**
Fill-in the blanks with appropriate choices/ following instructions given in the brackets.
- | | | |
|------|--|----|
| i. | On his way back to home, he -----(see) a snake. | 02 |
| ii. | He is -----(a/an) university student. | 02 |
| iii. | You -----(must/ought to) obey the traffic rules. | 02 |
| iv | The boy makes toys. (change the voice) | 02 |
| V | Does she want a book? (change the voice) | 02 |
- Q.4.** Write a paragraph in about 120 words on any one of the following topics:
Global Warming or Covid-19 Pandemic 05×01
- Q 5.** Answer **ANY** of the following: 05×01
Your department has organized a study tour to World Skill Centre. As you are the class representative of your class, draft a notice to inform all your classmates. Or
Write a report on the annual day celebration of your college.
- Q 6.** A. Answer any **TWO** of the following: 05×02
- | | | |
|------|---|--|
| i. | You need Rs. 600/-to pay the fees towards registration for examination. Write a letter to your father asking him to send the money to your account. | |
| ii. | You could not appear for the internal assessment on account of your illness. Write an application to the head of your department requesting him/her to allow you another chance for the said examination. | |
| iii. | You are Bimala Books, Jaraka Road, Jajpur . You have received a packet of engineering mathematics text books instead of Communicative English books from your distributor M/S Padmalaya Books, Satya Nagar, Bhubaneswar. Draft a letter of complaint. | |
- B. Jindal Steel Plant, Kalinga Nagar, Jajpur has invited applications for the post of Junior Engineer from diploma holders in Civil, Electrical and Mechanical Engineering. 10
Apply for the post and enclose your resume' or C.V.
- Q.7** Answer any **TWO** of the following: 05×02
- | | |
|------|---|
| i. | Write a short note on postures and gestures. |
| ii. | Discuss types of communication. |
| iii. | Communication follows a dynamic cycle. Explain with the help of a suitable diagram. |

2ND SEMESTER/ COMMON / 2022(S)

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. Write the symbols used for the following expression in flowcharts (I/o, Decision Making, Processing, Connector)
 - b. Interpret MICR
 - c. Define MIPS
 - d. Identify which are variables
(rama, r-ama, r_ama, rama2, 3rama, r@ama)
 - e. Distinguish between file and folder
 - f. Define algorithm
 - g. Compare between compiler and interpreter
 - h. Interpret WWW
 - i. Define array
 - j. Write four antivirus softwares
2. Answer **Any Six** Questions 6 x 5
 - a. Compare between time sharing and multiprogramming operating system
 - b. Draw a flow chart to get the factorial of a given number
 - c. Write on several type of operators used in C programming language
 - d. Explain different mode of data processing
 - e. Summarise different types of data transmission mode
 - f. Explain how you could able to know that a computer system is virus affected
 - g. Compare between 3rd and 4th generation computers
3. Draw a flow chart and write a program in C to get the addition of all even numbers from 1 to 99 10
4. Write on sequential, direct and ISAM file access method 10
5. Briefly write on several types of networking devices used to form a network 10
6. Summarise the features of DOS,UNIX and WINDOWS operating system 10
7. Classify memory in details 10

2nd Sem. / COMMON / 2022(S)

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
- Define Flux. Give an example of Acidic Flux.
 - Calculate the pH of 0.001M KOH solution.
 - What are the characteristics for a compound to be Aromatic?
 - What causes permanent hardness in water?
 - Write down any one difference between Double salt & Complex salt. Give an example of each.
 - Find out the Conjugate Base of HPO_4^{2-} .
 - Write down the electronic configuration of Cr & Cu.
 - Define isotope with an example.
 - Calculate the equivalent weight of CH_3COOH & $\text{Al}_2(\text{SO}_4)_3$.
 - Write down the general formula for Alkene series. What is the first member of alkene family?
2. Answer **Any Six** Questions 5 x 6
- Differentiate between Calcination & Roasting.
 - Write down the composition & uses of Bronze & Duralumin.
 - Differentiate between Saturated & Unsaturated Hydrocarbons.
 - Explain the Hot lime Soda method of softening of hard water.
 - Define Corrosion. Explain waterline Corrosion.
 - Write down the Structural formula & IUPAC name of the following:-
 - 2,3- dibromo -1,4-dichloro - but-2- ene
 - 5 - iodo - 4,4,5-trichloro - hex-2- ene
 - 1,1,2,2-tetrafluoro ethene
 - $\text{CH}_3\text{CH}(\text{OH})\text{C}(\text{Br})\text{C}(\text{CH}_3)\text{CH}_3$
 - $\text{CH}\equiv\text{C}-\text{CH}=\text{CH}_2$
 - Explain the Froth floatation method with a labelled diagram.

