Code No: RT21011 **R13** SET - 1

II B. Tech I Semester Supplementary Examinations, June - 2015
BASIC ELECTRICAL AND ELECTRONICS ENGINEERING
(Com. to CE, ME, CHEM, AME, MM, PE, PCE)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **THREE** Questions from **Part-B**

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PART –A

1 a) Define terms the inductance and capacitance

b) State the functions of yoke of a D.C. Generator

c) Discuss the ideal transformer on load with phasor diagram

d) What is the purpose of dampers in a synchronous generator?

e) Draw the graphic symbol of the P-N junction diode and explain its significance.

f) Why thyristor known as bidirectional transistor?

PART -B

2 a) Three equal resistances of value R ohms are connected in a delta (mesh) fashion. This is to be replaced by an equivalent star connected resistance R1, R2 and R3. What are the values of R1, R2 and R3 in the terms of R?

b) By applying Kirchhoff's law, find the current through all the elements in the circuit as shown in the Figure 1?

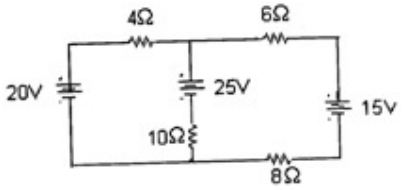

Figure 1

3 a) Draw the neat sketch of a 3-point starter and explain

b) Calculate the generated e.m.f of a 4-pole, wave-wound armature having 38 slots with 18 conductors per slot when driven at 1000 rpm. The flux / pole is 0.018 wb.
~~~~~~

4 a) Explain the principle and operation of a transformer. Also list different types of transformers

b) A 50Hz single phase transformer has 6600V/400V. Having e.m.f per turn is 10V and the maximum flux density in the core is 1.6 Tesla. Find the
i) Suitable number of primary and secondary turns
ii) Cross sectional area of the core

5 a) Explain the concept of rotating magnetic field

b) A 3-phase alternator is rated at 5-KVA, 110 Volts, 26.3A, 50Hz and 1200 rpm. The stator resistance between terminals as measured with dc is 0.2 Ohm. With no-load and rated speed the stator line voltage is 160 Volts for a field current of 4A. At rated speed, the short circuit stator current per terminal is 50A for a field current of 4A. Compute voltage regulation of alternator at 0.8 Pf lagging using synchronous impedance method.

6 a) With a neat circuit diagram, explain the operation of full wave bridge rectifier.

b) Describe the Op-Amplifier as differentiator with circuit diagram and derive necessary expressions.

7 a) Explain the V-I characteristics of common emitter configuration

b) Describe the concept of feedback amplifier.

Code No: RT21011 **R13** SET - 2

II B. Tech I Semester Supplementary Examinations, June - 2015
BASIC ELECTRICAL AND ELECTRONICS ENGINEERING
(Com. to CE, ME, CHEM, AME, MM, PE, PCE)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **THREE** Questions from **Part-B**

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PART –A

1 a) What are the factors affecting resistance?

b) State the function of commutator in D.C.Generator.

c) What is the main purpose of using core in a transformer?

d) Define distribution factor

e) Explain diode forward current

f) Draw the circuit symbol for a PNP and NPN transistors. Indicate the reference directions of three currents and polarities of three voltages

PART –B

2 a) Distinguish between ideal and practical voltage source. Give examples

b) A circuit consists of three resistances of 12, 18 and 36 ohms respectively by joined in parallel and the combination is connected in series with a resistance of 12 ohms. The whole circuit is connected to 60V supply. Calculate current in each branch, total current drawn and power dissipated in each resistor

3 a) Explain the working of d.c.motor with neat diagram.

b) A 4 pole wave wound dc generator is having 50 slots with 20 conductors per slot and rotating at 1500 rpm. The flux per pole is 0.018 wb, calculate the emf generated

4 a) Explain the transformer on no-load with phasor diagram.

b) A single phase core type 50Hz transformer has a square having 25cm side, the maximum flux density in the core 1.2 wb/m^2 .Calculate the number of turns per limb on H.V. side and L.V side for a 3400V/240V ratio.

5 a) Draw and explain the torque-slip characteristics of three-phase induction motor

b) A 3-phase star connected alternator has 8-poles and runs at 750rpm. It has 24 slots/phase and 10 conductors per slot, the flux being 0.055 Wb/pole. Calculate the line voltage. Assume winding factor to be 0.96.
~~~~~~

