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University Roll No.....

End Term Examination, Odd Semester, 2016-17

B. Tech., First Year, I-Semester

MEE 1002 : Basic Mechanical Engineering

Time: 02 ½ Hours

Max. Marks: 40

Section – A

Note: Attempt All Questions.

(1×16=16)

- I. Name any four properties of moulding sand.
- II. What is the function of riser in casting?
- III. What are the basic parts of a Lathe machine?
- IV. What is extrusion?
- V. Calculate the change in internal energy of a system undergoing a process in which 80 kJ/kg of work is done by the system and 180 kJ/kg of heat is added to the system.
- VI. Write the conditions for a process to be reversible.
- VII. What is thermodynamic equilibrium?
- VIII. A Carnot refrigerator absorbs heat at 4°C and rejects heat at 25°C. Calculate the C.O.P. of refrigerator.
- IX. What is pattern?
- X. What do you mean by green sand casting?
- XI. Explain intensive and extensive properties with example.
- XII. What is a quasi static process?
- XIII. What is hot working process?
- XIV. What is indirect extrusion?
- XV. Name any three types of rolling process?
- XVI. What is the function of flux in welding process?

Section – B

Note: Attempt Any Four Questions.

(3x4=12)

- I. Determine the half taper angle & final depth of cut of a job whose larger diameter is 40mm, small diameter is 20 mm and tapered length is 200mm.
- II. Explain the various types of flames used in oxy-acetylene gas welding with diagram and application.
- III. Write grinding wheel specification in detail.
- IV. Explain the processes: Threading, Knurling, and step turning with neat sketches.
- V. Describe the working principle of a shaper with the help of neat sketch.

Section – C

Note: Attempt Any Three Questions.

(4x3=12)

- I. Describe the process of resistant spot welding with neat sketch. Also write down their advantages, limitations & their applications.
- II. Explain the working principle of Shielded Metal Arc Welding (SMAW) with diagram.
- III. Differentiate between brazing, soldering and welding.
- IV. Describe the following drilling operation with diagram:
 - (i) Counter boring
 - (ii) Counter Sinking
 - (iii) Reaming
 - (iv) Tapping

Printed Pages : 02

University Roll No.

End Term Examination, Even Semester 2016-17

B. Tech., I-Year, II-Semester

MEE 1002 : Basic Mechanical Engineering

Time: 2½ Hrs.

Max. Marks: 40

Instruction: Draw figure wherever it is necessary.

Section – A

Note: Attempt All Questions.

(1x16=16)

- I. What is First Law of thermodynamics for a Process?
- II. Which material is used for non consumable electrode in welding?
- III. What is application of Zeroth Law of Thermodynamics
- IV. What is PMM-I?
- V. What is Quasi-static Process?
- VI. Explain Clearance Volume in IC engine?
- VII. What is straight polarity in welding?
- VIII. In a Heat engine, heat rejected to sink is 7/10 times of work output. Calculate the efficiency of the engine.
- IX. Explain Principle of Increase in Entropy of Universe?
- X. While entering in a nozzle, steam is having an enthalpy of 2000 KJ/Kg. On exit side enthalpy of steam is dropped by 200KJ/Kg. assuming the negligible inlet velocity, find out velocity at exit.
- XI. What are chills in casting?
- XII. What is Angle of Bite in rolling?
- XIII. What is the material of electrode in resistance welding and why?
- XIV. Write down SFEE for a Turbine?
- XV. In soldering, what material is used as solder?
- XVI. What is machine tool?

Section – B

Note: Attempt Any Four Questions.

(3x4=12)

- I. With the Help of neat sketch explain parts of shaper?
- II. Explain any three operations in details which can be performed on drill machine.
- III. Explain different type of flames produced in gas welding with their applications?
- IV. Write short note on
 - a. Carriage
 - b. Specification of lathe
- V. What is taper turning? Find the angle at which compound rest should be set to turn a taper on workpiece having a length of 200 mm, larger diameter being 45mm and smaller diameter 25 mm.

Section – C

Note: Attempt Any Three Questions.