3	Make a comparative study of Arrhenius Theory & Bronsted-Lowry Theory of acids & bases. Write down the limitations of Arrhenius Theory of acids & bases.	7 3
4	(a) Differentiate between Thermoplastic & Thermosetting polymers with examples. (b) How is Polyvinyl Chloride prepared? What are its uses?	5 5
5	(a) State and explain Faraday's first law of electrolysis. (b) How many grams of NaOH is required to prepare 4L of its solution having pH 10.	5 5
6	Explain the Bohr's model of atomic structure. What are the drawbacks of this model?	7+3
7	(a) What are the conditions for a fuel to be a good fuel? (b) What are Bio-fertilizers? Write Uses of various Bio-fertilizers.	5 5

2nd Sem./ COMMON / 2022(S)
Th-2A 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 the SI unit of i) Frequency ii) Temperature
 - b. State Triangle's law of vector addition
 - c. Define vector product of 02 vectors.
 - d. What is Static Friction ?
 - e. Define Universal Gravitational Constant (G)
 - f. Write any two application of Ultrasonic wave.
 - g. Define Latent heat.
 - h. What is refractive Index ?
 - i. Define Magnetic Flux Density.
 - j. Mention the value of relative permittivity of free space.

2. Answer **Any Six** Questions 6 x 5
 - a. Check the correctness of $T = 2\pi\sqrt{l/g}$ using Dimensional analysis.
 Where the symbols used have their usual meaning
 - b. State Kepler's Law of Planetary Motion..
 - c. State Laws of Limiting Friction.
 - d. Differentiate between Transverse wave and Longitudinal wave-motion.
 - e. Draw with labelled diagram Refraction pattern through material of Prism.
 - f. Compare Fleming's Left hand and Right hand rule.
 - g. State and explain Coulomb's law in magnetism.

3. Find the equations for i)Maximum height ii) Total time of Flight and iii) Horizontal range , when the projectile is fired at an angle with the horizontal. 10

4. Obtain the equations for (i) Displacement (ii) velocity (iii) Acceleration of a particle in Simple Harmonic Motion (SHM) 3+4+3

5. How much heat is required to convert 10 gm of ice at -5°C to steam at 100°C? 10

6. State Kirchhoff's laws. Derive the condition of balance in a wheatstone Bridge.. 4+6

7. Write the Principle, Properties and Applications of LASER. 10

2nd. SEM. /COMMON/ 2022(S)
TH-3 -ENGINEERING MATHEMATICS -II

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
1. a. Define Modulus Function and represent it graphically.
- b. Evaluate $\lim_{x \rightarrow 0} \frac{x}{\sqrt{1+x} - \sqrt{1-x}}$
- c. Differentiate $\sec^{-1} \left(\frac{\sqrt{a^2+x^2}}{a} \right)$ with respect to x.
- d. Define unit vector and find the unit vector of the given vector $2\hat{i} + 3\hat{j} + 6\hat{k}$.
- e. Evaluate the integral $\int (e^{5 \ln x} - e^{4 \ln x}) dx$.
- f. Define Homogeneous Function and State Euler's Theorem.
- g. Find the value of α so that $\vec{a} = \hat{i} + \hat{j} + \alpha\hat{k}$, $\vec{b} = 4\hat{i} - 3\hat{k}$ are perpendicular to each other.
- h. Find the order and degree of the following differential equation
$$\frac{d^2y}{dx^2} = \frac{3y + \frac{dy}{dx}}{\sqrt{\frac{d^2y}{dx^2}}}$$
- i. Find the value of $\int_{-2}^2 |x| dx$.
- j. If $y = t^2$ and $x = t^3$ find $\frac{dy}{dx}$ at $t = 1$. 6 x 5
2. Answer **Any six** questions:
- a. If $f(x) = \begin{cases} ax^2 + b, & \text{if } x < 1 \\ 1, & \text{if } x = 1 \\ 2ax - b, & \text{if } x > 1 \end{cases}$ is continuous at $x = 1$, then find the value of 'a' and 'b'.
- b. Find $\frac{dy}{dx}$ if $y = (\ln x)^{\tan x}$.
- c. Determine the area within the curve $y^2 = 4ax$ and the x-axis, the ordinate $x=4$.
- d. Evaluate $\int \frac{\tan x + \tan \alpha}{\tan x - \tan \alpha} dx$.
- e. Solve $(1 + x^2)dy + (1 + y^2)dx = 0$.

