OP JINDAL UNIVERSITY, RAIGARH (C.G.)

MID SEMESTER EXAMINATION, OCTOBER-2022

Program Name : **Diploma EE.** Program Code : **01DE060** Time : **01 Hr 15Min**

Semester: **3rd** Branch : ELECTRICAL Max. Marks : **25**

Course Code: **SOE-D-EE305** Course Name: ELECTRICAL DRAWING LAB

Note: **Section A :** All Questions are compulsory [05 x 02 marks=10 marks]
Section B : Answer any 2 questions out of 3 [02 x 04 marks=08 marks]
Section C : Answer any 1 questions out of 2 [01 x 07 marks=07 marks]

Q. 1.	Section [A]	CO
a)	Draw the symbols of the 1.1 Ceiling Fan 1.2 Earth	1,2
b)	Draw the symbols of the 2.1. Transformer 2.2 Capacitor	1,2
c)	Draw the symbols of the 3.1. Open Switch and Closed Switch 3.2 Two Way Switch	1,2
d)	Draw the symbols of the 4.1. Independent DC Voltage Source 4.2 Independent DC Current Source	1,2
e)	Draw the symbols of the 5.1. Zenner Diode 5.2 Wattmeter	1,2

Q. 2.	Section [B]	CO
a)	Draw the connection diagram of three resistor connected in (a) In parallel (b) In series with proper naming and mark the voltage and current flow	1,3
b)	Draw the connection diagram having two parallel resistor connected in series with parallel combination of one inductor and resistor and load R_L, is supplied by a voltage source	1,3
c)	Draw the symbolic diagram of following (C1) Independent DC Current Source (C2) Current Dependent Voltage Source (C3) Voltage Dependent Current Source (C4) Voltage Dependent Voltage Source	3

Q. 3.	Section [C]	CO
a)	Draw the connection diagram having Independent AC Voltage Source supplies to a step down transformer connected in series with an inductor and a diode and parallel combination of a capacitor and a resistive Load R_L and a bulb. A voltmeter is connected across Load R_L and one Ammeter connected in series with the Load R_L	3
b)	Draw the connection diagram of a circuit having three node A, B and C. Between node A and B a resistor is connected in series with parallel combination of a resistor and a capacitor. Between node B and C one resistor, one diode and again a resistor is connected in series and Between node A and C an Ammeter is connected in a series with a resistor and an inductor. A independent DC voltage source is connected across node A and node C and a voltmeter is connected across node A and node B.	3

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OP JINDAL UNIVERSITY, RAIGARH (C.G.)

MID SEMESTER EXAMINATION, OCTOBER-2022

Program Name : **Diploma EE.** Program Code : **01DE060** Time : **01 Hr 15Min**

Semester: **3rd** Branch : ELECTRICAL Max. Marks : **25**

Course Code: **SOE-D-EE305** Course Name: ELECTRICAL DRAWING LAB

Note: **Section A :** All Questions are compulsory [05 x 02 marks=10 marks]
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e)	Draw the symbols of the 5.1. Zenner Diode 5.2 Wattmeter	1,2

Q. 2.	Section [B]	CO
a)	Draw the connection diagram of three resistor connected in (a) In parallel (b) In series with proper naming and mark the voltage and current flow	1,3
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OP JINDAL UNIVERSITY, RAIGARH (C.G.)

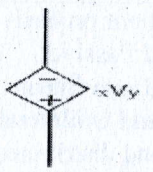
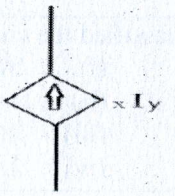
MID SEMESTER EXAMINATION, OCTOBER-2022

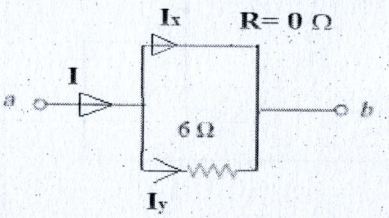
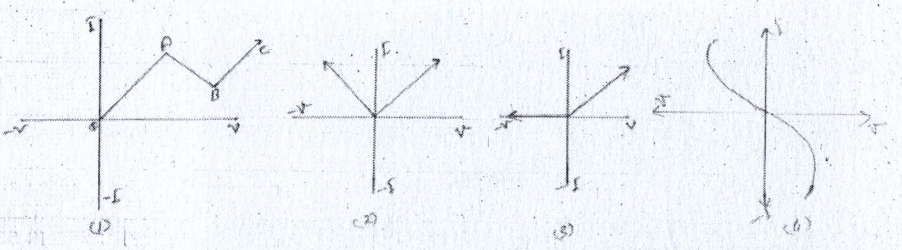
Program Name : **Diploma-EE.** Program Code : **01DE060** Time : **02 Hrs**

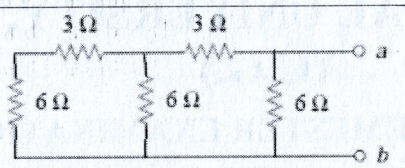
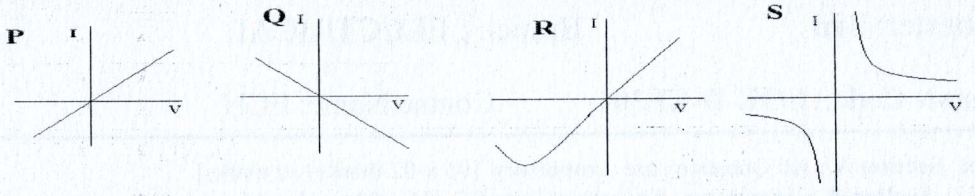
Semester: **3rd** Branch : ELECTRICAL Max. Marks : **50**

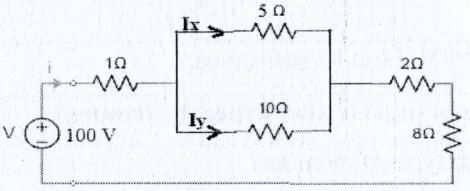
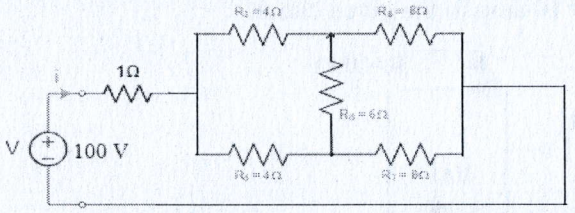
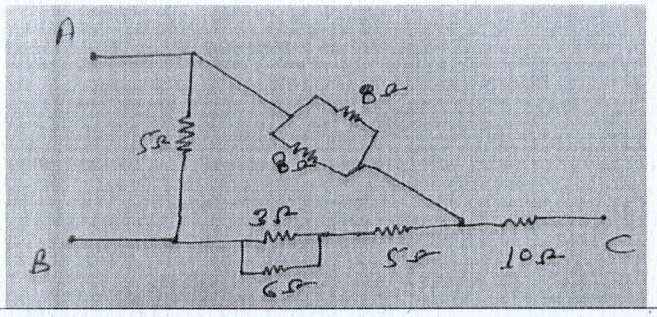
Course Code: **SOE-D-EE301** Course Name: ECN

Note: Section A : All Questions are compulsory [05 x 02 marks=10 marks]
Section B : Answer any 4 questions out of 5 [04 x 04 marks=16 marks]
Section C : Answer any 3 questions out of 5 [03 x 08 marks=24 marks]

Q. 1.	Section [A]	CO
a)	Name the electrical sources of the diagrams (1)  (2) 	1,2
b)	What is electric current (I) and its SI unit?	1
c)	An electric iron draws a current of 7 A at 130 V. Find its resistance.	3
d)	Transformer is which type of element active or passive also writes the reasons?	3
e)	Current source and Voltage source are which type of element?	2

Q. 2.	Section [B]	CO
a)	Find the value of Ix and Iy if I = 10 amp in the given circuit 	2
b)	Define Active-Network and Passive-Network and identify the Network by observing V-I characteristics of the Network. 	3

c)	Find R_{AB} in the circuit 	1
d)	Which I-V characteristic represent the Unilateral element from the diagrams P,Q, R and S 	2
e)	Write the Star to Delta and Delta to Star conversion formula with circuit diagram.	

Q. 3.	Section [C]	CO
a)	Write short notes with diagram on Independent and dependent electric sources.	1,2
b)	Classified the circuit element on basis of the following groups. (i) Active and Passive (ii) Linear and non-linear (iii) Bilateral and Unilateral (iv) Lumped and distributed	2,3
c)	Find current Ix and Iy in figure (3)  fig 3	1,2
d)	Find current I in figure (4)  Fig 4	1,2
e)	Find the value of Rab , Rbc and Rac from given figure (5) 	1,2

OP JINDAL UNIVERSITY, RAIGARH (C.G.)