(4x3=12)

- V. Explain Specification of Grinding Wheel in detail, while elaborating each term that came in specification.
- VI. Differentiate between followings
 - a. Soldering and Brazing.
 - b. Electric arc and gas welding.
- VII. Define Speed, feed and Depth of Cut as applied to Lathe machine operation. How do you estimate machining time?
- VIII. Write short note on following
 - a. Arc Blow and its remedies.
 - b. Concept of Polarity

End Term Examination

Odd-Semester, 2017-18

Program: B. Tech First Year

Subject: Basic Mechanical Engineering, MEE-1102

Time: 3 Hour

Maximum Marks: 50

Note: - Attempt all Questions

Section-A

[5×7]

1. Define the followings:

(a) Zeroth law of thermodynamics (b) Point function (c) Path function (d) Extensive properties (e) Intensive properties

2. (a) A fluid system, contained in a piston and cylinder machine, passes through a complete cycle of four processes. The sum of all heat transferred during a cycle is -700 kJ. The system completes 200 cycles per min. Complete the following table showing the method for each item.

Process	Q (kJ/min)	W(kJ/min)	ΔE (kJ/min)
1-2	0	8000	---
2-3	55000	0	---
3-4	-6000	---	95000
4-1	---	---	---

2. (b) The temperature ' t ' on a new thermometric scale ($^{\circ}S$) is defined in terms of a property ' R ' by the relation ' $t = a \cdot \ln(R) + b$ ' Where ' a ' and ' b ' are constants. The value of ' R ' are found to be 8.6 and 20.8 at the ice point and the steam point, the temperatures of ice point and steam point are assigned the numbers $80^{\circ}S$ and $350^{\circ}S$ respectively. Determine the temperature on new scale corresponding to a reading of ' R ' equal to 9.0 on the thermometer.

3. (a) Explain the COP of heat pump and refrigerator. Can it be less than 1?

3. (b) Coefficient of performance of a Carnot refrigerator is 6. If the refrigerator is reversed in direction, it starts working as Carnot heat engine. What will be the efficiency of the engine?

4. (a) A AISI 1040 steel rod of 300 mm diameter and 60 cm length is to be turned down to 294 mm for entire length. The suggested feed rate is 2 mm/revolution and the spindle speed is 400 rpm. Calculate the followings:

(i) Cutting speed (ii) Depth of cut (iii) Total machining time

4. (b) Prove that entropy change for an ideal gas undergoing in a thermodynamic process (for unit mass) is

$$\Delta s = C_p \ln \left(\frac{T_2}{T_1} \right) + R \ln \left(\frac{P_1}{P_2} \right)$$

5. Explain the working principle of drill machine with suitable diagram.

6. Explain the concept of GATING system used in casting with neat sketch.

7. Write down working principle of Shielded Metal Arc Welding with suitable diagram.

Section-B

[3×2]

1. What are the types of jaw-chucks used in Lathe? Differentiate between 3-jaw & 4-jaw chuck.

2. What are the types of pattern used in casting? Explain any two patterns with suitable diagram.

3. Differentiate between soldering and welding.

Section-C

[3×3]

1. What are the types of flames used in oxy-acetylene gas welding? Explain each of them with neat sketch.

2. Explain three casting defects with help of neat sketches.

3. Explain the following machining process with neat sketch:

(a) Step turning

(b) Knurling

(c) Tapping

University Roll No.....

End-Term Examination

Odd-Semester, 2018-19

Program: B.Tech,

Branch: All,

Year: 1st

Subject with Code: Basic Mechanical Engineering (BME G0001)

Time: 3 Hour

Maximum Marks: 50

Section-A

1. Attempt seven questions.

7 x 5 = 35 Marks

1. Explain the terms path function, cycle, thermometric property, critical point and dryness fraction.

“OR”

A new scale N of temperature is divided in such a way that the freezing point of ice is $100^{\circ}N$ and the boiling point is $400^{\circ}N$. What is the temperature reading on this new scale when the temperature is $150^{\circ}C$? At what temperature both the Celsius and the new temperature scale reading would be the same?

2. Develop the expression for the work transfer from a mass of gas undergoing reversible expansion process obeying the polytropic law, $pV^n = \text{constant}$
3. State the Kelvin-Planck and Clausius statements of the second law of thermodynamics, and establish the equivalence between them.

4. Derive the expression for the efficiency of a Carnot cycle. What is PMM of second kind?

“OR”

Write the Statement of Carnot's Theorem and prove any one of them.