- f. Find the scalar and vector projections of the vector $2\hat{i} - 3\hat{j} - 6\hat{k}$ on the line joining the points (3,4,-2) and (5,6,-3).
- g. Find $\frac{dy}{dx}$ if $x = \frac{2t}{1+t^2}$, $y = \frac{2t}{1-t^2}$.
- 3 i. If $\sqrt{1-x^6} + \sqrt{1-y^6} = k(x^3 - y^3)$, prove that $\frac{dy}{dx} = \frac{x^2}{y^2} \sqrt{\frac{1-y^6}{1-x^6}}$ 7
- ii. Evaluate $\lim_{x \rightarrow 0} \frac{1 - \cos^3 x}{x \sin 2x}$. 3
- 4 i. If $u = \tan^{-1}(x^2 + y^2 + z^2)$, show that $xu_x + yu_y + zu_z = \sin 2u$ 7
- ii. If sum of two unit vectors is a unit vector, show that the magnitude of their difference is $\sqrt{3}$. 3
- 5 i. Evaluate $\int \frac{2x+11}{\sqrt{x^2+10x+29}} dx$. 6
- ii. If $y = \tan^{-1} x$, prove that $(1+x^2)y_2 + 2xy_1 = 0$ 4
- 6 i. Solve the following differential equation $(1+y^2)dx = (\tan^{-1} y - x)dy$ 7
- ii. Find the derivative of $y = e^x$ by first principle. 3
- 7 i. In a triangle AOB , angle $AOB = 90^\circ$. If P, Q are the points of trisection of $\overline{AB}$, prove that $OP^2 + OQ^2 = \frac{5}{9}AB^2$ by vector method. 6
- ii. Evaluate $\int e^x \left(\frac{1}{x^2} - \frac{2}{x^3} \right) dx$. 4

IIND SEM ./COMMON / 2022(S)

Th4(a) - Engineering Mechanics

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. State the Law of Conservation of Linear momentum.
 - b. What is fundamental unit and derived units with examples?
 - c. What is coefficient of friction?
 - d. Write down the expression for Velocity Ratio of a Simple wheel and Axle.
 - e. What is Coplanar Concurrent Forces?
 - f. State Newton's 1st law of motion.
 - g. What is Self Locking machine?
 - h. What is the distance of centroid of a semi circular area from the base?
 - i. Define Force and its unit in S.I system.
 - j. Define Couple and its unit.
2. Answer **Any Six** Questions 6 x 5
- a. Derive the relation between Mechanical Advantage, Velocity Ratio and Efficiency of a Lifting machine.
 - b. In a lifting machine, an effort of 15N can lift a load of 300N and an effort of 20N can lift a load of 500N. Find the law of machine. Also find the effort required to lift a load of 880N.
 - c. What is Gear Train .Derive its velocity ratio of a Simple Gear Train.
 - d. State and Proof the Polygon Law of Forces.
 - e. Find the angle between two equal forces p, when their resultant is equal to (i) p and (ii) p/2
 - f. State and prove Lami's theorem.
 - g. The following forces act at a point
 - (i) 20N inclined at 30⁰ towards North to East.
 - (ii) 25N towards North
 - (iii) 30N towards North west, and
 - (iv) 35N inclined at 40⁰ towards south of west.Find the magnitude and direction of the resultant force.

