

5. (a) Define Lubricants. Write various functions of lubricants. 6
- (b) Differentiate between thermoplastics and thermosetting plastics. 3
- (c) Write polymerization reactions for the following polymers : 3
- (i) Polyvinyl chloride
- (ii) Polystyrene
- (iii) Polythene.



CHEM-22104

First Semester (Common to All)
(N-2022)

APPLIED CHEMISTRY-I

Time : 3 Hours

M. M. : 60

Note : Attempt all questions. Q. No. 1 is compulsory.

(Compulsory Question)

1. (a) Define Electron.
- (b) What are redox reactions ?
- (c) What is composition of Brass ?
- (d) Define hard and soft water on the basis of soap test.
- (e) Define Higher calorific values.
- (f) What are flash and fire points ? $2 \times 6 = 12$

2. (a) Explain Bohr's theory of atomic model. 6
- (b) Differentiate between Sigma and pi bonds. 3
- (c) What are Solutions ? Define Solute and solvent. 3

Or

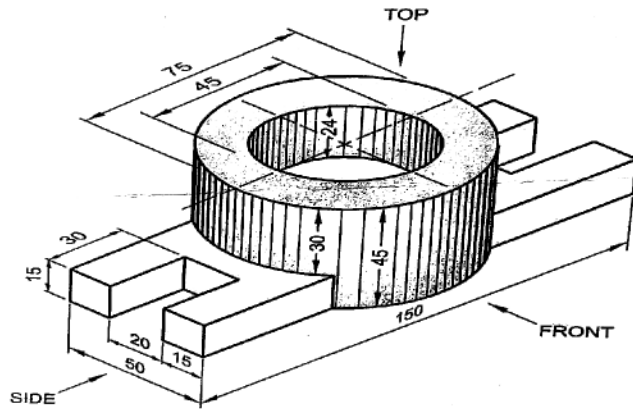
- (a) Differentiate between Orbit and Orbital. 6
- (b) Define a chemical bond. What is the cause of chemical bonding ? 3
- (c) Define the terms Molarity, molality and mass percentage. 3
3. (a) State and explain Faraday's first law of electrolysis. 6

- (b) Write a short note on electro plating. 3
- (c) Write the principle and process of froth floatation. 3

4. (a) What are the characteristics of a good fuel ? 6
- (b) What are the purposes of making alloys ? 3
- (c) Write qualities of drinking water. 3

Or

- (a) What is Permutit ? Explain Zeolite process used for removal of hardness of water. 6
- (b) What is Producer Gas ? Write its composition. 3
- (c) Write a short note on Octane number. 3



Section C

5. (a) Draw the isometric view of a regular circular cylinder of diameter 40 mm and height 90 mm resting on its base on the H.P. plane. 12
- (b) Draw the free-hand proportionate sketch (orthographic front view only) of any *two* of the following : 6+6=12
- (i) Buttress Thread
 - (ii) Hexagonal Nut
 - (iii) Split Pin Nut.

EG-22105

First Semester (N-2022)

(Common to All)

ENGINEERING GRAPHICS

Time : 3 Hours

M. M. : 60

Note : Question paper contained three Sections A, B and C. Attempt any *one* question from each Section. Assume any missing data/dimensions if any. BIS Standards SP46 : 2003 must be followed. First Angle Projection must be followed.

Section A

1. (a) Draw the conventions of following lines :
- (i) Object Line

(ii) Centre Line

(iii) Cutting Plane Line. $3 \times 1 = 3$

- (b) The distance between two stations is 600 km. It is represented on a railway map by a line 15 cm long. Construct a diagonal scale to measure kilometres and find its R.F. Indicate the distance 346 km on the scale. **15**

2. (a) Write the following sentence in single-stroke vertical capital letter writing in 7 : 4. Take the height of the letters as 35 mm. **15**

TECHNICAL EDUCATION

- (b) With the help of a suitable sketch, show how the parallel dimensioning technique is done. **3**

Section B

3. Figure I shows the pictorial view of an object. Draw the front, side and top views of the given object in first-angle orthographic projections :

6+6+6=18

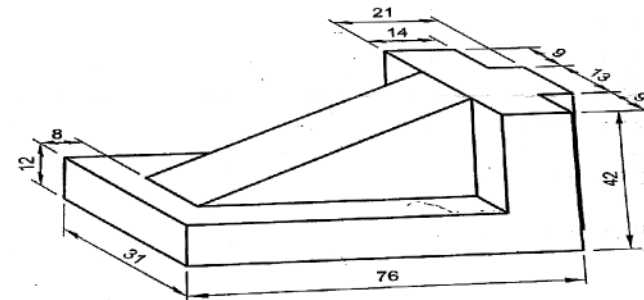
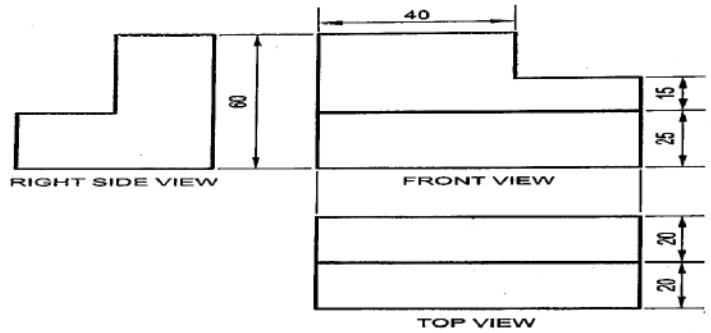