6 a) What is a rectifier? Explain the operation of half wave rectifier with a neat circuit diagram

b) Describe the Op-Amplifier as integrator with circuit diagram and derive necessary expressions.

7 a) Compare the characteristics of transistor amplifier in the three configurations?

b) Derive the relation between α, β, γ

Code No: RT21011 **R13** SET - 3

II B. Tech I Semester Supplementary Examinations, June - 2015
BASIC ELECTRICAL AND ELECTRONICS ENGINEERING
(Com. to CE, ME, CHEM, AME, MM, PE, PCE)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **THREE** Questions from **Part-B**

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PART –A

1 a) How the voltage is divided in a series circuit? Explain with an example

b) What is the significance of back e.m.f?

c) Define the regulation of transformer

d) Give the comparison of induction motors with synchronous motors

e) What are the advantages of OP-Amplifier?

f) Draw the input static Charactistics common base PNP transistor

PART -B

2 a) Define the following terms
(i) Electric field, (ii) electric current and (iii) potential

b) For the circuit as shown in following figure 1, Calculate the current in the various branches and the power delivered and consumed? (All resistances are in ohms)

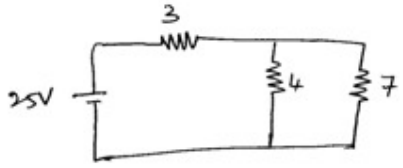

Figure 1

3 a) Classify the D.C. Generators along with voltage and current equations showing diagrammatically.

b) Derive an expression for emf induced in a d.c. generator
~~~~~~

4 a) Explain transformer on load with phasor diagram.

b) A single phase 50Hz, 40kVA transformer has an iron loss of 450W and full load copper loss of 900W. Find the load at which maximum efficiency is achieved at unity power factor.

5 a) Describe predetermination of regulation of an alternator from the O.C and S.C tests

b) A 6-pole, 50 Hz, squirrel cage induction motor runs on no load at 975rpm. Calculate the percentage slip and frequency of the rotor current

6 a) Explain the rectifying action of the P-N junction diode with circuit diagram and wave forms

b) Describe the non- inverting Op-Amplifier with circuit diagram and derive necessary expressions.

7 a) What is the transistor biasing? Explain

b) A transistor having $\alpha = 0.96$ is placed in common based configuration with load resistance of 5kΩ if the emitter to base junction resistance is 80 Ω, find the values of amplifier current voltage and power gain

Code No: RT21011 **R13** SET - 4

II B. Tech I Semester Supplementary Examinations, June - 2015
BASIC ELECTRICAL AND ELECTRONICS ENGINEERING
(Com. to CE, ME, CHEM, AME, MM, PE, PCE)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **THREE** Questions from **Part-B**

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PART –A

1 a) What is the difference between e.m.f and potential difference

b) Classify D.C.Motors.

c) Why transformer efficiency is high compared to other electrical devices

d) Define the slip of an induction motor

e) What are the characteristics of Op-Amplifier

f) Draw output static Charactistics common base PNP transistor

PART –B

2 a) What is meant by electrical power? Give different forms of expressions for electrical power with units

b) Define electrical energy and specify its units?

c) A current of 5 A flows in a resistor of resistance 8 ohms. Determine the rate of heat dissipation and also the heat dissipated in 10 minute?

3 a) Briefy explain the working of a D.C.Generator.

b) A 400V D.C. shunt motor takes a current of 4.5A on no-load and 58.2A on full-load. Armature reaction weakens the field by 3%. Calculate the ratio of full-load speed to no-load speed. Given $R_a = 0.2\Omega$, brush voltage drop is 4V, $R_F = 150\Omega$.

4 a) Explain O.C and S.C test of a transformer?

b) If P_1 and P_2 are the iron loss and copper loss of a transformer on full load. Find the ratio of P_1 and P_2 such that maximum efficiency occurs at 75% of full load.
~~~~~~

