

Course Code:-SOE-D-FS103

**OP JINDAL UNIVERSITY**

Mid Semester Examination, November-2023

Diploma. 1<sup>st</sup> Semester [Program Code: ]

(Meta,EE,Minning,Mech)

**ENGINEERING PHYSICS**

Time: 2 Hrs.

Max. Marks: 50

Note:

M CO KL

**Section A ( 10 marks)**

All Questions are compulsory [05 x 02 marks=10 marks]

1	a.	Define Unit and its types.	2		
	b.	Give some points of difference between scalars and vectors.	2		
	c.	Define a Projectile.Give some examples of Projectile Motion.	2		
	d.	Define a Friction and write its types.	2		
	e.	Define Conservative forces and Non-Conservative forces.	2		

**Section B ( 16 marks)**

Answer any 4 questions [04 x 04 marks=16 marks]

2	a.	State the Principle of Homogeneity of Dimensions .Check the dimensional correctness of a physical equation $FS = \frac{1}{2} mv^2 - \frac{1}{2} mu^2$ where F is the force acting on a body of mass m and S is the distance moved by the body when its velocity changes from u to v.	4		
	b.	State the Triangle law of vector addition and Parallelogram law of vector addition for adding two vectors.	4		
	c.	Derive an expression for the Kinetic energy of a body of mass m moving with velocity v.	4		
	d.	Show that the total mechanical energy of a freely falling body remains constant throughout its fall.	4		
	e.	Define Simple Harmonic Motion and give some examples.	4		

**Section C ( 24 marks)**

Answer any 3 questions [03 x 08 marks=24 marks]

3	a.	A Projectile is fired horizontally with a velocity u.Show that its trajectory is a parabola.Also obtain expressions for its (i)time of flight (ii)horizontal range and (iii)velocity at any instant.	8		
	b.	A Projectile is fired with a velocity u making an angle with the horizontal.Show that its trajectory is a parabola.Derive expressions for (i)time of maximum height (ii)time of flight (iii)maximum height (iv) horizontal range.	8		
	c.	(i)Friction is a necessary evil.Explain. (ii)Describe the various methods by which friction between two surfaces can be reduced.	8		
	d.	(i)Define the term power .Is it a scalar or vector quantity?Give its dimensions	8		



# OF JNU UNIVERSITY

Department of Physics, New Delhi 110019

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## INTERMEDIATE PHYSICS

Time: 3 hrs

Max. Marks: 100

M. T. 11/11/11

### Section A (10 marks)

Answer any four questions in 100 words each.

- Explain the concept of a conservative force.
- On a smooth plane of inclination, a block is released from rest. Find the velocity of the block at the bottom of the plane.
- Define a conservative force and give an example.
- Define a conservative force and give an example.

### Section B (10 marks)

Answer any two questions in 100 words each.

- State the principle of conservation of momentum. Check the dimensional consistency of a physical equation  $F = ma$ .
- State the law of conservation of energy. A body of mass  $m$  is thrown vertically upwards with an initial velocity  $u$ . Find the maximum height reached by the body.
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### Section C (10 marks)

Answer any two questions in 100 words each.

- State the law of conservation of energy. A body of mass  $m$  is thrown vertically upwards with an initial velocity  $u$ . Find the maximum height reached by the body.
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	and units. (ii)A man weighing 60kg climbs up a staircase carrying a load of 20kg on his head. The stair case has 20 steps each of height 0.2 m . If he takes 10s to climb,find his power.			
e.	(i) Explain the terms static friction,limiting friction and kinetic friction. (ii)A block of weight 20N is placed on a horizontal table and a tension T ,which can be increased to 8N before the block begins to slide, is applied at the block moving at a constant speed once it has been set in motion .Find the coefficient of static and kinetic friction.	8		



Course Code: SOE-D-FS105

**OP JINDAL UNIVERSITY**

Mid Semester Examination, October-2023

**Diploma I****Mathematics****Mathematics I****Time: 2 Hrs.****Max. Marks: 50**

Note:

M CO KL

**Section A ( 10 marks)**

All Questions are compulsory [05 x 02 marks=10 marks]