MID SEMESTER EXAMINATION, OCTOBER-2022

Program Name : **Diploma-EE.** Program Code : **01DE060** Time : **02 Hrs**

Semester: **3rd** Branch : ELECTRICAL Max. Marks : **50**

Course Code: **SOE-D-EE301** Course Name: ECN

Note: **Section A :** All Questions are compulsory [05 x 02 marks=10 marks]
Section B : Answer any 4 questions out of 5 [04 x 04 marks=16 marks]
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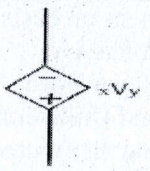
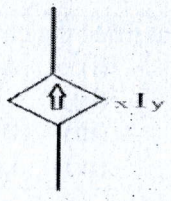
Q. 1.	Section [A]	CO
a)	Name the electrical sources of the diagrams (1)  (2) 	1,2
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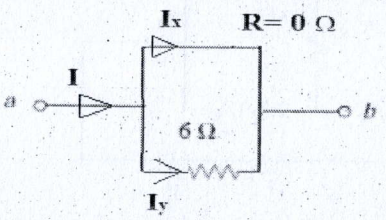
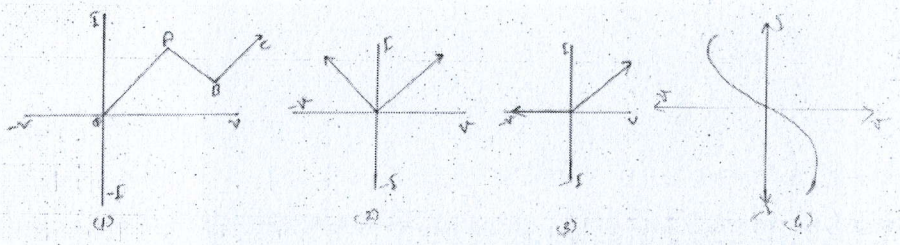
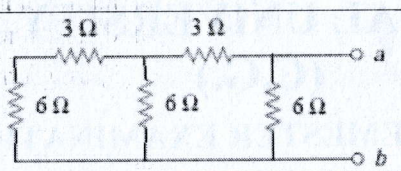
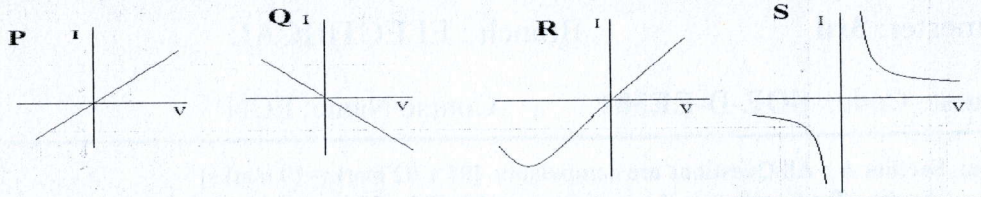
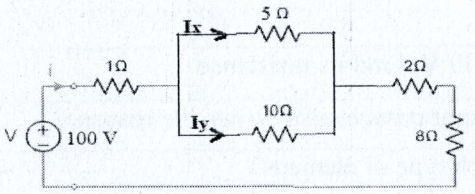
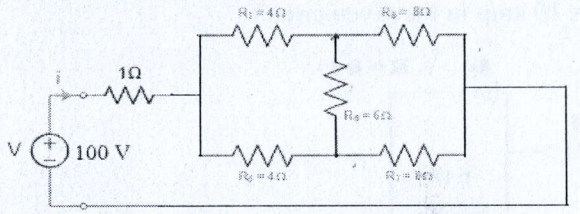
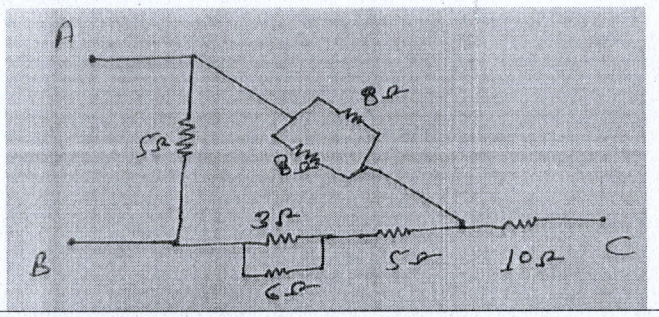
a)	Find the value of Ix and Iy if I = 10 amp in the given circuit 	2
b)	Define Active-Network and Passive-Network and identify the Network by observing V-I characteristics of the Network. 	3

c)	Find R_{AB} in the circuit 	1
d)	Which I-V characteristic represent the Unilateral element from the diagrams P,Q, R and S 	2
e)	Write the Star to Delta and Delta to Star conversion formula with circuit diagram.	

Q. 3.	Section [C]	CO
a)	Write short notes with diagram on Independent and dependent electric sources.	1,2
b)	Classified the circuit element on basis of the following groups. (i) Active and Passive (ii) Linear and non-linear (iii) Bilateral and Unilateral (iv) Lumped and distributed	2,3
c)	Find current Ix and Iy in figure (3)  fig 3	1,2
d)	Find current I in figure (4)  Fig 4	1,2
e)	Find the value of Rab , Rbc and Rac from given figure (5) 	1,2

OP JINDAL UNIVERSITY, RAIGARH (C.G.)

MID SEMESTER EXAMINATION, OCTOBER-2022

Course: Diploma In Electrical Engineering Time : **02 Hrs**

Semester: **3rd** Branch: Electrical Engineering

Max. Marks: **50**

Subject Code: SOE-D-EE302 Subject: **Electrical Machine-I**

Note: **Section A :** All Questions are compulsory [05 x 02 marks=10 marks]
Section B : Answer any 4 questions out of 5 [04 x 04 marks=16 marks]
Section C : Answer any 3 questions out of 5 [03 x 08 marks=24 marks]

Q. 1.	Section [A]	CO
a)	What is the flaming right-hand rule?	CO1
b)	Explain the law of conservation with an example.	CO1
c)	Which type of material is used for made up of armature?	CO4
d)	What is the function of a commutator?	CO4
e)	Compare between Lap winding and Wave winding.	CO4

Q. 2.	Section [B]	CO
a)	Explain the types of d.c. machines.	CO1
b)	What is the EMF equation of d.c. generator? explain in detail.	CO4
c)	Explain the difference between Wave winding and lap winding.	CO4
d)	Explain the principle of d.c. generator.	CO4
e)	A shunt motor delivers 450 A at 230V and the resistance of the shunt and armature are 50Ω and .03 Ω respectively. Calculate the generated e.m.f..	CO4

Q. 3.	Section [C]	CO
a)	Explain the detail construction of d.c. generator.	CO1
b)	What is the condition of maximum efficiency of d.c. generator?	CO4
c)	A short-shunt compound generator delivers a load current of 30 A at 220 V, and has armature, series field and shunt field resistance of 0.05 Ω, 0.03 Ω and 200 Ω respectively. Calculate the induced e.m.f. and armature current. Allow 1V per brush drop.	CO4
d)	What type of losses occur in d.c. generator, explain in details?	CO4
e)	A four-pole dc generator having wave wound armature winding has 51 slots, each slot containing 20 conductors. What will be the voltage generated in the machine when driven at 1500 rpm assuming the flux per pole to be 7.0 mWb?	CO4

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OP JINDAL UNIVERSITY, RAIGARH (C.G.)

MID SEMESTER EXAMINATION, OCTOBER-2022

Program Name: **Diploma.** Program Code: **01DE060** Time: **02 Hrs**

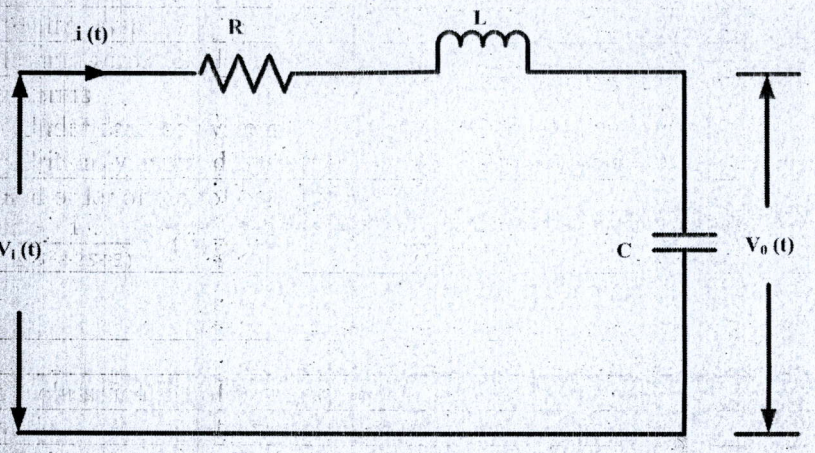
Semester: **3rd** Branch: **Electrical** Max. Marks: **50**

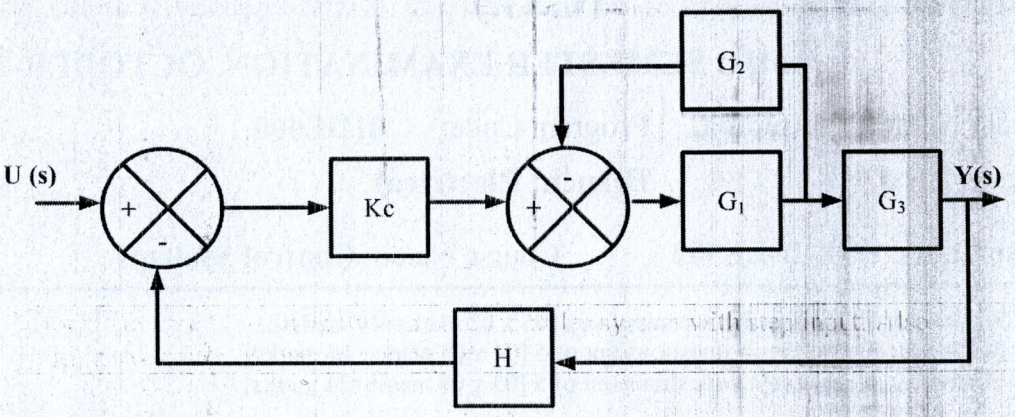
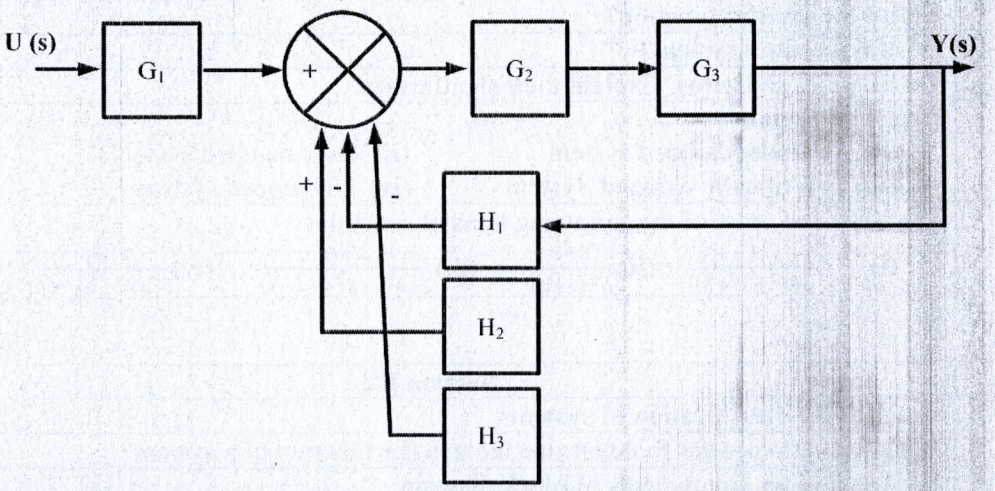
Course Code: **SOE-D-EE303** Course Name: **Control Systems**

Note: **Section A:** All Questions are compulsory [05 x 02 marks=10 marks]
Section B: Answer any 4 questions out of 5 [04 x 04 marks=16 marks]
Section C: Answer any 3 questions out of 5 [03 x 08 marks=24 marks]

Q. 1.	Section [A]	CO
a)	Define the transfer function?	
b)	What is a control system?	
c)	Define poles and zeros. Explain their significance.	
d)	Explain the terms (i) Under damped system (ii) Over damped system (iii) Critically damped System (iv) Undamped system	
e)	Find type and order of the following transfer functions (i) $\frac{1}{s(S^2+2S+3)}$ (ii) $\frac{S+2}{S^2(S+3)}$ (iii) $\frac{S-6}{S(S^3-6S^2+3S-2)}$ (iv) $\frac{S^2+6}{S^3(S^2+3S-2)}$	

Q. 2.	Section [B]	CO
a)	Describe the classification of systems.	
b)	What the various steps to determine the transfer function of a system?	
c)	Explain various components of block diagram.	
d)	Explain various standard test signals of the Control System?	
e)	Elaborate the terms involved in signal flow graph.	