5 a) How e.m.f. is induced in the armature of an alternator. What are the factors that cause the change of the alternator terminal voltage?

b) A 10-pole, 3-phase induction motor runs at a speed of 485 rpm at 50 Hz supply. Determine i) synchronous speed ii) slip

6 a) Explain the working of P-N junction diode with neat diagrams

b) Describe the inverting Op-Amplifier with circuit diagram and derive necessary expressions.

7 a) Differentiate between NPN and PNP junction transistors

b) One NPN transistor is used in the self biasing arrangement the circuit component values are V_{CC} = 4.5volts, Rc =1.5kΩ, Re =0.27kΩ , and R1=27kΩ if β=44. Find the stability factor and quiescent point Q (Vce, Ic)?

Code No: RT21032 **R13** SET - 1

II B. Tech I Semester Supplementary Examinations, June - 2015
MECHANICS OF SOLIDS
(Com. to ME, AME, AE, MTE)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **THREE** Questions from **Part-B**

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PART–A

1	a)	What is elastic limit and elasticity?	4
	b)	Draw the S.F.D and B.M.D of a cantilever carrying point load at the free end.	4
	c)	Write the assumptions of simple bending.	3
	d)	A cantilever of length 2.6m carries a u.d.l of 16.5 kN/m length over entire length. If moment of inertia of the beam is 7.90 x 10^7 mm^4 and value of E = 2 × 10^5 N/mm^2, determine the deflection at the free end.	4
	e)	A spherical vessel 1.5m diameter is subjected to an internal pressure of 2 N/mm^2.Find the thickness of the plate required if maximum stress is not to exceed 150N/mm^2.	3
	f)	Define the terms Torsion and torsional rigidity.	4

PART–B

2	a)	Derive an expression for the major and minor principle stresses on an oblique plane, when the body is subjected to direct stresses in two mutually perpendicular directions accompanied by shear stresses.	12M
	b)	A steel rod which tapers uniformly from 5cm diameter to 3cm diameter in length of 50cm,is subjected to an axial load of 6000N.If E = 2 × 10^5 N/mm^2, find the extension of the rod.	4M
3	a)	A cantilever of length 4m carries a gradually varying load, zero at the free end to 2kN/m at the fixed end .Draw the S.F.D and B.M.D for the cantilever.	8M
	b)	Derive the relation between loading, shear force and bending moment	8M
4	a)	A Cantilever of length 2m fails when a load of 2kN is applied at the free end. If the section of the beam is 40m x 60m,find the stress at the failure.	8M
	b	Show that for a rectangular section the maximum shear stress is 1.5 times the average stress.	8M
5	a)	A cantilever beam AB of length 6m carries a point load of 100kN at free end and another point load 100kN at 3m from the free end.If E =10^5N/mm^2 and I =10^8 mm^4 for the cantilever then determine the slope and deflection at the free end by Moment area method.	12M
	b)	Write in brief about double integration method.	4M
6		Derive Lami's equation of thick cylinders.	16M
7	a)	Derive the expression for the crippling load when both ends of the column are hinged.	10M
	b)	Define polar modulus .Derive polar modulus for solid shaft and hollow shaft.	6M
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Code No: RT21032 **R13** SET - 2

II B. Tech I Semester Supplementary Examinations, June - 2015
MECHANICS OF SOLIDS
(Com. to ME, AME, AE, MTE)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **THREE** Questions from **Part-B**