1	a.	Define Finite Set with an example.	2		
	b.	Define Intersection of a set.	2		
	c.	Write the definition of Power Set and give an example.	2		
	d.	Find $(a,b) \cup [a,b]$	2		
	e.	Define modulus Function with an example.	2		

**Section B ( 16 marks)**

Answer any 4 questions [04 x 04 marks=16 marks]

2	a.	If $A = \{1,3,5,7,9\}$ and $B = \mathbb{R}$ ( Set of Real Number) then find the value of $A \cap B$ and $A \cup B$ .	4		
	b.	Find the Power Set of the following (a) $\{-1,3,5,7\}$ (b) $\{2,4,6\}$	4		
	c.	Find the Relations if $A = \{2,4,6,8,10\}$ and $B = \{-1,-2,5,6,7\}$ and relation defined by " $\leq$ ( Less then or equal to)".	4		
	d.	Find the distance between the given point (a) $(3,-1)$ and $(2,-4)$ (b) $(7,3)$ and $(5,4)$	4		
	e.	Show that the point $(a,a)$ , $(-a,-a)$ and $(-a\sqrt{3}, a\sqrt{3})$ are vertices of Equilateral Traingle.	4		

**Section C ( 24 marks)**

Answer any 3 questions [03 x 08 marks=24 marks]

3	a.	Find The Cartesian Product of the following (a) $\{1,3,5,7\}$ and $\{2,4,6,8\}$ (b) $\{-1,2,3\}$ and $\{-2,-4,-6\}$ (c) $\{1,2,3\}$ and $\mathbb{N}$ ( Set of Natural Number) (d) $\{2,5,7\}$ and $\{5,6,4\}$	8		
	b.	Find the Relations ,Domain and Range of the Relations if (a) $A = \{1,2,3,4\}$ and $B = \{-1,2,5\}$ and relation defined as " $=$ ( Equal to) "	8		

	(b) $A = \{-1, -3, 5\}$ and $B = \{6, -1, 4, 5\}$ and relation defined as " $\geq$ (Greater than or equal to)"			
c.	Define the Polynomial Function and Sketch the graph of the following $f(x) = x^2$ and $f(x) =  x $	8		
d.	Find the Angle if the equations are (a) $3x + 7y - 3 = 0$ and $5x - 2y + 9 = 0$ (b) $5x - 6y + 8 = 0$ and $5x - 6y + 2 = 0$	8		
e.	Find the equation of line parallel to the given equation and passes through (1,3) (a) $2x - 7y + 8 = 0$ (b) $3x + 3y + 1 = 0$	8		

Course Code: SOE-D-FS104

**OP JINDAL UNIVERSITY**

Mid Semester Examination, October-2023

Diploma 1<sup>st</sup> Semester

Engineering Chemistry &amp; Environmental Studies

[EE, MECH &amp; META, MINING]



Time: 2 Hrs.

Max. Marks: 50

Note:

M CO KL

**Section A ( 20 marks)**

Answer any 4 questions [04 x 05 marks=20 marks]

1	a.	Define ionic bond, covalent bond with examples?	5		
	b.	Explain Aafbau's principle with diagram and any two examples.	5		
	c.	What are fundamental particles of atom? Write their name and characteristics.	5		
	d.	Explain isotopes, isobars, and isotones with examples.	5		
	e.	Write the chemical formula with molecular mass of following compounds: a) Sodium hydroxide b) Nitric acid c) Sodium Chloride d) Sulfuric acid e) Sodium bicarbonate	5		

**Section B ( 30 marks)**

Answer any 3 questions [03 x 10 marks=30 marks]

2	a.	What is chemistry? Write their importance in our daily life.	10		
	b.	Write the electronic configuration of following elements: Be, Ar, Ni, Fe, Zn, Ne, O, Al, He, Mn.	10		
	c.	What is hydrogen bond? Write their types and effects with examples.	10		
	d.	Balance the following equation: a) $C_2H_6 + O_2 \rightarrow H_2O + CO_2$ b) $S_8 + O_2 \rightarrow SO_3$ c) $HgO \rightarrow Hg + O_2$ d) $C_4H_{10} + O_2 \rightarrow CO_2 + H_2O$ e) $Ag + H_2S + O_2 \rightarrow Ag_2S + H_2O$ f) $3N_2 + 9H_2 \rightarrow 6NH_3$ g) $TiCl_4 + H_2O \rightarrow TiO_2 + HCl$ h) $Na + H_2O \rightarrow NaOH + H_2$ i) $H_2 + I_2 \rightarrow HI$ j) $KClO_3 \rightarrow KCl + O_2$	10		





Course Code: SOE-D-FS106

**OP JINDAL UNIVERSITY**

Mid Semester Examination, October-2023

Diploma 5<sup>th</sup> Semester [Program code-01DE40]**Mechanical Engineering****Engineering Drawing**

Time: 2.5 Hrs.