5. Define welding process. Explain various types of flame used in Oxy-Acetylene gas welding with diagram.

6. Define any five of the following terms:

- | | | |
|-----------------|---------------|----------------|
| i. Ductility | ii. Toughness | iii. Hardness |
| iv. Fatigue | v. Creep | vi. Resilience |
| vii. Elasticity | | |

7. What is pattern? What are the different types of pattern? Discuss any two types with diagrams.

Section-B

1. Attempt all questions.

3 x 2 = 6 Marks

- Describe any two types of casting defects.
- What is Green sand and its composition?
- Discuss the different types of plain carbon steel.

2. Attempt all questions.

3 x 3 = 9 Marks

- Explain the elements of gating system used in casting with suitable diagram.
- What are the types of polarity used in the shielded metal arc welding? Explain it.
- What are the types of pattern allowances used in casting?

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University Roll No:

End Term Examination, Even Semester 2018-19

Program B Tech. Branch, Year: I, Semester: II

Subject Code: BMEG0001 Basic Mechanical Engineering

Time: 3 Hour Maximum

Marks: 50

Section-A

Attempt all the questions

(7 x 5= 35 Marks)

Q:1. Air expands reversibly and adiabatically from 3 bar to 1 bar in a nozzle. The initial velocity is 90 m/s. the initial temperature is 150°C. Calculate the velocity of air at the exit of the nozzle. Assume the flow as steady. Take value of c_p as 1.005 kJ/kg K and c_v as 0.718 kJ/kg K for air.

OR

Q:1. An engine cylinder has a piston of area 0.12 m² and contains gas at a pressure of 1.5 MPa. The gas expands according to a process which is represented by a straight line on a pressure-volume diagram. The final pressure is 0.15 MPa. Calculate the work done by the gas on the piston if the stroke is 0.30 m. Also show on p-v diagram.

Q:2. (a) If a gas of volume 6000 cm³ and at pressure of 0.1 MPa is compressed quasi-statically according to $pv^2 = \text{constant}$ until the volume becomes 2000 cm³, determine the final pressure and the work transfer in kJ.

(b) Derive an expression for work transfer for a close system going under a reversible poly-tropic process.

Q:3. Three Carnot engines are arranged in series. The first engine takes 4000 kJ of heat from a source of 2000 K temperature and delivers 1800 kJ of work; the second and third engine delivers 1200 kJ and 500 kJ of work respectively. Make calculations for exhaust temperature of second and third engine.

Q:4. Steam initially at 1.5 MPa and 400 degree Celsius expands reversibly and adiabatically in a turbine to a temperature of 50 degree Celsius. Using steam table, determine the ideal work output of the turbine per kg of steam.

OR

Q:4. 1 m^3 of air is heated reversibly at constant pressure from 290 K to 580 K and then cooled reversibly constant volume process back to original temperature. If initial pressure is 1 bar, work out the net heat flow and overall change in entropy. Represent the process on T-S plot. Take c_p as 1.005 kJ/kg K and c_v as 0.718 kJ/kg K.

Q:5. Explain the following

- a) Chaplets b) Work c) Shake or Rapping Allowance d) Pattern function e) PMM-II

Q:6. With the help of neat sketches, explain different types of flames in gas welding process. Also mention their applications.

Q:7 a) Write any four objectives of gating system.

- b) Explain various elements of gating system using neat and clear sketch.

Section-B

Attempt all the questions

(3 x 2 = 6 Marks)

Q:1 What is straight and reverse polarity.

Q:2 Explain the property Permeability and Refractoriness of moulding sand.

Q:3 Differentiate between resilience and toughness.

Section-C

Attempt all the questions

(3 x 3 = 9 Marks)

Q:1. State the ranges of composition for low, medium and high carbon steel. Give two applications for each range

Q:2. Using neat sketches explain any three types of patterns.

Q:3. Explain the following terms

- a) Consumable electrode
- b) Electric Arc
- c) Flux

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University Roll No:

End Term Examination, Odd Semester 2019-20

B.Tech, Branch, Year: I, Semester: I

Subject Code: BME G 0001, Subject Title: Basic Mechanical Engineering

Time: 3 Hour

Maximum Marks: 50

Section- A

Note: Attempt ANY FIVE Questions.

5 x 4 = 20 marks

- (I) A fluid system, contained in a piston and cylinder machine, passes through a complete cycle of four processes. The sum of all heat transferred during a cycle is - 700 kJ. The system completes 200 cycles per min. Complete the following table showing the method for each item.