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PART –A

1 a) What is tangential stress and longitudinal stress?

b) Draw the S.F.D and B.M.D of a cantilever carrying u.d.l throughout.

c) Define section modulus. Derive for rectangular section.

d) A cantilever of length 3.6m carries a u.d.l of 12.5 kN/m length over entire length. If moment of inertia of the beam is 7.90 x 10^7 mm^4 and value of E = 2 × 10^5 N/mm^2, determine the deflection at the free end.

e) A spherical vessel 2.0m diameter is subjected to an internal pressure of 4 N/mm^2. Find the thickness of the plate required if maximum stress is not to exceed 180N/mm^2.

f) Write the limitations of Euler's formula.

PART -B

2 a) Derive an expression for the stresses on an oblique plane of a rectangular body,when the body is subjected simple shear stresses. 12M

b) A steel rod which tapers uniformly from 6cm diameter to 4cm diameter in length of 60cm,is subjected to an axial load of 7000N.If E = 2 X 10^5 N/mm^2, find the extension of the rod. 4M

3 a) A cantilever of length 3m carries a gradually varying load, zero at the free end to 1kN/m at the fixed end .Draw the S.F.D and B.M.D for the cantilever. 8M

b) Derive the relation between loading, shear force and bending moment 8M

4 Derive the equation M/I = f/y = E/R 16M

5 a) A cantilever beam AB of length 4m carries a point load of 100kN at free end and another point load 100kN at 2m from the free end. If E =$10^5$$N/mm^2$ and I =10^8 mm^4 for the cantilever then determine the slope and deflection at the free end by Moment area method. 12M

b) Write in brief about Macualay's method. 4M

6 a) A cylindrical vessel is 1.6m diameter and 5m long is closed at ends by rivets. It is subjected to an internal pressure of 4N/mm^2.If the maximum principal stress is not to exceed 120 N/mm^2, find the thickness of the shell. Assume E = 2 x 10^5 N/mm^2 and Poisson's ratio = 0.25. Find the change in diameter, length and volume of the shell. 10M

b) Differentiate between thin cylinder and thick cylinder. 6M

7 Derive the expression for the crippling load by Rankine's method. 16M
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Code No: RT21032 **R13** SET - 3

II B. Tech I Semester Supplementary Examinations, June - 2015
MECHANICS OF SOLIDS
(Com. to ME, AME, AE, MTE)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **THREE** Questions from **Part-B**

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PART –A

1	a)	State Hooke's law	2
	b)	Write about different types of beams and different loadings.	4
	c)	Write about neutral axis and moment of resistance.	4
	d)	What is deflection, slope and radius of curvature in a beam?	3
	e)	Derive expression for circumferential stress in a thin cylindrical shell.	5
	f)	What do you mean by strength of a shaft?	4

PART –B

2		Derive the relation between three moduli of elasticity	16M
3		A beam of length is 10m is simply supported and carries point loads of 5kN each at a distance of 3m and 7m from left support and also a uniformly distributed load of 1 kN/m between the point loads. Draw the S.F.D and B.M.D	16M
4	a)	A Cantilever of length 2m fails when a load of 2kN is applied at the free end. If the section of the beam is 40m x 60m, find the stress at the failure.	8M
	b)	Prove that maximum shear stress in a circular section of a beam is 4/3 times the average shear stress.	8M
5	a)	A beam of span 8m and of uniform flexural rigidity EI= 40MN $-m^2$,is simply supported at its ends. It carries a uniformly distributed load of 15kN/m run over the entire span. It is also subjected to a clockwise moment of 160kNm at a distance of 3m from left support. Calculate the slope of the beam at the point of application of moment.	10M
	b)	Write about moment area method.	6M
6		Derive Lami's equation of thick cylinders.	16M
7	a)	A solid cylindrical shaft is to transmit 300kW power at 100 r.p.m .If the shear stress is not to exceeed 80N/ mm^2,find its diameter.	6M
	b)	Derive the expression for the crippling load when both ends of the column are hinged.	10M
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Code No: RT21032 **R13** SET - 4