Max. Marks: 50

Note:

M CO KL

**Section A (10 marks)**

All Questions are compulsory [05 x 02 marks=10 marks]

1	a.	Define the term "Representative fraction (R.F.)".	2		
	b.	Make a pentagon with sides of 30 mm.	2		
	c.	Sketch a 10 cm long line and divide it into five equal parts.	2		
	d.	Make an equilateral triangle with sides of 40 mm.	2		
	e.	Draw a right angle and bisect it into two equal parts.	2		

**Section B (16 marks)**

Answer any 4 questions [04 x 04 marks=16 marks]

2	a.	Draw a scale of 1:60 to show meters and decimeters and long enough to measure up to 6 meters. Also measure a distance of 3.7m on scale.	4		
	b.	Construct a scale of 1:4 to show centimeters and long enough to measure up to 5 decimeters. Also measure a distance of 3.7dm on scale.	4		
	c.	To construct an ellipse by concentric circle method. The major axis of an ellipse is 150 mm long and minor axis is 100 mm long.	4		
	d.	Draw a rectangle having its sides 125 mm and 75 mm long. Inscribe a parabola in it.	4		
	e.	To construct a hyperbola when the distance of the focus from the directrix is equal to 50 mm and eccentricity is 3/2.	4		

**Section C (24 marks)**

Answer any 3 questions [03 x 08 marks=24 marks]

3	a.	On a map the distance between two points is 14 cm. the real distance between them is 20 km. Draw a diagonal scale of this map to read kilometers and hectometers and to measure up to 25 km. show a distance of 17.6 km on this scale.	8		
	b.	Construct a diagonal scale of R.F = 1/6250 to read up to 1 kilometer and to read meters on it. Show a length of 653 meters on it.	8		
	c.	On a building plan, a line 20cm long represents a distance of 10m. Devise a diagonal scale for the plan to read up to 12 m, showing meters, decimeters and centimeters. Show on your scale the lengths 6.48 m and 11.14 m.	8		
	d.	The distance between the Hyderabad and Mumbai is 1200km. A train covers this distance in 20 hours. R.F. of the scale is 1/400, 000. Draw a plain scale to measure time up to a single minute. Show the distance covered by the train in 26 minutes.	8		
	e.	What is eccentricity? To construct an ellipse when the distance of the focus from the directrix is equal to 50 mm and eccentricity is 2/3.	8		



Course Code:SOE-D-FS102

**OP JINDAL UNIVERSITY**

Mid Semester Examination, November-2023

Diploma 1<sup>st</sup> Semester

Diploma

**Communication English**

Time: 2 Hrs.

Max. Marks: 50

Note:

M CO KL

**Section A ( 20 marks)**

Answer any 4 questions [04 x 05 marks=20 marks]

1	a.	Define Communication with its process. Make a diagram of the Communication Process.	5	CO1	KL1
	b.	Why 'Feedback' is important in the process of Communication? Write a note on 'Channel of Communication'.	5	CO1	KL1
	c.	What are the merits and demerits of Oral and Written Communication?	5	CO1	KL1
	d.	Explain listening process. What are the differences between 'Hearing' and 'Listening'?	5	CO1	KL1
	e.	What are the various types of Verbal Communication?	5	CO1	KL1

**Section B ( 30 marks)**

Answer any 3 questions [03 x 10 marks=30 marks]

2	a.	What are the various types of Barriers to Communication? Explain in detail.	10	CO1	KL1
	b.	Explain Non-Verbal Communication with its types in detail with examples.	10	CO4	KL1
	c.	Describe the principles of effective communication with reference to 7 C's.	10	CO1	KL1
	d.	Write a paragraph on 'Virtual reality and human perception'.	10	CO5	KL2