Process	Q (kJ/min)	W(kJ/min)	ΔE (kJ/min)
1-2	0	8000	---
2-3	55000	0	---
3-4	-6000	---	95000
4-1	---	---	---

- (II) Derive steady flow equation for a turbine with clean sketch. Also write the assumptions.
- (III) Explain the COP of heat pump and refrigerator. The coefficient of performance of a Carnot refrigerator is 6. If the refrigerator is reversed in direction, it starts working as Carnot heat engine. What will be the efficiency of the engine?
- (IV) What are the basic elements of gating system? Explain each with neat sketch.
- (V) Discuss in brief the split pattern & gated pattern with suitable figure.
- (VI) Define casting process and also discuss advantages, disadvantages and limitation of casting process.

Section- B

Note: Attempt ALL Questions.

5 x 3 = 15 marks

- (I) Prove that entropy change for an ideal gas undergoing in a thermodynamic process (for unit mass) is

$$\Delta s = C_p \ln \left(\frac{T_2}{T_1} \right) + R \ln \left(\frac{P_1}{P_2} \right)$$

- (II) A reversible heat engine interacts with three thermal reservoirs at 500 K, 400 K and 300 K respectively. The engine does 300 kJ of net work and absorbs 900 kJ of energy as heat from the reservoir at 500 K. Determine the magnitude and direction of heat interaction of the engine with the other two reservoirs.
- (III) Find the enthalpy, entropy and volume of steam at 38 bar, 350°C from steam table only.
- (IV) Why allowances are provided on a pattern? Mention which allowances are positive and which are negative?
- (V) Define the following material properties:
(a) Malleability (b) Ductility (c) Brittleness

Section- C

Note: Attempt ANY THREE Questions.

3 x 5 = 15 marks

- (I) Calculate the following from steam table:
a. Enthalpy and entropy of 2 kg of steam at a pressure of 40 bar and 90% dry.
b. Enthalpy and entropy of vaporization of water at 10 bar.
c. Enthalpy and volume of 4 kg of steam at 100 bar, 450°C.
- (II) Explain the principle and working of Shielded Metal Arc Welding (SMAW) with neat sketch.
- (III) What are the possible casting defects that may be caused by the improper gating system design? List the five such defects.
- (IV) Explain different types of flames in Oxy acetylene welding with the help of clean sketches marks with temperatures.

Course Name: B. Tech

Course Outcome

CO1: Understand the basic laws of thermodynamics and their applications in real world.

CO2: Calculate heat and energy transfer occurs in atmosphere and in components under thermal engineering applications.

CO3: Interpret the behavior of steam and its applications in thermal engineering.

CO4: Acknowledge the application of thermal engineering associated with human body.

CO5: Understand the basic industrial processes of metal joining, fabrication & casting with applications in real world.

CO6: Develop basic know how and awareness of various manufacturing processes.

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University Roll No.

End Term Examination, Odd Semester 2022-23

Program (B.Tech.), Year: Ist Year (All), Semester: I

Subject Code: BMEG 0001 & Subject Name: Basic Mechanical Engineering

Time: 3 Hours

Maximum Marks: 50

Instruction for students: (i) Attempt all the questions from each section, and also assume any missing data with proper justifications. (ii) A steam table is permissible.

Section – A

Attempt All Questions

4 X 5 = 20 Marks

No.	Detail of Question	Marks	CO	BL	KL
1	State the Kelvin-Planck and Clausius statements of the second law of the thermodynamics along with neat sketch.	4	CO1	U	C
2	A machine operating as a heat pump extracts heat from the surroundings atmosphere, is driven by a 36×10^4 kJ/hr motor and supplies 10.8×10^5 kJ/hr heat to a house needed for its heating in winter. Find the coefficient of performance (COP) for the heat pump. How this COP will be affected if the objective of the same machine is to cool the house in summer requiring 10.8×10^5 kJ/hr of heat rejection? Or Define term coefficient of performance (COP) of refrigerator (Ref.) and heat pump (HP). Show that that the COP of a heat pump is greater than the COP of a refrigerator by unity $[(COP)_{HP} = 1 + (COP)_{Ref}]$.	4	CO2	An E	D F
3	A Carnot cycles operates between two thermal reservoirs at 27°C and 277°C . Determine the followings: (a) Its thermal efficiency if it operates as a heat engine (b) The amount of work delivered in kW by the heat engine if 36×10^4 kJ/hr from the higher temperature thermal reservoir (c) Its COP if it operates as a refrigerator (d) Its COP if it operates as a heat pump. Or Three Carnot heat engine are connected in series. The first engine takes 4000 kJ of heat from source at 2000 K and delivers 1800 kJ of work; the second and third heat engines delivers 1200 kJ and 500 kJ of work respectively. Calculate the temperature of intermediate reservoir.	4	CO1 CO4	E U	DI S