II B. Tech I Semester Supplementary Examinations, June - 2015
MECHANICS OF SOLIDS
(Com. to ME, AME, AE, MTE)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **THREE** Questions from **Part-B**

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PART –A

1	a)	Define modular ratio, thermal stresses and thermal strain		4
	b)	Draw the B.M.D of simply supported beam with uniformly varying load with zero at free ends and w per metre run at the centre.		4
	c)	Draw the shear stress diagram of T section.		3
	d)	A cantilever of length 3.0m carries a point load of 12.5 kN at the free end. If moment of inertia of the beam is 1.00×10^8 mm^4 and value of $E = 2 \times 10^5$ N/mm^2, determine the deflection at the free end.		3
	e)	Derive expression for longitudinal stress in a thin cylindrical shell.		5
	f)	Write the assumptions made in derivation of shear stress produced in circular shaft subjected to torsion.		3

PART -B

2	a)	Derive the relation between modulus of elasticity and modulus of rigidity.	8M
	b)	Determine the expression for strain energy stored in a body due to shear stress.	8M
3		A beam of length is 12m is simply supported and carries point loads of 6kN each at a distance of 4m and 8m from left support and also a uniformly distributed load of 2 kN/m between the point loads. Draw the S.F.D and B.M.D	16M
4		Derive the shear stress at any point in the cross section of a beam which is subjected to a shear force F.	16M
5	a)	A cantilever beam AB of length 4m carries a point load of 100kN at free end and another point load 100kN at 2m from the free end. If $E = 10^5 N/mm^2$ and $I = 10^8$ mm^4 for the cantilever then determine the slope and deflection at the free end by Double integration method.	12M
	b)	Write in brief about Macualay's method.	4M
6	a)	A cylindrical vessel is 1.6m diameter and 5m long is closed at ends by rivets. It is subjected to an internal pressure of $4N/mm^2$.If the maximum principal stress is not to exceed 120 N/mm^2, find the thickness of the shell. Assume $E = 2 \times 10^5$ N/mm^2 and Poisson's ratio = 0.25. Find the change in diameter, length and volume of the shell.	10M
	b)	Differentiate between thin cylinder and thick cylinder.	6M
7		Derive the equation $\tau/R = C\theta/L = q/R$	16M
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Code No: RT21034 **R13** SET - 1

II B. Tech I Semester Supplementary Examinations, June - 2015
MANAGERIAL ECONIMICS AND FINANCIAL ANALYSIS
(Com. to ME, ECE, CSE, IT, ECC, MTE)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **THREE** Questions from **Part-B**

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PART –A

1	a)	What is demand? And explain the types of demand.	3M
	b)	Explain Cobb-Douglas Production function.	4M
	c)	What is Oligopoly market? And significance of kinked demand curve.	4M
	d)	Explain the salient features and types of partnership.	4M
	e)	Describe the importance of ratio analysis.	4M
	f)	Explain the meaning of capital.	3M