Q. 3.	Section [C]	CO
a)	Explain various block diagram reduction rules.	
b)	Determine the transfer function of the following circuit with $V_i(t)$ as input and $V_0(t)$ as output: 	

c)	Find the transfer function using block diagram reduction technique  	
d)	Find the transfer function using block diagram reduction technique  	
e)	Perform the time domain analysis on second order system with step input. Also determine various parameters associated with it.	

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OP JINDAL UNIVERSITY, RAIGARH (C.G.)

MID SEMESTER EXAMINATION, OCTOBER-2022

Program Name : **Diploma** Program Code : **01DE060** Time : **02 Hrs**

Semester: **3rd** Branch : **Electrical Engineering** Max. Marks : **50**

Course Code: **SOE-D-EE304** Course Name: **Digital Electronics**

Note: Section A : All Questions are compulsory [05 x 02 marks=10 marks]
Section B : Answer any 4 questions out of 5 [04 x 04 marks=16 marks]
Section C : Answer any 3 questions out of 5 [03 x 08 marks=24 marks]

Q. 1.	Section [A]	CO
a)	Find the value of a function. F=1⊙1⊙0⊙0⊙1⊙1⊙0.	CO1
b)	Convert Hexa-Decimal number (ABC91) to the Octal number system.	CO1
c)	Solve: $(3496.544)_{10}$ =$(??)_2$.	CO1
d)	Implement OR expression with NAND gates.	CO1
e)	Solve: $(1010)_2$+$(1111)_2$+$(0110)_2$.	CO1

Q. 2.	Section [B]	CO
a)	What is the minimum number of gates required to implement the Boolean expression "AB+C"? i) If we have to use only two input NOR gates. ii) If we have to use only two input NAND gates. Draw its logical circuit.	CO5
b)	State the following: i) Commutative Law ii) Absorption Law iii) Distributive Law iv) DE Morgan's Theorem.	CO1
c)	Explain NAND and NOR gates with Truth Table.	CO1
d)	Simplify the Boolean expression: F=x'yz+x'yz'+xz.	CO5
e)	Explain digital system and write its characteristics.	CO1

Q. 3.	Section [C]	CO
a)	Write merits and demerits of digital system over analog system.	CO1
b)	Explain BCD codes with examples, and write the BCD code for 842'1' and 5211.	CO1
c)	Explain Gray code. Write its all possible value for 4-bit variable.	CO1
d)	Explain specific purpose gates and implement its expression by using NAND gates.	CO1
e)	Implement the following function with two input logic gates and its truth table: i) F1=A+B'C ii) F2=(AB+CD+EF)' iii) F3=(ABCD)+(EFGH)' iv) F4=(AB)'C+(AB)C'	CO1 CO5

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O P JINDAL UNIVERSITY, RAIGARH (C.G.)

MID SEMESTER EXAMINATION, OCTOBER-2022

Program Name: **Diploma** Time: **02 Hrs**

Semester: **3rd** Branch: **Mechanical** Max Marks: **50**

Course Code: **SOE-D-ME301** Course Name: **Manufacturing Processes-I**

Note: **Section A:** All Questions are compulsory [05 x 02 marks=10 marks]
Section B: Answer any 4 questions out of 5 [04 x 04 marks=16 marks]
Section C: Answer any 3 questions out of 5 [03 x 08 marks=24 marks]

Section [A]

Q. 1	**Define the following terms-**
a.	Lathe
b.	Head stock
c.	Tail stock
d.	Core
e.	Pattern

Section [B]

Q. 2	**Short answer question**
a.	What is CNC machines? Write the function of CNC Lathe.
b.	What is riser? Write the various types of riser.
c.	Write the application of CNC machines.
d.	Define the terms "chills and chaplets".
e.	What is casting? Write the advantages and application of casting.

Section [C]

Q. 3	**Long answer question**
a.	Draw a block diagram of lathe and define its basic various part.
b.	What is drill? Draw a neat sketch of a drill bit.
c.	Draw a block diagram of a drill machine and define its basic various part.
d.	What is gating system? Explain it.
e.	Write the various steps for making a casting.

O P JINDAL UNIVERSITY, RAIGARH (C.G.)

MID SEMESTER EXAMINATION, OCTOBER-2022

Program Name: **Diploma** Time: **02 Hrs**

Semester: **3rd** Branch: **Mechanical** Max Marks: **50**

Course Code: **SOE-D-ME301** Course Name: **Manufacturing Processes-I**

Note: **Section A:** All Questions are compulsory [05 x 02 marks=10 marks]
Section B: Answer any 4 questions out of 5 [04 x 04 marks=16 marks]
Section C: Answer any 3 questions out of 5 [03 x 08 marks=24 marks]

Section [A]

Q. 1	**Define the following terms-**
a.	Lathe
b.	Head stock
c.	Tail stock
d.	Core
e.	Pattern

Section [B]

Q. 2	**Short answer question**
a.	What is CNC machines? Write the function of CNC Lathe.
b.	What is riser? Write the various types of riser.
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OP JINDAL UNIVERSITY, RAIGARH (C.G.)

MID SEMESTER EXAMINATION, OCTOBER-2022

Course: **Diploma** Time: **02 Hrs.**

Semester: **3rd** Branch: Mechanical Engineering Max. Marks: **50**

Subject Code: SOE-D-ME302 Subject: Fluid Mechanics and Machines

Note: **Section A :** All Questions are compulsory [05 x 02 marks=10 marks]
Section B : Answer any 4 questions out of 5 [04 x 04 marks=16 marks]
Section C : Answer any 3 questions out of 5 [03 x 08 marks=24 marks]

Q. 1.	Section [A]	CO
a)	What is a fluid? write one key difference between liquids and gases.	
b)	Define mass density and specific weight and write their unit.	
c)	Among water, petrol and milk each with equal volume of one liter, which one will have the highest mass and why?	
d)	Define compressibility? why we can compress gases but not liquids?	
e)	What is the value if 1 atmospheric pressure in m of Hg and water each?	

Q. 2.	Section [B]	CO
a)	What is buoyancy and law of floatation? why a boat made of wood or metal can float while the metal block sinks and wooden block floats?	
b)	What is total pressure and center of pressure? explain with a diagram.	
c)	Convert a pressure head of 100 m of water to milk of specific gravity 0.92 and honey of specific gravity 1.14. Also convert a pressure intensity of 10 kg(f)/cm^2 into height of mercury and water column. Take the barometer reading as 76 cm of Mercury.	
d)	What is meant by head in fluid mechanics? What is meant by datum point here? also define the terms hydrostatic pressure and dynamic pressure.	
e)	What is the main conclusion of Bernoulli's equation? what is the type of flow considered in this equation and why? Mention at least two applications of Bernoulli's theorem in fluid mechanics device.	

Q. 3.	Section [C]	CO
a)	Define pressure. What are the different units of pressure. What is barometric pressure. Explain any 2 pressure measuring technologies/devices with diagram.	
b)	What is Archimedes principle? what are its applications?	
c)	Explain the three conditions of equilibrium for a floating or submerged body. When is a wholly submerged body said to be in equilibrium?	
d)	Explain the total pressure on a horizontal and vertical surface with an illustrative diagram.	
e)	Illustrate with a neat diagram the difference between atmospheric, Absolute, Gage and vacuum pressure. Give at least one example for measuring instrument to measure each of the above pressures.	

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OP JINDAL UNIVERSITY, RAIGARH (C.G.)

MID SEMESTER EXAMINATION, OCTOBER-2022

Course: **Diploma** Time: **02 Hrs.**

Semester: **3rd** Branch: Mechanical Engineering Max. Marks: **50**

Subject Code: SOE-D-ME302 Subject: Fluid Mechanics and Machines

Note: Section A : All Questions are compulsory [05 x 02 marks=10 marks]
Section B : Answer any 4 questions out of 5 [04 x 04 marks=16 marks]
Section C : Answer any 3 questions out of 5 [03 x 08 marks=24 marks]

Q. 1.	Section [A]	CO
a)	What is a fluid? write one key difference between liquids and gases.	
b)	Define mass density and specific weight and write their unit.	
c)	Among water, petrol and milk each with equal volume of one liter, which one will have the highest mass and why?	
d)	Define compressibility? why we can compress gases but not liquids?	
e)	What is the value if 1 atmospheric pressure in m of Hg and water each?	

Q. 2.	Section [B]	CO
a)	What is buoyancy and law of floatation? why a boat made of wood or metal can float while the metal block sinks and wooden block floats?	
b)	What is total pressure and center of pressure? explain with a diagram.	
c)	Convert a pressure head of 100 m of water to milk of specific gravity 0.92 and honey of specific gravity 1.14. Also convert a pressure intensity of 10 kg(f)/cm^2 into height of mercury and water column. Take the barometer reading as 76 cm of Mercury.	
d)	What is meant by head in fluid mechanics? What is meant by datum point here? also define the terms hydrostatic pressure and dynamic pressure.	
e)	What is the main conclusion of Bernoulli's equation? what is the type of flow considered in this equation and why? Mention at least two applications of Bernoulli's theorem in fluid mechanics device.	

Q. 3.	Section [C]	CO
a)	Define pressure. What are the different units of pressure. What is barometric pressure. Explain any 2 pressure measuring technologies/devices with diagram.	
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OP JINDAL UNIVERSITY, RAIGARH (C.G.)