4	Derive an expression of the entropy change for the constant volume (isochoric) process.	4	CO1	U	P
	Or A lump of steel of mass 4 kg at 500 K is dropped in 40 kg of oil at 150 K. Calculate the entropy change of steel. The oil and the universe. Assume specific heats of steel and oil as 0.25 kJ/kg K and 1.75 kJ/kg K, respectively.		CO2	E	C
5	Describe the following mechanical properties of the materials: (a) Ductility (b) Malleability (c) Elasticity (d) Hardness	4	CO5	R	P

Section – B

Attempt All Questions

3 X 5 = 15 Marks

No.	Detail of Question	Marks	CO	BL	KL
6	Calculate the specific enthalpy and specific entropy of 1 kg of steam at 5°C when its dryness fraction is 0.85.	3	CO3	E	P
	Or State the limitations of first law of thermodynamics. Define the thermal efficiency of a heat engine with neat sketch.				
7	What is the specific enthalpy and specific entropy of 1.5 kg of steam at a pressure of 0.010 bars, when the dryness fraction is 0.5?	3	CO2 CO3	E U	D
	Or Explain the phase change process of pure substance with the help of pressure-volume diagram.				
8	Define the term Entropy. What is the principle of increase of entropy of Universe?	3	CO1	U	C
9	What are the types of pattern allowances used in casting? Explain any two types of pattern allowances with suitable diagram.	3	CO5	R	P
	Or Classify and describe the different types of flames used in oxy-acetylene gas welding with neat sketch.				
10	Classify plain carbon steel according to the carbon content and list the many engineering and technological fields in which it is utilized.	3	CO5	R	F
	Or Why green sand is called green? Also explain any two types of moulding sand properties.				

Section – C

Attempt All Questions

5 X 3 = 15 Marks

No.	Detail of Question	Marks	CO	BL	KL
11	Explain all elements of gating system in casting with a neat sketch.	5	CO 6	U	S
12	What is pattern? Explain any four types of pattern with neat sketch.	5	CO 5	R	P
13	What are the types of polarity used in arc welding? Write working principle and applications of shielded metal arc welding process.	5	CO 5	R	P

Course Name: B.Tech.

Course Outcome

CO1: Understand the basic laws of thermodynamics and their applications in real world.

CO2: Calculate heat and energy transfer occurs in atmosphere and in components under thermal engineering applications.

CO3: Interpret the behavior of steam and its applications in thermal engineering.

CO4: Acknowledge the application of thermal engineering associated with human body.

CO5: Understand the basic industrial processes of metal joining, fabrication & casting with applications in real world.

CO6: Develop basic know how and awareness of various manufacturing processes.

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University Roll No.

End Term Examination, Even Semester 2022-23

Program (B.Tech.), Year: Ist Year (All), Semester: II

Subject Code: BMEG 0001 & Subject Name: Basic Mechanical Engineering

Time: 3 Hours

Maximum Marks: 50

Instruction for students: (i) Attempt all the questions from each section, and also assume any missing data with proper justifications. (ii) A steam table is permissible.

Attempt All Questions

4 × 5 = 20 Marks

No.	Detail of Question	Marks	CO	BL	KL
1.	<p>A heat pump working on the reversed Carnot cycle takes in heat from a reservoir at 27 °C and delivers heat at reservoir at 127 °C. The heat pump is driven by a reversible heat engine. The reversible heat engine takes in heat from a reservoir at 1727 °C and rejects heat to a reservoir at 127 °C. Evaluate the followings: (i) Thermal efficiency of the heat engine (ii) The COP of the heat pump (iii) The amount of work required to operate the heat pump (iv) The rate of heat supplied to the heat engine.</p> <p>Or</p> <p>Explain the differences between a heat engine and a refrigerator using an appropriate diagram. Additionally, discuss the performance of both the systems.</p>	4	CO2	An	PC