PART –B

2	a)	Define managerial economics and explain its relation with other subjects.	8M
	b)	Explain the importance of demand forecasting and describe any two methods of demand forecasting.	8M
3	a)	Describe the salient features of law of variable propositions.	8M
	b)	Explain any four concepts of costs.	8M
4	a)	Explain the conditions of perfect competition and how the price and output determined in the short-run?	8M
	b)	Describe the importance of pricing and write any two methods of pricing.	8M
5	a)	What is business? And explain the merits and demerits of Joint-Stock Companies.	8M
	b)	Explain the causes and consequences of business cycles.	8M
~~~~~~

6 a) Explain the limitations of ratio analysis. 6M

b) The following is an extract of a balance sheet of a company during the last year. Compute current ratio and quick ratio. Also interpret the ratios. 10M

	(Rs.)
Land and buildings	50,000
Plant and machinery	1,00,000
Furniture and fixtures	25,000
Closing stock	25,000
Sundry debtors	12,500
Wages prepaid	2,500
Sundry creditors	8,000
Rent outstanding	2,000

7 a) What is capitalization? And explain the need for capital budgeting. 8M

b) Briefly explain the techniques of capital budgeting. 8M

Code No: RT21034 **R13** SET - 2

II B. Tech I Semester Supplementary Examinations, June - 2015
MANAGERIAL ECONIMICS AND FINANCIAL ANALYSIS
(Com. to ME, ECE, CSE, IT, ECC, MTE)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **THREE** Questions from **Part-B**

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PART –A

1	a)	Explain the law of demand and types of demand.	4M
	b)	Describe the salient features of Isoquants.	3M
	c)	Explain the conditions of monopoly.	4M
	d)	Describe the merits and demerits of sole trader.	4M
	e)	Explain the double entry system.	4M
	f)	What is Capitalization?	3M

PART –B

2	a)	Define managerial economics and explain its scope.	8M
	b)	What is elasticity of demand? And explain its types and measurement.	8M
3	a)	Explain the importance production function and describe the salient features of Cobb-Douglas production function.	8M
	b)	Describe the importance of Break-even analysis and Break-even point.	8M
4	a)	Explain the conditions of perfect competition and monopolistic competition.	8M
	b)	Describe any three methods of pricing.	8M
5	a)	Explain the salient features of private limited and public limited companies.	8M
	b)	What is the meaning of business cycles? And explain different phases of business cycles.	8M
~~~~~~

6 a) Explain the importance of funds flows and cash flow statements. 6M

b) The following is an extract of a balance sheet of a company during the last year. 10M
Compute current ratio and quick ratio. Also interpret the ratios.

	(Rs.)
Land and buildings	1,50,000
Plant and machinery	3,00,000
Furniture and fixtures	1,25,000
Closing stock	25,000
Sundry debtors	62,500
Wages prepaid	7,500
Sundry creditors	18,000
Rent outstanding	12,000

7 a) Briefly explain the traditional methods of capital budgeting. 8M

b) Briefly describe the modern methods of capital budgeting. 8M

Code No: RT21034 **R13** SET - 3

II B. Tech I Semester Supplementary Examinations, June - 2015
MANAGERIAL ECONIMICS AND FINANCIAL ANALYSIS
(Com. to ME, ECE, CSE, IT, ECC, MTE)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **THREE** Questions from **Part-B**

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PART –A

1	a)	Define Managerial Economics.	3M
	b)	Isoquants Vs. Iso costs.	4M
	c)	Salient features of Oligopoly and kinked demand curve.	4M
	d)	Merits and demerits of partnership.	4M
	e)	Importance of ratio analysis.	4M
	f)	Explain the need for capital budgeting.	3M