Fig-1

4. Figure II shows the pictorial view of an object. Draw the front, side and top views of the given object in first angle orthographic projections :

6+6+6=18

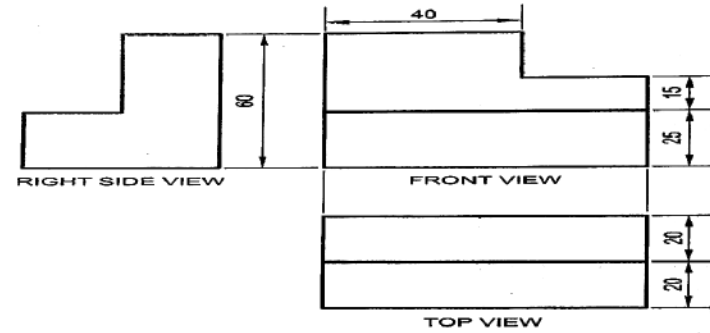
6. (a) Figure III shows three incomplete views of an object. Redraw these views, draw the missing lines and complete the views : 9



- (b) Draw free hand-proportionate sketches (front and top orthographic views) of the following : $5+5+5=15$
- Plain Washer
 - Single collar Stud
 - Flat Point Set Screw.



6. (a) Figure III shows three incomplete views of an object. Redraw these views, draw the missing lines and complete the views : 9



- (b) Draw free hand-proportionate sketches (front and top orthographic views) of the following : $5+5+5=15$
- Plain Washer
 - Single collar Stud
 - Flat Point Set Screw.



Section III

5. (a) Make a precis and give it a suitable title :
Beauty is a source of eternal joy and everlasting pleasure. It becomes a fountain head of inspiration. It cheers us up when our life is surrounded by dark clouds of misery and when we are stuck by the pain of deep sorrow or acute grief. God and nature have together conspired to spread beauty in the world of men. The pretty face of a woman, the smile of a child, the glory of sunrise and sunset, the changing lines and shapes of spring flowers have universal charm which never fade. The beauty of a piece of art, a

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Total No. of Questions—7] [Total No. of Printed Pages—7

ENG-22101

First Semester (Common to All)
(N-2022)

COMMUNICATION SKILLS IN ENGLISH

Time : 3 Hours

M. M. : 60

Note : Attempt *Five* questions in all. Section I (Q. No. 1) is compulsory. Select *two* questions each from Section II and Section III.

Section I

1. Define the following :
 - (a) Define Communication.
 - (b) Explain Empathy.

- (c) How much money had Della saved ?
- (d) What does the poet mean by "The head is held high" ?
- (e) Name the two types of Minutes of Meeting.
- (f) Glossory :
- (i) Negligence
- (ii) Assistant. **6×2=12**

Section II

2. (a) Explain the barriers to effective communication.
- (b) Difference between Hard skills and Soft skills.

- (c) Describe the two possessions Jim and Della are proud of. **6+3+3**

3. (a) Write a brief character sketch of Uncle Podger.
- (b) Explain the process of Communication.
- (c) Write a short note on Life Skills.

6+3+3

4. (a) Explain the central idea of 'Where the Mind is Without Fear'.
- (b) Explain Emotional intelligence and its types.
- (c) Difference between Verbal and Non-Verbal Communication. **6+3+3**

poem, a musical composition has an everlasting appeal. Nevertheless, it is too much to say that the same object of beauty will always give the same amount of joy. Variety is essential. However, in general sense, it is quite true to say that a thing of beauty is a joy for ever.

(b) Do as directed :

Give Hindi equivalent of the following :

- (i) Academy
- (ii) Craftsman
- (iii) Warning

(c) Change the tense :

- (i) I go to school.

(Future Indefinite Perfect tense)

(ii) It has rained. (Present continuous)

(iii) She will be reading a book.

(Past perfect continuous)

6+3+3

6. (a) Draft an e-Mail regarding request for leave due to medical reasons.

(b) Draft a Notice regarding change of work timings.

(c) Change from Active into Passive :

(i) He has sent the message.

(ii) They had brought beautiful toys.