2.	<p>A Carnot cycles operates between two thermal reservoirs at 227 °C and 727 °C. Determine the followings: (a) Its thermal efficiency if it operates as a heat engine (b) The amount of work delivered in kW by the heat engine if 36×10^4 kJ/hr of heat supplied from the higher temperature thermal reservoir of the heat engine (c) Its COP if it operates as a refrigerator (d) Its COP if it operates as a heat pump.</p> <p style="text-align: center;">Or</p> <p>Define the following thermodynamic processes with appropriate diagram (i) Isochoric process (ii) Isobaric process (iii) Quasi static process (iv) Cyclic process.</p>	4	CO2 CO1	E R	C F
3.	Derive an expression for the work done in an adiabatic process undergoing a reversible expansion process according to a law: $pV^\gamma = \text{constant}$.	4	CO2	A	P
4.	Discuss the concept of gating system with suitable diagram that is being utilized in the iron and steel industry. Additionally, describe each of the components of the gating system.	4	CO5	C	D
5.	<p>A lump of plain carbon steel of mass 16 kg at 727 °C is dropped in 160 kg of oil at 27 °C. Make calculations for the entropy change of steel, the oil and the universe. Take specific heats of steel and oil as 0.5 kJ/kg K and 3.5 kJ/kg K, respectively.</p> <p style="text-align: center;">Or</p> <p>Discuss the importance of pattern allowances in the process of casting alloy steel within the foundry shop. In addition, explain any three types of pattern allowances that are utilized in the casting process.</p>	4	CO4	E	PC

Section – B

Attempt All Question

3 × 5 = 15 Marks

No.	Detail of Question	Marks	CO	BL	KL
6.	Evaluate the enthalpy and entropy of 10 kg of steam at a pressure of 0.010 bar, when dryness fraction is 0.85.	3	CO3	E	C
7.	Estimate the specific enthalpy and specific entropy of 1 kg of steam at 0 °C when its dryness fraction is 0.6.	3	CO3	E	C
8.	Discuss the function of the pattern that is utilized in the process of green sand casting. Additionally, describe any two types of patterns with suitable diagram.	3	CO5	R	U

<p>4</p>	<p>Draw a straightforward classification and explanation for the various types of flames utilized in oxy-acetylene gas welding ($O_2 + C_2H_2$ welding) within the automobile industry.</p> <p style="text-align: center;">Or</p> <p>The Government of India initiated the Khelo India Programme or Khelo India Scheme in order to enhance the Olympic performance of the Indian team. On the other hand, the strategy was designed to address a more significant issue involving the allocation of capital resources.</p> <div> <p style="text-align: right; font-size: small;">Image Source: DD News</p> </div> <p>Discuss, how the Khelo India scheme has influenced the manufacturing of sports equipments in India?</p>	<p>3</p>	<p>CO5</p>	<p>R</p>	<p>U</p>
<p>10</p>	<p>Give an explanation of the term "Entropy" in thermodynamics. Additionally, explain why the entropy change of an adiabatic process is zero?</p> <p style="text-align: center;">Or</p> <p>The "Make in India" initiative, which was launched by the Government of India, places a significant emphasis on manufacturing processes. Describe the manner in which these processes work into the overall scheme (i.e. Make in India) and how they contribute to achieving its objectives?</p> <div> <p style="text-align: right; font-size: small;">Image Source: Wikipedia</p> </div>	<p>3</p>	<p>CO3 CO6</p>	<p>U U</p>	<p>P P</p>

Section – C

Attempt All Questions

5 × 3 = 15 Marks

No.	Detail of Question	Marks	CO	BL	KL
11.	Discuss the working principle, advantages and industrial applications of shielded metal arc welding (SMAW) process with neat sketch.	5	CO5	R	P
12.	<p>Demonstrate that the change in entropy per unit mass that occurs when a perfect gas transitions from state 1 (P_1, V_1, T_1) to state 2 (P_2, V_2, T_2) in terms of pressure and volume.</p> $S_2 - S_1 = C_v \log_e \frac{P_2}{P_1} + C_p \log_e \frac{V_2}{V_1}$ <p style="text-align: center;">Or</p> <p>Three Carnot heat engines are arranged in series. The first engine takes 2000 kJ of heat from a source at 1000 K and delivers 900 kJ of work; the second and third engines deliver 600 kJ and 250 kJ of work respectively. Evaluate the exhaust temperature of the second and third Carnot engine.</p>	5	CO6	U	P
13.	Describe the following mechanical properties of the engineering materials: (i) Ductility (ii) Malleability (iii) Elasticity (iv) Plasticity (v) Strength	5	CO5	R	F