PART –B

2	a)	What is demand? And explain the law of demand and its exceptions.	8M
	b)	Explain the significance of demand forecasting and describe any two methods of demand forecasting.	8M
3	a)	Explain the law of variable proportions.	8M
	b)	Describe any three cost concepts.	8M
4	a)	Explain the conditions of monopoly and how the price and output determined in the monopoly?	8M
	b)	Explain any three methods of pricing.	8M
5	a)	Describe the salient features, merits and demerits of public enterprises.	8M
	b)	Explain the meaning and phases of business cycles.	8M
~~~~~~

6 a) Explain the limitations of financial analysis. 4M

b) Calculate Funds from operations from the following Profit and Loss Account. 12M

Dr.			Cr.
	(Rs.)		(Rs.)
To salaries	2,50,000	By gross profit	9,00,000
To printing and stationery	20,000	By gain on sale of	1,20,000
To postage and telegrams	20,000	land	
To telephone charges	25,000		
To auditor's fee	20,000		
To other expenses	95,000		
To depreciation	1,40,000		
To loss on sale of furniture	8,000		
To discount	2,000		
To good will	40,000		
To trademarks	10,000		
To net profit	3,90,000		
	10,20,000		10,20,000

7 a) What is capitalization? And briefly explain the traditional methods capital budgeting. 8M

b) Describe the modern methods of capital budgeting. 8M

Code No: RT21034 **R13** SET - 4

II B. Tech I Semester Supplementary Examinations, June - 2015
MANAGERIAL ECONIMICS AND FINANCIAL ANALYSIS
(Com. to ME, ECE, CSE, IT, ECC, MTE)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **THREE** Questions from **Part-B**

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PART –A

1	a)	Explain the scope of Managerial Economics.		3M
	b)	Explicit Vs. Implicit costs.		4M
	c)	Oligopoly and kinked demand curve.		4M
	d)	Salient features of partnership.		4M
	e)	Significance of ratio analysis.		4M
	f)	Explain the need for capital budgeting.		3M

PART –B

2	a)	What is elasticity of demand? And explain its types and measurement.	10M
	b)	Explain any two methods of demand forecasting.	6M
3	a)	Describe the importance of Break-even analysis and Break-even pint.	8M
	b)	Briefly explain the salient features of law of variable propositions.	8M
4	a)	Describe the conditions and price-out-put determination in perfect completion.	10M
	b)	Explain any two methods of pricing.	6M
5	a)	Explain the salient features, merits and demerits of private and public limited companies.	10M
	b)	Describe the phases of business cycle.	6M
~~~~~~

6 a) Explain the objectives of funds flows statement. 4M

b) Calculate the funds from operations from the following profit and loss account for the year ending 30.9.2013.

Dr.			Cr.	
	(Rs)		(Rs)	
To salaries	50,000	By gross profit	6,00,000	
To rent	30,000	By profit on sale of		
To postage and telegrams	20,000	buildings	50,000	
To printing and stationery	30,000			
To telephone charges	30,000			
To audit fee	20,000			
To law charges	25,000			
To interest	5,000			
To bad debts	2,000			
To provision for bad debts	3,000			
To preliminary expenses written off	20,000			
To goodwill written off	30,000			
To provision for Tax	40,000			
To proposed dividend	60,000			
To general reserve	1,00,000			
To loss on sale of furniture	10,000			
To net profit	1,75,000			
	6,50,000		6,50,000	12M

7 a) Explain the traditional methods of capital budgeting. 8M

b) Describe the modern methods of capital budgeting. 8M

Code No: RT21031 **R13** SET - 1

II B. Tech I Semester Supplementary Examinations, June - 2015
METALLURGY AND MATERIAL SCIENCE
(Com. to ME, AME)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **THREE** Questions from **Part-B**

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PART –A

1	a)	Explain metallic bond in detail.	[3]
	b)	What is an alloy? What is the need for alloying?	[3]
	c)	What is an eutectic temperature?	[4]
	d)	What are cast Irons? Why are they named so?	[4]
	e)	Give reasons why there exist many types of ceramics.	[4]
	f)	What are the properties that are to be considered for good bonding between fibres and matrix.	[4]