- 3 State Triangle Law of force and proof Parallelogram Law of Force. 10
- 4 Define Centroid. 10
An I- section has the following dimensions in mm units.
Bottom flange= 300x100
Top flange= 150x50
Web= 300x50
Determine mathematically the position of centre of gravity of the section.
- 5 Define Angle of repose. 10
A body of weight 500N is pulled up an inclined plane, by a force of 350N. The inclination of the plane is 30° to the horizontal and the force is applied parallel to the plane.
Determine the co-efficient of friction.
- 6 A body of weight 70KN is suspended by two strings whose lengths are 6cm and 8cm from two points in the same horizontal level. The horizontal distance between the two points is 10cm. Determine the tensions of the strings. 10
- 7 Define Coefficient of Restitution. What are various types of Impacts? Discuss any one of them. 10

II ND /COMMON / 2022(S)

Th4-A&B Basic Electrical and Electronics

Full Marks: 80

Time- 3 Hrs

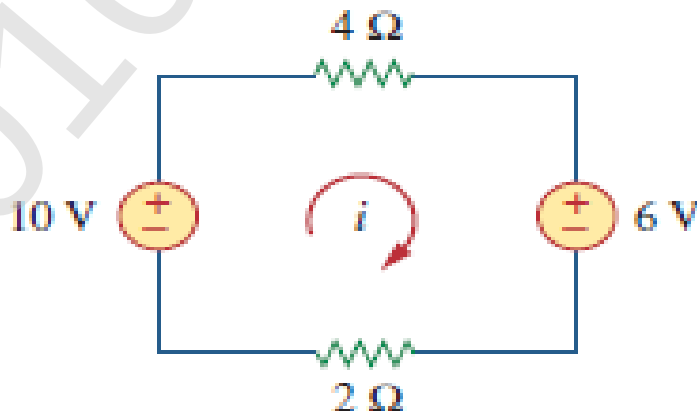
Answer any five Questions including Q No.1& 2
Figures in the right hand margin indicates marks

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

- a. What is the importance of pole and pole shoes in DC machine?
- b. With a 8 ohm resistor and a 6 ohm inductive reactance, what is the total impedance?
- c. What is the function of penstock in hydroelectric power plant?
- d. What is fuse? Why it is used?
- e. Write down 2 uses of PMMC & MI type instrument.
- f. What is transducer and classify different types of transducer?
- g. What is the function of filter?
- h. What is the function of delay line in CRO?
- i. What is ripple and ripple factor?
- j. Write down the relationship of output and input current gain in CE, CB configuration.

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

a.



Find out (i)current (ii)voltage drop across 4 ohm and 2 ohm (iii)
Power absorbed by resistance 4 ohm and 2 ohm.

- b. Write down the construction and principle of filament lamp.
 - c. Discuss the torques required in measuring instruments in briefly.
 - d. With a neat block diagram explain the working of unregulated DC power supply system.
 - e. With a neat circuit diagram explain full wave center tap rectifier.
 - f. Explain different types of modulation.
 - g. Explain the construction and working principle of a PN junction diode.
-
- | | | |
|---|---|----|
| 3 | A coil of resistance 10 ohm and inductance 0.1H is connected in series with a capacitor 150 μ F across a 200V,50 Hz supply. Calculate (i)Inductive reactance (ii)Capacitive reactance (iii)Impedance (iv) Power factor(v) Current | 10 |
| 4 | A building has the following electrical appliances
(i) A 1.5 HP motor running for 6 hrs in a day.
(ii) Four fans each of 80W running for 10 hrs. in a day.
(iii) Four tube lights of 40W running for 15 hrs. per day.
Find the monthly bill for the month of February 2022 if unit cost of bill is Rs.2.50. | 10 |
| 5 | Draw the block diagram of Thermal Power Plant and explain the function of each elements of it. | 10 |
| 6 | (a) Explain the working principle of single-phase CE amplifier.
(b) Explain working principle of multimeter with block diagram. | 10 |
| 7 | Define Oscillator and classify it. Also explain working of basic Oscillator with simple block diagram. | 10 |