(iii) Respect your elders. **6+3+3**

7. (a) You are Simran Chauhan resident of B-13, 403 Noida, U.P. Write a letter to the Bank Manager of SBI, Noida regarding issuance of check book in favour of your Account No. 12345678.

(b) You are Khushi Verma studying in Stephen College, New Delhi. Write a letter to your sister/brother regarding Sports Day celebrated in your college.

(c) One word substitution :

(i) One who believes in God

(ii) Study of mind

(iii) One who looks at the bright side of things. **6+3+3**



11. Expand HDMI.

12. Which language is directly understood by computer ?

Section II

Note : Attempt any *two* questions.

1. (a) What is a Computer ? Explain its working with the help of a block diagram. 6
(b) Define Booting. What are its types ? 3
(c) Explain the working of internet browser. 3
2. (a) What is OS ? Explain the functions of OS. 6
(b) Write a short note on peripheral device. 3
(c) What is a search engine ? How is ranking done by search engine ? 3
3. (a) What do you understand by a national portal ? Write a page about national portal of India. 6

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Total No. of Questions—18] [Total No. of Printed Pages—6

IITS-22106

First Semester (Common to All)
Common to Group B in First Semester
(CI, ME, AU, IN, EEE, MT) (N-2022)
Common to Gr-A in Second Semester
CO, IT, ET, EX, IOT, MLT
INTRODUCTION TO IT SYSTEMS

Time : 3 Hours

M. M. : 60

Section I

Note : All questions are compulsory. 1×12=12

1. Which is the default alignment in MS Word ?
 - (a) Right
 - (b) Centre
 - (c) Left
 - (d) Justify

2. What is the extension of an MS Word file ?
3. Which of the following is an example of page orientation ?
 - (a) Landscape
 - (b) Subscript
 - (c) Superscript
 - (d) A4
4. Which enables us to send the same letter to different people ?
 - (a) Macros
 - (b) Template
 - (c) Mail merge
 - (d) None of the above
5. Which of the following is the first calculating device ?
 - (a) Abacus
 - (b) Calculator
 - (c) Turing Machine
 - (d) Pascaline

6. Which cable is used to connect a hard drive to a motherboard ?
 - (a) A SATA Cable
 - (b) An IDE Cable
 - (c) A USB Cable
 - (d) A PS2 Cable
7. What is a URL ?
8. Full form of USB is.....
9. 1 GB is equal to :
 - (a) 1024 MB
 - (b) 1028 MB
 - (c) 256 MB
 - (d) 1012 MB
10. Which of the following is an example of non-volatile memory ?
 - (a) ROM
 - (b) RAM
 - (c) Cache Memory
 - (d) All of the above

5. (a) Answer the following w.r.t Microsoft excel : **6**
- (i) How can we merge multiple cells text strings in a cell ?
- (ii) How can you split a column into 2 or more columns ?
- (iii) What is a filter ?
- (b) What is an online threat ? Explain any *three* types of online threats. **3**
- (c) What is MS Word ? What are its uses ? Which formatting features can be added to the MS Word document ? **3**
6. (a) Discuss simple functions used in Microsoft excel with example. **6**
- (b) What is an online fraud ? **3**
- (c) Give usecases of Computer, Internet and Softwares. **3**



- (b) What is a software ? Why do you need it ? How are they created ? **3**
- (c) What is a memory in computer ? What are its types ? What are their usecases with reference to its types ? **3**

Section III

Note : Attempt any *two* questions.

4. (a) What is mail merge ? When is it required ? Write steps to mail merge a document to 5 recipients considering a scenario where a teacher dispatches marks of 5 different subjects obtained by students to their respective parents. **6**
- (b) What is Spreadsheet ? How is a Formula different from a Function in Excel ? **3**
- (c) What is a virus ? How antivirus protects against a virus ? **3**

6. (a) Find the modulus and argument of the complex number $-1+i\sqrt{3}$ and hence, write the complex number in polar form.

6

- (b) Resolve into partial fractions :

$$\frac{2x+5}{(x+1)(x-2)} \cdot \quad 3$$

- (c) If $C(n, 10) = C(n, 14)$, then find the value of n and also, find $C(25, n)$. 3

7. (a) If x is so small that its squares and higher powers may be neglected, then show that

$$\frac{\sqrt{1-3x} + (1-x)^{5/3}}{(4-x)^{1/2}} \cong 1 - \frac{35x}{24} \cdot \quad 6$$

- (b) Find the 5th term in the expansion of $(x+2y)^6$. 3

- (c) Express $\frac{1+i}{1-i}$ in the form of $A + iB$. 3



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Total No. of Questions—7] [Total No. of Printed Pages—4

MATH-22102

First Semester (N-2022)

(Common for All)

MATHEMATICS-I

Time : 3 Hours

M. M. : 60

Note : Attempt *Five* questions in all. Section A (Q. No. 1) is compulsory. Select *two* questions each from Section B and Section C.