MID SEMESTER EXAMINATION, OCTOBER-2022

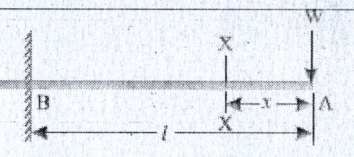
Program Name: **Diploma** Program Code: **01DE040** Time: **02 Hrs**

Semester: **3rd** Branch: MECHANICAL Max. Marks: **50**

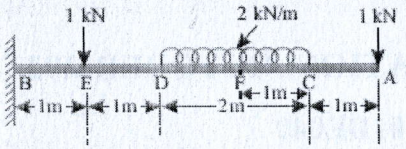
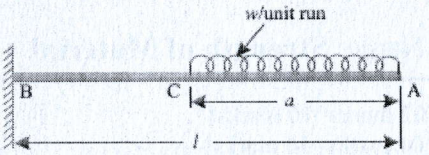
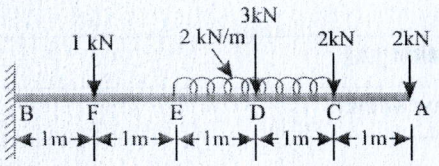
Course Code: **SOE-D-ME-303** Course Name: **Strength of Material**

Note: **Section A :** All Questions are compulsory [05 x 02 marks=10 marks]
Section B : Answer any 4 questions out of 5 [04 x 04 marks=16 marks]
Section C : Answer any 3 questions out of 5 [03 x 08 marks=24 marks]

Q. 1.	Section [A]	CO
a)	What are the different types of loads? Draw sketch.	3
b)	Define a thin cylinder.	2
c)	What are the different types of beams? Draw Sketch.	1
d)	Define Strain Energy. Write the mathematical formula of strain energy.	2
e)	Write the relation between Young's Modulus and Bulk Modulus with its unit.	2

Q. 2.	Section [B]	CO
a)	A square steel rod $20mm \times 20mm$ in section is to carry an axial load (Compressive) of $100KN$. Calculate the shortening in a length of $50mm$. $E = 2.14 \times 10^8\ KN/m^2$.	1
b)	Define & derive Poisson's ratio.	2
c)	Calculate the bursting pressure for a cold drawn seamless steel cylinder of $60mm$ inside diameter with $2mm$ wall thickness. The ultimate strength of steel is $380MN/m^2$.	2
d)	What are the different end conditions of the column? Write the effective length in each condition.	3
e)	Draw a shear force and bending moment diagram of a cantilever beam with an end load. 	3

Q. 3.	Section [C]	CO
a)	Describe & derive Hooke's law and Draw a strain-strain curve for mild steel.	2
b)	A solid round bar $60mm$ in diameter and $2.5m$ long is used as a strut. One end of the strut is fixed, while its other end is hinged. Find the safe compressive load for this strut, Using Euler's formula. Assume $E = 200GN/m^2$ and factor of safety $= 3$.	2

c)	Draw the S.F. and B.M. diagrams for the cantilever loaded as shown in the figure. 	3
d)	Draw Shear force and Bending moment diagram of beam as in the figure. 	3
e)	Draw the S.F. and B.M. diagrams for cantilever loaded as shown in the figure. 	3

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OP JINDAL UNIVERSITY, RAIGARH (C.G.)

MID SEMESTER EXAMINATION, OCTOBER-2022

Program Name: **Diploma** Program Code: **01DE040** Time: **02 Hrs**

Semester: **3rd** Branch: MECHANICAL Max. Marks: **50**

Course Code: **SOE-D-ME-303** Course Name: **Strength of Material**

Note: **Section A :** All Questions are compulsory [05 x 02 marks=10 marks]
Section B : Answer any 4 questions out of 5 [04 x 04 marks=16 marks]
Section C : Answer any 3 questions out of 5 [03 x 08 marks=24 marks]

Q. 1.	Section [A]	CO
a)	What are the different types of loads? Draw sketch.	3
b)	Define a thin cylinder.	2
c)	What are the different types of beams? Draw Sketch.	1
d)	Define Strain Energy. Write the mathematical formula of strain energy.	2
e)	Write the relation between Young's Modulus and Bulk Modulus with its unit.	2

Q. 2.	Section [B]	CO
a)	A square steel rod $20mm \times 20mm$ in section is to carry an axial load (Compressive) of $100KN$. Calculate the shortening in a length of $50mm$. $E = 2.14 \times 10^8\ KN/m^2$.	1
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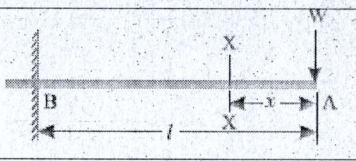
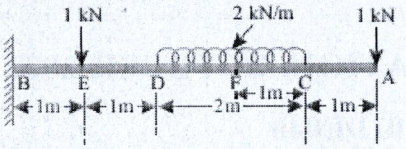
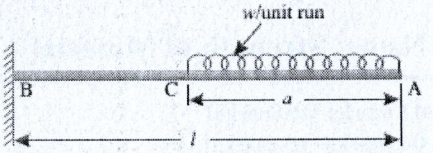
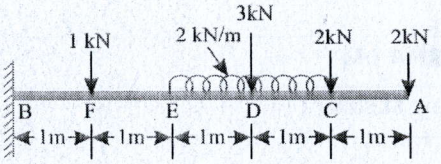
c)	Calculate the bursting pressure for a cold drawn seamless steel cylinder of $60mm$ inside diameter with $2mm$ wall thickness. The ultimate strength of steel is $380MN/m^2$.	2
d)	What are the different end conditions of the column? Write the effective length in each condition.	3
e)	Draw a shear force and bending moment diagram of a cantilever beam with an end load. 	3

Q. 3.	Section [C]	CO
a)	Describe & derive Hooke's law and Draw a strain-strain curve for mild steel.	2
b)	A solid round bar $60mm$ in diameter and $2.5m$ long is used as a strut. One end of the strut is fixed, while its other end is hinged. Find the safe compressive load for this strut, Using Euler's formula. Assume $E = 200GN/m^2$ and factor of safety $= 3$.	2

c)	Draw the S.F. and B.M. diagrams for the cantilever loaded as shown in the figure. 	3
d)	Draw Shear force and Bending moment diagram of beam as in the figure. 	3
e)	Draw the S.F. and B.M. diagrams for cantilever loaded as shown in the figure. 	3

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OP JINDAL UNIVERSITY, RAIGARH (C.G.)

MID SEMESTER EXAMINATION, OCTOBER-2022

Program Name: Diploma Mechanical **Program code:** 01DE040 Time: **02 Hrs**

Semester: 3rd **Branch:** Mechanical Max. Marks: **50**

Subject Code: SOE-D-ME304 **Subject:** Plant Safety and Maintenance Engineering

Note: Section A : All Questions are compulsory [05 x 02 marks=10 marks]
Section B : Answer any 4 questions out of 5 [04 x 04 marks=16 marks]
Section C : Answer any 3 questions out of 5 [03 x 08 marks=24 marks]

Q. 1.	Section [A]	CO
a)	Define wear? What are the different problem due to wear?	1
b)	What are the basic goals of Plant maintenance?	1
c)	What are the types of Plant maintenance?	1
d)	Classified the Lubricants with example?	1
e)	What do you understand by decision tree in fault tracing?	2

Q. 2.	Section [B]	CO
a)	Write different plant maintenance safety system & explain one of them?	1
b)	Explain the functions & responsibilities of Plant Maintenance Department?	1
c)	Distinguish between preventive maintenance and breakdown maintenance?	1
d)	Discuss the major causes of accident in industries?	1
e)	What are the importance of fault tracing?	2

Q. 3.	Section [C]	CO
a)	What do you mean by corrosion & how many types of corrosion, write corrosion prevention methods.	1
b)	Discuss the role of inspection in reducing breakdown?	1
c)	Define Lubrication? Classified the methods of Lubrication? And explain any one of them with neat sketch?	1
d)	In a pulley drive of lathe machine, operator finds that belt goes frequently off the drive, locate the causes of trouble. Draw a decision tree in this case?	2
e)	A centrifugal water pump is not getting proper discharge. Draw decision tree for its maintenance?	2

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OP JINDAL UNIVERSITY, RAIGARH (C.G.)

MID SEMESTER EXAMINATION, OCTOBER-2022

Program Name: Diploma Mechanical **Program code:** 01DE040 Time: **02 Hrs**

Semester: 3rd **Branch:** Mechanical Max. Marks: **50**

Subject Code: SOE-D-ME304 **Subject:** Plant Safety and Maintenance Engineering

Note: Section A : All Questions are compulsory [05 x 02 marks=10 marks]
Section B : Answer any 4 questions out of 5 [04 x 04 marks=16 marks]
Section C : Answer any 3 questions out of 5 [03 x 08 marks=24 marks]

Q. 1.	Section [A]	CO
a)	Define wear? What are the different problem due to wear?	1
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c)	What are the types of Plant maintenance?	1
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OP JINDAL UNIVERSITY, RAIGARH (C.G.)

MID SEMESTER EXAMINATION, OCTOBER-2022

Program Name: **Diploma - Meta** Program Code: **01DE050** Time: **02 Hrs.**

Semester: **3rd** Branch: METALLURGY Max. Marks: **50**

Course Code: **SOE-D-MT301** Course Name: **METALLURGICAL THERMODYNAMICS**

Note: **Section A:** All Questions are compulsory [05 x 02 marks=10 marks]
Section B: Answer any 4 questions out of 5 [04 x 04 marks=16 marks]
Section C: Answer any 3 questions out of 5 [03 x 08 marks=24 marks]

Q. 1.	Section [A]	CO
a)	Define System & Surroundings	
b)	Define open and closed system	
c)	Define state variable	
d)	Define state function	
e)	Define Adiabatic Process	

Q. 2.	Section [B]	CO
a)	Define Extensive and Intensive property with example	
b)	Define First law of thermodynamics. Define heat capacity	
c)	Mention the limitations of thermodynamics. Mention the parameters on which rate of reaction depends.	
d)	Mention the applications of thermodynamics. Define isolated system	
e)	Define the term equilibrium. Define Hess Law	

Q. 3.	Section [C]	CO
a)	Define (i) Mechanical equilibrium (ii) Thermal equilibrium (iii) Chemical equilibrium (iv) Thermodynamic equilibrium.	
b)	Define (i) Specific heat (ii) Molar heat capacity (iii) Mention the expression for change in internal energy at constant volume.	
c)	Derive the expression for constant pressure process in terms of enthalpy.	
d)	Mention first law in terms of enthalpy	
e)	Define isochoric process. Derive the expression for the heat capacity at constant volume and pressure	

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OP JINDAL UNIVERSITY, RAIGARH (C.G.)

MID SEMESTER EXAMINATION, OCTOBER-2022

Program Name: **Diploma - Meta** Program Code: **01DE050** Time: **02 Hrs.**

Semester: **3rd** Branch: METALLURGY Max. Marks: **50**

Course Code: **SOE-D-MT301** Course Name: **METALLURGICAL THERMODYNAMICS**

Note: Section A: All Questions are compulsory [05 x 02 marks=10 marks]
Section B: Answer any 4 questions out of 5 [04 x 04 marks=16 marks]
Section C: Answer any 3 questions out of 5 [03 x 08 marks=24 marks]

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OP JINDAL UNIVERSITY, RAIGARH (C.G.)

MID SEMESTER EXAMINATION, OCTOBER-2022

Program Name: **Diploma - Meta** Program Code: **01DE050** Time: **02 Hrs.**

Semester: **3rd** Branch: METALLURGY Max. Marks: **50**

Course Code: **SOE-D-MT301** Course Name: **METALLURGICAL THERMODYNAMICS**

Note: Section A: All Questions are compulsory [05 x 02 marks=10 marks]
Section B: Answer any 4 questions out of 5 [04 x 04 marks=16 marks]
Section C: Answer any 3 questions out of 5 [03 x 08 marks=24 marks]

Q. 1.	Section [A]	CO
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OP JINDAL UNIVERSITY, RAIGARH (C.G.)

MID SEMESTER EXAMINATION, OCTOBER-2022

Program Name: **Diploma** Program Code : **01DE050** Time : **02 Hrs**

Semester: **3rd** Branch : **Metallurgical Engineering** Max. Marks : **50**

Course Code: **SOE-D-MT302** Course Name: **Heat Treatment of Materials**

Note: Section A : All Questions are compulsory [05 x 02 marks=10 marks]
Section B : Answer any 4 questions out of 5 [04 x 04 marks=16 marks]
Section C : Answer any 3 questions out of 5 [03 x 08 marks=24 marks]

Q. 1.	Section [A]
a)	Name any two bulk heat-treatment processes?
b)	What is ferrite + cementite?
c)	What is annealing?
d)	What is the critical temperature for annealing of a eutectoid (0.8%) steel?
e)	What is cementite?

Q. 2.	Section [B]
a)	Explain different heat-treatment processes?
b)	Explain i) Ductility ii) Malleability iii) Toughness iv) Hardness v) Hardenability.
c)	Explain the effect of different heat-treatment processes on various mechanical properties of steel?
d)	Explain martempering and austempering ?
e)	Describe a method for the hardenability measurement of a standard cylindrical metal sample?

Q. 3.	Section [C]
a)	Draw and explain the Fe-Fe3C (Iron-Carbon) diagram?
b)	Draw and explain the TTT diagram for Eutectoid steel?
c)	What is Quenching? What are different quenching mediums? The fastest cooling rate while quenching a steel sample can be achieved by using which medium?
d)	Write about peritectic, eutectic and eutectoid reactions. Draw the schematic microstructures and unit cell of alpha-ferrite, gamma-austenite, cementite, and delta-ferrite?
e)	Discuss in detail the mechanism of pearlitic transformation? Justify the answer with the help of a schematic diagram of the growth of pearlite.

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OP JINDAL UNIVERSITY, RAIGARH (C.G.)

MID SEMESTER EXAMINATION, OCTOBER-2022

Program Name: **Diploma** Program Code : **01DE050** Time : **02 Hrs**

Semester: **3rd** Branch : **Metallurgical Engineering** Max. Marks : **50**

Course Code: **SOE-D-MT302** Course Name: **Heat Treatment of Materials**

Note: Section A : All Questions are compulsory [05 x 02 marks=10 marks]
Section B : Answer any 4 questions out of 5 [04 x 04 marks=16 marks]
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OP JINDAL UNIVERSITY, RAIGARH (C.G.)

MID SEMESTER EXAMINATION, OCTOBER-2022

Program Name: **Diploma** Program Code : **01DE050** Time : **02 Hrs**

Semester: **3rd** Branch : **Metallurgical Engineering** Max. Marks : **50**

Course Code: **SOE-D-MT302** Course Name: **Heat Treatment of Materials**

Note: **Section A :** All Questions are compulsory [05 x 02 marks=10 marks]
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OP JINDAL UNIVERSITY, RAIGARH (C.G.)

MID SEMESTER EXAMINATION, OCTOBER-2022

Program Name: **Diploma** Program Code : **01DE050** Time : **02 Hrs**
Semester: **3rd** Branch :META Max. Marks: **50**
Course Code: **SOE-D-MT303** Course Name: **Metal Joining Process**

Note: Section A : All Questions are compulsory [05 x 02 marks=10 marks]
Section B : Answer any 4 questions out of 5 [04 x 04 marks=16 marks]
Section C : Answer any 3 questions out of 5 [03 x 08 marks=24 marks]

Q. 1.	Section [A]	CO
a)	What exactly do you mean by "welding"?	-
b)	What specifically are heterogeneous joining processes?	-
c)	What is OFW?	-
d)	What do you mean by autogenous in the Joining process?	-
e)	Can you justify why gas welding is a part of the homogeneous process? how is it feasible	-

Q. 2.	Section [B]	CO
a)	What exactly is the joining process? How can we define it according to ASW?	-
b)	In the joining process, how does the carburizing flame vary from the oxidizing flame?	-
c)	Discuss oxidizing flame with some special characteristics.	-
d)	What is reducing flame? How much oxygen is mixed into the fuel gas?	-
e)	What is a neutral flame? How much oxygen is mixed into the fuel gas?	-

Q. 3.	Section [C]	CO
a)	Classify the comprehensive joining process.	-
b)	How acetylene gas is produced for use as a fuel gas in welding? Discuss the chemical reaction as well as the process.	-
c)	Using a schematic diagram, describe oxy-acetylene welding	-
d)	In natural flame, discuss inner and outer combustion.	-
e)	Discuss forehand and backward welding processes	-

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OP JINDAL UNIVERSITY, RAIGARH (C.G.)

MID SEMESTER EXAMINATION, OCTOBER-2022

Program Name: **Diploma** Program Code : **01DE050** Time : **02 Hrs**
Semester: **3rd** Branch :META Max. Marks: **50**
Course Code: **SOE-D-MT303** Course Name: **Metal Joining Process**

Note: Section A : All Questions are compulsory [05 x 02 marks=10 marks]
Section B : Answer any 4 questions out of 5 [04 x 04 marks=16 marks]
Section C : Answer any 3 questions out of 5 [03 x 08 marks=24 marks]

Q. 1.	Section [A]	CO
a)	What exactly do you mean by "welding"?	-
b)	What specifically are heterogeneous joining processes?	-
c)	What is OFW?	-
d)	What do you mean by autogenous in the Joining process?	-
e)	Can you justify why gas welding is a part of the homogeneous process? how is it feasible	-

Q. 2.	Section [B]	CO
a)	What exactly is the joining process? How can we define it according to ASW?	-
b)	In the joining process, how does the carburizing flame vary from the oxidizing flame?	-
c)	Discuss oxidizing flame with some special characteristics.	-
d)	What is reducing flame? How much oxygen is mixed into the fuel gas?	-
e)	What is a neutral flame? How much oxygen is mixed into the fuel gas?	-

Q. 3.	Section [C]	CO
a)	Classify the comprehensive joining process.	-
b)	How acetylene gas is produced for use as a fuel gas in welding? Discuss the chemical reaction as well as the process.	-
c)	Using a schematic diagram, describe oxy-acetylene welding	-
d)	In natural flame, discuss inner and outer combustion.	-
e)	Discuss forehand and backward welding processes	-

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OP JINDAL UNIVERSITY, RAIGARH (C.G.)

MID SEMESTER EXAMINATION, OCTOBER-2022

Program Name: **Diploma** Program Code : **01DE050** Time : **02 Hrs**
Semester: **3rd** Branch :META Max. Marks: **50**
Course Code: **SOE-D-MT303** Course Name: **Metal Joining Process**

Note: Section A : All Questions are compulsory [05 x 02 marks=10 marks]
Section B : Answer any 4 questions out of 5 [04 x 04 marks=16 marks]
Section C : Answer any 3 questions out of 5 [03 x 08 marks=24 marks]

Q. 1.	Section [A]	CO
a)	What exactly do you mean by "welding"?	-
b)	What specifically are heterogeneous joining processes?	-
c)	What is OFW?	-
d)	What do you mean by autogenous in the Joining process?	-
e)	Can you justify why gas welding is a part of the homogeneous process? how is it feasible	-

Q. 2.	Section [B]	CO
a)	What exactly is the joining process? How can we define it according to ASW?	-
b)	In the joining process, how does the carburizing flame vary from the oxidizing flame?	-
c)	Discuss oxidizing flame with some special characteristics.	-
d)	What is reducing flame? How much oxygen is mixed into the fuel gas?	-
e)	What is a neutral flame? How much oxygen is mixed into the fuel gas?	-

Q. 3.	Section [C]	CO
a)	Classify the comprehensive joining process.	-
b)	How acetylene gas is produced for use as a fuel gas in welding? Discuss the chemical reaction as well as the process.	-
c)	Using a schematic diagram, describe oxy-acetylene welding	-
d)	In natural flame, discuss inner and outer combustion.	-
e)	Discuss forehand and backward welding processes	-

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OP JINDAL UNIVERSITY, RAIGARH (C.G.)

MID SEMESTER EXAMINATION, OCTOBER-2022

Program Name : **Diploma** Program Code : **01DE050** Time : **02 Hrs**

Semester: **3rd** Branch : **META** Max. Marks : **50**

Course Code: **SOE-D-MT304** Course Name: **Testing of Materials**

Note: **Section A :** All Questions are compulsory [05 x 02 marks=10 marks]
Section B : Answer any 4 questions out of 5 [04 x 04 marks=16 marks]
Section C : Answer any 3 questions out of 5 [03 x 08 marks=24 marks]

Q. 1.	Section [A]	CO
a)	Define elastic and plastic deformation.	
b)	Describe briefly with diagram the process of determining offset yield strength.	
c)	Define stress and strain.	
d)	What do you mean by the term ductility?	
e)	Draw the diagram of a standard tensile specimen and label it properly.	

Q. 2.	Section [B]	CO
a)	Derive the relationship between true strain and engineering strain.	
b)	What is yield point phenomenon in metals and alloys?	
c)	Differentiate between slip and twinning.	
d)	Explain briefly with diagram: a) Toughness b) Resilience	
e)	Draw diagram for Engineering and True stress-strain curve in a single figure. Why there is a difference in both curves?	

Q. 3.	Section [C]	CO
a)	Determine the length of a 1.25 m bar of aluminium to which a stress of 210 MPa is applied. Given modulus of elasticity = 66.7 GPa	
b)	Draw the stress-strain diagram for mild steel and label the important points in the figure.	
c)	Calculate the true stress and true strain when the engineering stress and engineering strain values are 1500 MPa and 0.8 respectively.	
d)	A 13 mm diameter tensile specimen has a 50 mm gage length. The load corresponding to the 0.2% offset is 6800 kg and the maximum load is 8400 kg. Fracture occurs at 7300 kg. The diameter after fracture is 8 mm and the gage length at fracture is 65 mm. Calculate a) Yield stress b) Ultimate tensile stress c) %Elongation d) %Reduction in Area	
e)	What is UTM? Describe the tension test procedure.	