Section A

1. (i) Write the modulus of $z = 3 + 4i$.
- (ii) Write the value of $P(10, 2)$.
- (iii) $\sin 2A = \dots\dots\dots$

(iv) $\frac{d}{dx}(\cot x) = \dots\dots\dots$

(v) Write the number of terms in the expansion of $(x + 2y)^{11}$.

(vi) $\lim_{x \rightarrow 0} \frac{\tan x}{x} = \dots\dots\dots$ **6×2=12**

Section B

2. (a) Simplify :

$$\frac{\tan(90^\circ - \theta) \cdot \sec(180^\circ - \theta) \cdot \sin(-\theta)}{\sin(180^\circ + \theta) \cdot \cot(360^\circ - \theta) \cdot \operatorname{cosec}(90^\circ + \theta)} \cdot 6$$

(b) Prove that :

$$\frac{\cos 37^\circ - \sin 37^\circ}{\cos 37^\circ + \sin 37^\circ} = \tan 8^\circ \cdot 3$$

(c) Find the ratio of the radii of two circles at the centres of which two equal arcs subtend angles of 60 degree and 75 degree. **3**

3. (a) Prove that :

$$2 \cos 2A = \sqrt{2 + \sqrt{2 + \sqrt{2 + 2 \cos 16A}}} \cdot 6$$

(b) Draw the graph of $\sin x$ from $-\pi$ to π . **3**

(c) Evaluate $\lim_{x \rightarrow 2} \frac{x^2 - 5x + 6}{x^2 - 4}$. **3**

4. (a) Prove that :

$$\lim_{x \rightarrow 0} \frac{a^x - 1}{x} = \log_e a \cdot 6$$

(b) Prove that :

$$\frac{\sin x + \sin 5x + \sin 9x}{\cos x + \cos 5x + \cos 9x} = \tan 5x \cdot 3$$

(c) If $f(x) = \frac{2x - 5}{3x + 4}$, then find $f(-2)$. **3**

Section C

5. (a) Differentiate $\sin x$ w.r.t. x by first principle of derivative. **6**

(b) If $y = \sqrt{\sin x + \sqrt{\sin x + \sqrt{\sin x + \dots \infty}}}$, then prove that $(2y - 1) \frac{dy}{dx} = \cos x$. **3**

(c) Differentiate $\frac{3x^2 - 5}{2x^2 + 5}$ w.r.t. x . **3**

- (c) State and prove conservation of angular momentum. **3**
6. (a) Define stress and strain. Explain bulk modulus of elasticity. **6**
- (b) What is difference between heat and temperature ? **3**
- (c) Convert -40°C into Fahrenheit Scale. **3**
7. (a) What is expansion of solids ? Derive relation between co-efficient of linear, superficial and cubical expansion. **6**
- (b) Explain construction and working of Mercury Thermometer. **3**
- (c) Explain absolute pressure, gauge pressure and vacuum pressure. **3**



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Total No. of Questions—7] [Total No. of Printed Pages—4

PHY-22103

First Semester (Common to All) (N-22)

APPLIED PHYSICS-I

Time : 3 Hours

M. M. : 60

Note : Attempt *Five* questions in all. Section A (Q. No. 1) is compulsory. Select *two* questions each from Section B and Section C.

Section A

1. (i) Write dimensional formula and units of :
- (a) Momentum
- (b) Torque
- (ii) Write number of significant figures in the following :
- (a) 0.0600
- (b) 1032.00

- (iii) Write a short note on banking of roads.
- (iv) What is moment of inertia of straight rod about an axis through its center ?
- (v) Define surface tension and its units.
- (vi) What are the different modes of transfer of heat ? **6×2=12**

Section B

- 2. (a) What is principle of homogeneity ? Explain it by using suitable example. **6**
- (b) Convert 35J into erg using dimensional analysis. **3**
- (c) Define kinetic energy and its units. Derive expression for it. **3**
- 3. (a) Define work and its units. Explain types of work with suitable examples. **6**
- (b) Find relation between linear velocity and angular velocity in circular motion. **3**

- (c) Find the value of m so that the $\vec{A} = 5\hat{i} + 7\hat{j} - 3\hat{k}$ and $\vec{B} = 2\hat{i} + 2\hat{j} - m\hat{k}$ are perpendicular to each other. **3**

- 4. (a) What are rectangular components of force ? Explain, why is it easier to pull than to Push a lawn roller ? **6**
- (b) Define centripetal force with example. Write expression for centripetal force in terms of angular velocity and time period. **3**
- (c) Explain kilowatt hour as the unit of energy. **3**

Section C

- 5. (a) Explain moment of inertia and its units. Derive expression for radius of gyration. **6**
- (b) What is effect of temperature and impurity on surface tension ? **3**