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OP JINDAL UNIVERSITY, RAIGARH (C.G.)

MID SEMESTER EXAMINATION, OCTOBER-2022

Program Name : **Diploma EE.** Program Code : **01DE060** Time : **02 Hrs**

Semester: **5th** Branch : ELECTRICAL Max. Marks : **50**

Course Code: **SOE-D-EE501** Course Name: UEE & ET

Note: Section A : All Questions are compulsory [05 x 02 marks=10 marks]
Section B : Answer any 4 questions out of 5 [04 x 04 marks=16 marks]
Section C : Answer any 3 questions out of 5 [03 x 08 marks=24 marks]

Q. 1.	Section [A]	CO
a)	Which component in block diagram is the heart of the Electric Drive and also list the basic elements of Electric Drive	1
b)	Give the name of the drive which is used for (1) Crane (2) Metal cutting machine tools	2,3
c)	Define Drive and Electric Drive with example	1,4
d)	Which drive is also called as Line shaft drive and why?	1
e)	What are the functions of "Power Modulator" in Electric drive?	2

Q. 2.	Section [B]	CO
a)	List the various types of electric drive and give a comparison between AC and DC drive	2
b)	Compare between Individual-drive and group-drive.	2
c)	List the function performed by an Electric Drives and its applications.	3
d)	Define heating time constant & cooling time constant of an electrical machine?	5
e)	What do you understand by Load Equalization?	4

Q. 3.	Section [C]	CO
a)	Draw and explain the block diagram of electric drive system.	1
b)	What are the factors influencing while selection of an Electrical Drive?	3
c)	Write the short note on merits and demerits of Electric Drives.	1
d)	Describe the various type of Electric Drive with the example on following basis 1) Individual drive 2) Group drive 3) Multi motor drive	3
e)	Explain the various classes of motor duty cycle for electric motors required to work on the basis of 1. Continuous duty load 2. Intermittent duty load 3. Variable or fluctuating load 4. Short time duty load	5

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OP JINDAL UNIVERSITY, RAIGARH (C.G.)

MID SEMESTER EXAMINATION, OCTOBER-2022

Program Name : **Diploma EE.** Program Code : **01DE060** Time : **02 Hrs**

Semester: **5th** Branch : ELECTRICAL Max. Marks : **50**

Course Code: **SOE-D-EE501** Course Name: UEE & ET

Note: Section A : All Questions are compulsory [05 x 02 marks=10 marks]
Section B : Answer any 4 questions out of 5 [04 x 04 marks=16 marks]
Section C : Answer any 3 questions out of 5 [03 x 08 marks=24 marks]

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d)	Which drive is also called as Line shaft drive and why?	1
e)	What are the functions of "Power Modulator" in Electric drive?	2

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c)	List the function performed by an Electric Drives and its applications.	3
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e)	What do you understand by Load Equalization?	4

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OP JINDAL UNIVERSITY, RAIGARH (C.G.)

MID SEMESTER EXAMINATION, OCTOBER-2022

Program Name: **Diploma** Program Code: **01DE060** Time: **02 Hrs**

Semester: **5th** Branch: ELECTRICAL Max. Marks: **50**

Course Code: **SOE-D-EE502** Course Name: **MPMC**

Note: Section A: All Questions are compulsory [05 x 02 marks=10 marks]
Section B: Answer any 4 questions out of 5 [04 x 04 marks=16 marks]
Section C: Answer any 3 questions out of 5 [03 x 08 marks=24 marks]

Q. 1.	Section [A]	CO
a)	Convert binary to octal number- i) 0101 1001 ii) 1011 0111	
b)	Convert hexadecimal to decimal number- i) 3CA h ii) F290 h	
c)	Describe the working of following pin of 8085 processor- i) Ready ii) INTR	
d)	Convert $(5426)_8$ number into hexadecimal number.	
e)	Define RAM and ROM memory in brief.	

Q. 2.	Section [B]	CO
a)	Differentiate between CISC and RISC based architecture.	
b)	Explain interrupt of 8085 microprocessor in detail.	
c)	Define maskable and non-maskable interrupt.	
d)	Write a program to add two 8-bit numbers and store the result in accumulator.	
e)	Find the addition of two hexadecimal number B5C h and A11F h and show the result in binary form.	

Q. 3.	Section [C]	CO
a)	Explain the working of microprocessor 8085 with its architecture diagram.	
b)	Define all logic gates with suitable diagram and their truth able.	
c)	Discuss the applications of microprocessor.	
d)	Differentiate between Harvard and Von Neumann architecture.	
e)	Interface two 8 KB ROM with microprocessor 8085 with diagram and address range.	

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OP JINDAL UNIVERSITY, RAIGARH (C.G.)

MID SEMESTER EXAMINATION, OCTOBER-2022

Program Name: **Diploma** Program Code: **01DE060** Time: **02 Hrs**

Semester: **5th** Branch: ELECTRICAL Max. Marks: **50**

Course Code: **SOE-D-EE502** Course Name: **MPMC**

Note: Section A: All Questions are compulsory [05 x 02 marks=10 marks]
Section B: Answer any 4 questions out of 5 [04 x 04 marks=16 marks]
Section C: Answer any 3 questions out of 5 [03 x 08 marks=24 marks]

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b)		Define all logic gates with suitable diagram and their truth able.	
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O P JINDAL UNIVERSITY, RAIGARH (C.G.)

MID SEMESTER EXAMINATION, OCTOBER-2022

Program Name: **Diploma** Time: **02 Hrs**

Semester: **5th** Branch: **Mechanical** Max Marks: **50**

Course Code: **SOE-D-ME501** Course Name: **Energy Conversion-I**

Note: **Section A:** All Questions are compulsory [05 x 02 marks=10 marks]
Section B: Answer any 4 questions out of 5 [04 x 04 marks=16 marks]
Section C: Answer any 3 questions out of 5 [03 x 08 marks=24 marks]

Section [A]

Q. 1	Define the following terms-
a.	Steam
b.	Boiler mountings
c.	Boiler accessories
d.	Steam turbine
e.	Steam condenser

Section [B]

Q. 2	Short answer question
a.	What are the different between water tube and fire tube boiler?
b.	Write the function of convergent and divergent portion of a nozzle.
c.	What is jet condenser? Write the function of jet condenser.
d.	Write the various factors affecting the cooling of water in cooling tower.
e.	Write the function of steam turbine.

Section [C]

Q. 3	Long answer question
a.	What is boiler? Give the five names of high pressure and low pressure boilers
b.	How are the steam turbines classified? Explain it.
c.	Explain the various types of nozzles with neat sketch.
d.	Explain the function of steam nozzle used with steam turbines.
e.	Write the various factors affecting the nozzle efficiency.

O P JINDAL UNIVERSITY, RAIGARH (C.G.)

MID SEMESTER EXAMINATION, OCTOBER-2022

Program Name: **Diploma** Time: **02 Hrs**

Semester: **5th** Branch: **Mechanical** Max Marks: **50**

Course Code: **SOE-D-ME501** Course Name: **Energy Conversion-I**

Note: **Section A:** All Questions are compulsory [05 x 02 marks=10 marks]
Section B: Answer any 4 questions out of 5 [04 x 04 marks=16 marks]
Section C: Answer any 3 questions out of 5 [03 x 08 marks=24 marks]

Section [A]

Q. 1	**Define the following terms-**
a.	Steam
b.	Boiler mountings
c.	Boiler accessories
d.	Steam turbine
e.	Steam condenser

Section [B]

Q. 2	**Short answer question**
a.	What are the different between water tube and fire tube boiler?
b.	Write the function of convergent and divergent portion of a nozzle.
c.	What is jet condenser? Write the function of jet condenser.
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OP JINDAL UNIVERSITY, RAIGARH (C.G.)

MID SEMESTER EXAMINATION, OCTOBER-2022

Program Name: Diploma Mechanical **Program code:** 01DE040 Time: **02 Hrs**

Semester: 5th **Branch:** Mechanical Max. Marks: **50**

Subject Code: SOE-D-ME502 **Subject:** Industrial Engineering and Production Management

Note: Section A : All Questions are compulsory [05 x 02 marks=10 marks]
Section B : Answer any 4 questions out of 5 [04 x 04 marks=16 marks]
Section C : Answer any 3 questions out of 5 [03 x 08 marks=24 marks]

Q. 1.	Section [A]	CO
a)	Define wage and incentives?	3
b)	What are the steps of selecting a Plant Location?	1
c)	Define Job evaluation?	3
d)	Write the difference between Production and Productivity.	1
e)	Define Rating and its necessity?	2

Q. 2.	Section [B]	CO
a)	Define Standard time, Basic time, Observed time, Rating Factor?	2
b)	"Incentives are necessary for smooth and efficient running of a factory", Explain?	3
c)	What are the Various allowances considered in Time study?	2
d)	What are the difference between Method Study and Work Measurement?	2
e)	What are the factors affecting the wages?	3

Q. 3.	Section [C]	CO
a)	What do you mean by Production management? What are the Objectives and scope of Industrial Engineering?	1
b)	Discuss Product type layout, where it is used. State its advantages and disadvantages?	1
c)	How many types of Therbligs? Write the names with their symbols?	2
d)	The normal cycle time for an operation is 1.14 minutes. It is estimated that 405 minutes of 480 minutes' day are available to the operator for production purposes. Determine the standard time and the number of pieces for a standard hour.	3
e)	In a company the rate per hour is ₹30 Standard time for completion of job is 10 hours. A worker completes the job in 8 hours. Calculate his total wage.	3

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OP JINDAL UNIVERSITY, RAIGARH (C.G.)

MID SEMESTER EXAMINATION, OCTOBER-2022

Program Name: Diploma Mechanical **Program code:** 01DE040 Time: **02 Hrs**

Semester: 5th **Branch:** Mechanical Max. Marks: **50**

Subject Code: SOE-D-ME502 **Subject:** Industrial Engineering and Production Management

Note: Section A : All Questions are compulsory [05 x 02 marks=10 marks]
Section B : Answer any 4 questions out of 5 [04 x 04 marks=16 marks]
Section C : Answer any 3 questions out of 5 [03 x 08 marks=24 marks]

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19/10/22

OP JINDAL UNIVERSITY, RAIGARH (C.G.)

MID SEMESTER EXAMINATION, OCTOBER-2022

Program Name : **Diploma Mechanical** Program Code : **01DE040** Time : **02 Hrs**

Semester: **5th** Branch : **MECHANICAL**

Max. Marks : **50**

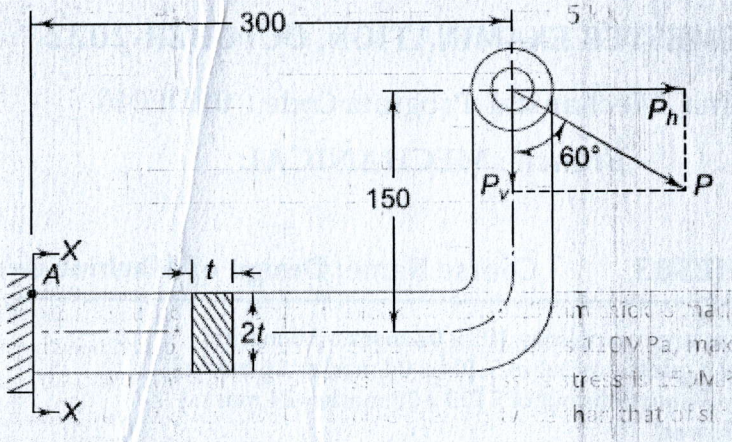
Course Code: **SOE-D-ME503** Course Name**: Design of Machine elements**

Note: Section A : All Questions are compulsory [05 x 02 marks=10 marks]
Section B : Answer any 4 questions out of 5 [04 x 04 marks=16 marks]
Section C : Answer any 3 questions out of 5 [03 x 08 marks=24 marks]
Design data book is allowed

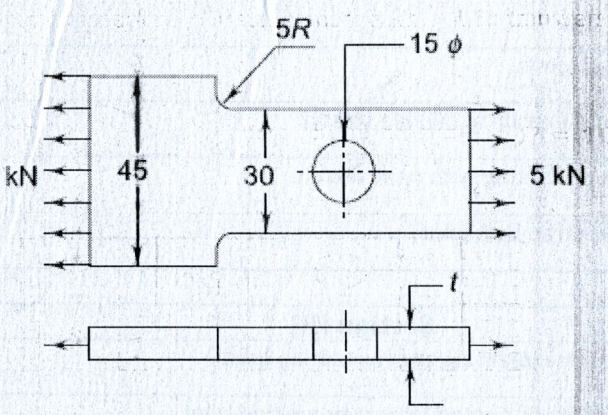
Q. 1.	Section [A]	CO
a)	What is creep?	CO1
b)	Define efficiency of riveted joints.	CO1
c)	What is factor of safety and explain allowable stress?	CO1
d)	What is rivet and process of riveting with neat sketch.	CO2
e)	Draw a diagram of double-strap butt joint?	CO4

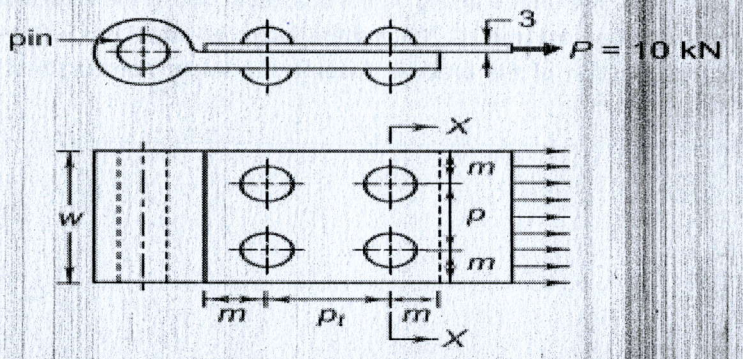
Q. 2.	Section [B]	CO
a)	With the help of neat sketch explain zig-zag riveted lap joint?	CO6
b)	Advantages and disadvantage of riveted joint over welded joint	CO1
c)	State maximum principal stress theory of failure.	CO2
d)	Explain with suitable diagram of types of riveted joints.	CO4
e)	What is a ductile material and brittle material? Give its examples.	CO1

Q. 3.	Section [C]	CO
a)	List down the types of failure of riveted joint with diagram.	CO1
b)	A wall bracket with a rectangular cross-section is shown in Fig. 4.39. The depth of the cross-section is twice of the width. The force P acting on the bracket at 600 to the vertical is 5 kN. The material of the bracket is grey cast iron FG 200 and the factor of safety is 3.5. Determine the dimensions of the cross-section of the bracket. Assume maximum normal stress theory of failure.	CO3



c)	A flat plate subjected to a tensile force of 5 kN is shown in Fig. 5.13. The plate material is grey cast iron FG 200 and the factor of safety is 2.5. Determine the thickness of the plate.	CO3
d)	A double riveted double cover butt joint in plates 20 mm thick is made with 25 mm diameter, rivtes at 100 mm pitch, the permissible tensile stress is 120MPa, maximum permissible shear stress is 100MPa, maximum permissible compressive stress is 150MPa. Find the efficiency of joint, the strength of the rivet in double shear as twice than that of single shear.	CO5
e)	A brake band attached to the hinge by means of a riveted joint is shown in Fig. 8.59. Determine the size of the rivets needed for the load of 10 kN. Also, determine the width of the band. The permissible stresses for the band and rivets in tension, shear and compression are 80, 60 and 120 N/mm2 respectively. Assume, margin (m) = 1.5d transverse pitch (pt) = p Find the pitch of the rivets.	CO5





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OP JINDAL UNIVERSITY, RAIGARH (C.G.)

MID SEMESTER EXAMINATION, OCTOBER-2022

Program Name : **Diploma Mechanical** Program Code : **01DE040** Time : **02 Hrs**

Semester: **5th** Branch : **MECHANICAL**

Max. Marks : **50**

Course Code: **SOE-D-ME503** Course Name: **Design of Machine elements**

Note: **Section A :** All Questions are compulsory [05 x 02 marks=10 marks]
Section B : Answer any 4 questions out of 5 [04 x 04 marks=16 marks]
Section C : Answer any 3 questions out of 5 [03 x 08 marks=24 marks]
Design data book is allowed

Q. 1.	Section [A]	CO
a)	What is creep?	CO1
b)	Define efficiency of riveted joints.	CO1
c)	What is factor of safety and explain allowable stress?	CO1
d)	What is rivet and process of riveting with neat sketch.	CO2
e)	Draw a diagram of double-strap butt joint?	CO4

Q. 2.	Section [B]	CO
a)	With the help of neat sketch explain zig-zag riveted lap joint?	CO6
b)	Advantages and disadvantage of riveted joint over welded joint	CO1
c)	State maximum principal stress theory of failure.	CO2
d)	Explain with suitable diagram of types of riveted joints.	CO4
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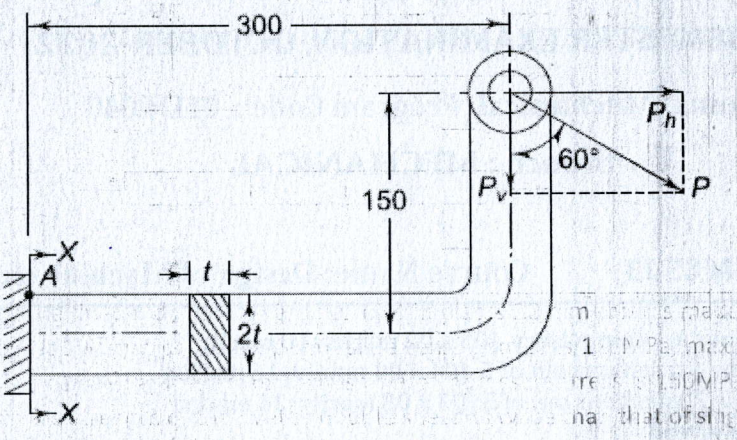
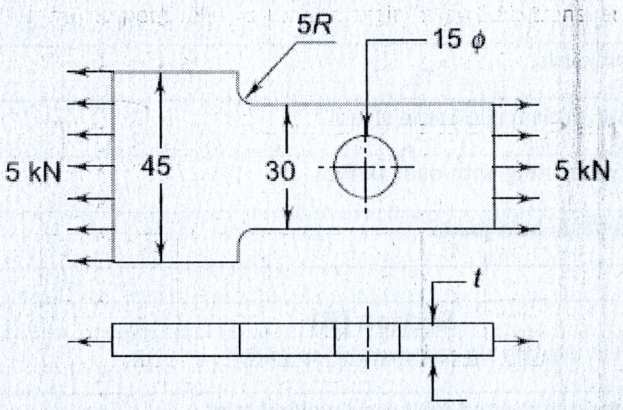
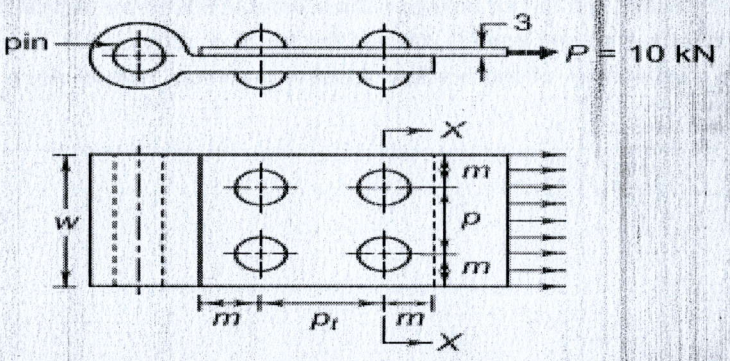
a)	List down the types of failure of riveted joint with diagram.	CO1
b)	A wall bracket with a rectangular cross-section is shown in Fig. 4.39. The depth of the cross-section is twice of the width. The force P acting on the bracket at 600 to the vertical is 5 kN. The material of the bracket is grey cast iron FG 200 and the factor of safety is 3.5. Determine the dimensions of the cross-section of the bracket. Assume maximum normal stress theory of failure.	CO3



c)	A flat plate subjected to a tensile force of 5 kN is shown in Fig. 5.13. The plate material is grey cast iron FG 200 and the factor of safety is 2.5. Determine the thickness of the plate. 	CO3
d)	A double riveted double cover butt joint in plates 20 mm thick is made with 25 mm diameter, rivtes at 100 mm pitch, the permissible tensile stress is 120MPa, maximum permissible shear stress is 100MPa, maximum permissible compressive stress is 150MPa. Find the efficiency of joint, the strength of the rivet in double shear as twice than that of single shear.	CO5
e)	A brake band attached to the hinge by means of a riveted joint is shown in Fig. 8.59. Determine the size of the rivets needed for the load of 10 kN. Also, determine the width of the band. The permissible stresses for the band and rivets in tension, shear and compression are 80, 60 and 120 N/mm2 respectively. Assume, margin (m) = 1.5d transverse pitch (pt) = p Find the pitch of the rivets. 	CO5

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OP JINDAL UNIVERSITY, RAIGARH (C.G.)

MID SEMESTER EXAMINATION, OCTOBER-2022

Program Name: **B. Tech.** Program Code : **01UG050** Time: **02 Hrs**

Semester:**5th** Branch : Metallurgy Max. Marks: 50

Course Code: **SOE-B-MME503** Course Name: **Non-Ferrous Extractive Metallurgy**

Note: Section A : All Questions are compulsory [05 x 02 marks=10 marks]
Section B: Answer any 4 questions out of 5 [04 x 04 marks=16 marks]
Section C: Answer any 3 questions out of 5 [03 x 08 marks=24 marks]

Q. 1.	Section [A]	CO
a)	Name the locations of bauxite, gold, copper and magnesite in India.	CO-1
b)	Enlist the four applications of hard chromium plating process.	CO-3
c)	What are the impurities removed during electro refining of copper?	CO-2
d)	Write the reduction reaction under vacuum and high pressure for oxides.	CO-2
e)	State the Faraday's first law of electrolysis.	CO-2

Q. 2.	Section [B]	CO
a)	Pressure leaching is beneficial. How?	CO-2
b)	Enlist the factors affecting the rate of roasting operation?	CO-2
c)	Discuss the method used for purification of leach liquor.	CO-2
d)	Why the loss of current occurred during the electrolysis process of non-ferrous metals?	CO-3
e)	Describe the factors affecting the capacity of screens.	CO-1

Q. 3.	Section [C]	CO
a)	Explain the stages of fluidized bed roasting process with suitable diagram.	CO-2
b)	Why the halides are used in the production of reactive metals? State the reactions for preparations of halides for reduction of oxide?	CO-3
c)	Describe the electro refining method of gold with neat labeled diagram.	CO-1
d)	Discuss the blast furnace smelting process for production of matte.	CO-2
e)	What do you mean by electroplating? Write the processing variables for brass electroplating.	CO-3

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OP JINDAL UNIVERSITY, RAIGARH (C.G.)

MID SEMESTER EXAMINATION, OCTOBER-2022

Program Name: **B. Tech.** Program Code : **01UG050** Time: **02 Hrs**

Semester:**5th** Branch : Metallurgy Max. Marks: 50

Course Code: **SOE-B-MME503** Course Name: **Non-Ferrous Extractive Metallurgy**

Note: Section A : All Questions are compulsory [05 x 02 marks=10 marks]
Section B: Answer any 4 questions out of 5 [04 x 04 marks=16 marks]
Section C: Answer any 3 questions out of 5 [03 x 08 marks=24 marks]

Q. 1.	Section [A]	CO
a)	Name the locations of bauxite, gold, copper and magnesite in India.	CO-1
b)	Enlist the four applications of hard chromium plating process.	CO-3
c)	What are the impurities removed during electro refining of copper?	CO-2
d)	Write the reduction reaction under vacuum and high pressure for oxides.	CO-2
e)	State the Faraday's first law of electrolysis.	CO-2

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Q. 3.	Section [C]	CO
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OP JINDAL UNIVERSITY, RAIGARH (C.G.)

MID SEMESTER EXAMINATION, OCTOBER-2022

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e)	State the Faraday's first law of electrolysis.	CO-2

Q. 2.	Section [B]	CO
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OP JINDAL UNIVERSITY, RAIGARH (C.G.)

MID SEMESTER EXAMINATION, OCTOBER-2022

Program Name: **B. Tech.** Program Code : **01UG050** Time: **02 Hrs**

Semester:**5th** Branch : Metallurgy Max. Marks: 50

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Q. 2.	Section [B]	CO
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b)	Enlist the factors affecting the rate of roasting operation?	CO-2
c)	Discuss the method used for purification of leach liquor.	CO-2
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OP JINDAL UNIVERSITY, RAIGARH (C.G.)

MID SEMESTER EXAMINATION, OCTOBER-2022

Program Name: **B. Tech.** Program Code : **01UG050** Time: **02 Hrs**

Semester:**5th** Branch : Metallurgy Max. Marks: 50

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d)	Write the reduction reaction under vacuum and high pressure for oxides.	CO-2
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a)	Pressure leaching is beneficial. How?	CO-2
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OP JINDAL UNIVERSITY, RAIGARH (C.G.)

MID SEMESTER EXAMINATION, OCTOBER-2022

Program Name: **Diploma – Meta** Program Code : **01DE050** Time : **02 Hrs**

Semester: **5th** Branch : METALLURGICAL ENGINEERING

Max. Marks : **50**

Course Code: **SOE-D-MT502** Course Name: **Metal Working Process**

Note: **Section A:** All Questions are compulsory [05 x 02 marks=10 marks]
Section B: Answer any 4 questions out of 5 [04 x 04 marks=16 marks]
Section C: Answer any 3 questions out of 5 [03 x 08 marks=24 marks]

Q. 1.	Section [A]
a)	What is the basic condition for plastic deformation to take place in any material?
b)	Define the two basic mechanisms by which plastic deformation takes place in crystal structures?
c)	Define yield criteria. Name the most commonly used yield criteria
d)	Name the common processes that fall under metal working processes.
e)	Write the applications of hot and cold rolling.

Q. 2.	Section [B]
a)	Explain cluster mill in detail with diagram.
b)	Define angle of bite and no slip angle. Write the factors affecting the maximum permissible value of angle of contact.
c)	If the maximum reduction of rolling slab is from 50 to 25 mm, calculate the value of COF. If the roll diameter is 350 mm, find the length of projection of arc of contact.
d)	In a single pass rolling process using 800 mm diameter of steel rolls, a strip of width 370 mm and thickness 12 mm undergoes 15% reduction of the thickness. What would be the angle of bite in radians.
e)	The elongation factor during rolling of an ingot is 2.1. What would be the minimum number of passes needed to produce a section of 150 X 150 mm from an ingot of 500 X 500 mm.

Q. 3.	Section [C]
a)	Explain in detail the variables of metal forming.
b)	Calculate the rolling load if a steel is hot rolled from a 70 mm thick slab of width 960 mm. The reduction in thickness achieved is 30% and the roll diameter is 700 mm. the plain strain flow stress is 100 MPa at the entrance and 160 MPa at the exit from the roll gap because of the increasing velocity. The coefficient of friction is 0.2. If the roll speed is 100 rpm, what is the power required to drive the rolls?
c)	A 200mm wide aluminum alloy strip is hot rolled from an initial thickness of 30 mm to a final thickness of 15 mm. The diameter of the rolls is 900 mm and rotate at 100 rpm. The plain strain flow stress is 90 MPa at the entrance and 140 MPa at the exit from the roll gap due to increasing velocity. Determine the rolling load and the power required. Assume the coefficient of friction as 0.3.

d)	Define the formability of metals. Explain the method in detail to predict the formability of metals.
e)	Name the materials used for rolling mills. Also explain in detail the hot and cold rolling process of steel with applications of each.

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OP JINDAL UNIVERSITY, RAIGARH (C.G.)

MID SEMESTER EXAMINATION, OCTOBER-2022

Program Name: **Diploma – Meta** Program Code : **01DE050** Time : **02 Hrs**

Semester: **5th** Branch : METALLURGICAL ENGINEERING

Max. Marks : **50**

Course Code: **SOE-D-MT502** Course Name: **Metal Working Process**

Note: **Section A:** All Questions are compulsory [05 x 02 marks=10 marks]
Section B: Answer any 4 questions out of 5 [04 x 04 marks=16 marks]
Section C: Answer any 3 questions out of 5 [03 x 08 marks=24 marks]

Q. 1.	Section [A]
a)	What is the basic condition for plastic deformation to take place in any material?
b)	Define the two basic mechanisms by which plastic deformation takes place in crystal structures?
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d)	Name the common processes that fall under metal working processes.
e)	Write the applications of hot and cold rolling.

Q. 2.	Section [B]
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c)	A 200mm wide aluminum alloy strip is hot rolled from an initial thickness of 30 mm to a final thickness of 15 mm. The diameter of the rolls is 900 mm and rotate at 100 rpm. The plain strain flow stress is 90 MPa at the entrance and 140 MPa at the exit from the roll gap due to increasing velocity. Determine the rolling load and the power required. Assume the coefficient of friction as 0.3.

d)	Define the formability of metals. Explain the method in detail to predict the formability of metals.
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19/10/22

OP JINDAL UNIVERSITY, RAIGARH (C.G.)

MID SEMESTER EXAMINATION, OCTOBER-2022

Program Name : **Diploma** Program Code : **01DE050** Time : **02 Hrs**

Semester: **5th** Branch : **META** Max. Marks : **50**

Course Code: **SOE-D-MT503** Course Name: **Industrial Management and Entrepreneurship**

Note: Section A : All Questions are compulsory [05 x 02 marks=10 marks]
Section B : Answer any 4 questions out of 5 [04 x 04 marks=16 marks]
Section C : Answer any 3 questions out of 5 [03 x 08 marks=24 marks]

Q. 1.	Section [A]	CO
a)	Define management.	
b)	What is meant by the term 'Esprit de Corps'?	
c)	Who is known as the father of modern management theory? List any two principles of management.	
d)	Define industrial accident according to the Factories Act, 1948.	
e)	What do you understand by the term 'Safety Criteria'?	

Q. 2.	Section [B]	CO
a)	What are the characteristics of professionalism?	
b)	Define any two: (i) Accident (ii) Incident (iii) near-miss event	
c)	What is meant by the term 'Ethics'? What are the few examples of common unethical practices in business?	
d)	Give an example of interrelationship between various departments with diagram.	
e)	What is meant by Human relations at workplace? List the factors affecting human relations.	

Q. 3.	Section [C]	CO
a)	What are the different methods of improving motivation in an organization? Explain in brief.	
b)	Explain how the industrial accidents can be prevented.	
c)	What is planning in management? Discuss the steps in planning.	
d)	What are the different types of the organizational structure? Explain any one of the type in detail.	
e)	What is the need of leadership in an organization? Describe the various functions of a leader.	

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OP JINDAL UNIVERSITY, RAIGARH (C.G.)

MID SEMESTER EXAMINATION, OCTOBER-2022

Program Name : **Diploma** Program Code : **01DE050** Time : **02 Hrs**

Semester: **5th** Branch : **META** Max. Marks : **50**

Course Code: **SOE-D-MT503** Course Name: **Industrial Management and Entrepreneurship**

Note: **Section A :** All Questions are compulsory [05 x 02 marks=10 marks]
Section B : Answer any 4 questions out of 5 [04 x 04 marks=16 marks]
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