PART -B

2	a)	Explain the cooling history of 4.3% C in Fe-Fe_3C system by drawing cooling curve?	[8]
	b)	Calculate proportionate of different phases for 2.8%C in Fe-Fe_3C diagram at 1200^0C, 1173^0C, and 600^0C. Also draw the microstructures at room temperature?	[8]
3	a)	What are cast Irons? Why are they named so? Give the importance of cast irons in the metallurgical curriculum with suitable example	[8]
	b)	Explain the microstructure, properties and applications of i. White Cast Iron ii. S.G. Cast Iron.	[8]
4	a)	What are the requirements of an age-hardenable alloy.	[4]
	b)	Give a typical heat treatment schedule for duralumin and explain the relevant microstructural changes.	[12]
~~~~~~

5 a) Mention atleast three compositions of copper alloys suitable for the following applications. [10]
i. Ship propeller
ii. Bearings
iii. Non-sparking tools
iv. Springs

b) Discuss briefly the precipitation hardening procedure with specific reference to beryllium copper. [6]

6 a) Explain the differences between an alloy and alloy system. [8]

b) How are the alloy systems classified based on the number of elements present in it. Explain them with suitable examples. [8]

7 What is MMC? Where are they used? Classify the MMCs according to the type of reinforcement and explain with suitable example [16]

Code No: RT21031 **R13** SET - 2

II B. Tech I Semester Supplementary Examinations, June - 2015
METALLURGY AND MATERIAL SCIENCE
(Com. to ME, AME)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **THREE** Questions from **Part-B**

~~~~~~

PART –A

1	a)	What is the importance of grain size in steel?	[3]
	b)	Justify the statement " Alloy is a material which is expected of a metal, but it is not a pure metallic element".	[3]
	c)	Name possible types of Cementite in Fe-Fe_3C diagram?	[4]
	d)	Discuss in detail the effect of alloying elements in steels.	[4]
	e)	Distinguish between hardness and hardenability.	[4]
	f)	Discuss briefly about whisker reinforced composites?	[4]

PART -B

2	a)	Define and explain the structural phases. i. Ferrite ii. Austenite iii. Cementite.	[9]
	b)	Describe the construction of the phase diagram for 2 metals completely soluble in liquid state and insoluble in solid state.	[7]
3		What are four basic types of cast Irons? Explain them with respect to properties, microstructure with a diagram and applications?	[16]
4	a)	Define the term heat treatment and explain why are the steels heat treated	[8]
	b)	Define and explain hardness and Hardenability.	[8]
~~~~~~

5 a) Explain the following types of malleable cast irons. [9]
i. Ferritic malleable cast iron
ii. Pearlitic malleable cast iron.
iii. Ferrito-Pearlitic malleable Cast Iron.

b) Explain the different kinds of carbon steels. Explain them. Also give their carbon contents. [7]

6 a) (i) How the beta titanium alloys are strengthened. [8]
(ii) Give at least 2 applications for alpha; alpha-beta and beta titanium alloys.

b) Explain the role of the following elements on the structure and properties of copper alloys. [8]
i. lead
ii. phosporus
iii. aluminium
iv. Manganese.

7 a) Explain the importance of particle size in composite materials. [8]

b) Explain the differences between matrix and dispersed phase in a composite material. [8]

Code No: RT21031 **R13** SET - 3

II B. Tech I Semester Supplementary Examinations, June - 2015
METALLURGY AND MATERIAL SCIENCE
(Com. to ME, AME)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **THREE** Questions from **Part-B**

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PART –A

1	a)	Define grain and grain boundary?	[3]
	b)	Discuss various types of intermediate phases?	[3]
	c)	What is the effect of carbon on Mechanical properties	[4]
	d)	What is the difference between Iron-Cementite and Iron-graphite phase diagram?	[4]
	e)	Give the heat treatment and applications for the following steels i. Austenitic stainless steels ii. Martensitic stainless steels	[4]
	f)	What are laminates? Indicate their characteristics.	[4]

PART -B

2	a)	Define crystallization of metal? How is that commercial alloy invariably solidify with heterogeneous nucleation?	[8]
	b)	What factor favours the formation of fine grained material? How is a large single crystal being produced?	[8]
3	a)	What is the disadvantage of too high a first stage annealing temperature for Malleable Cast Iron? Explain.	[8]
	b)	Why are alloying elements added to steels? Give some examples of common alloying elements and their effect on the properties of steel.	[8]
4	a)	Discuss the characteristics of quenchants for effective removal of heat from a work piece.	[8]
	b)	Explain the effect of current on the depth of hardness during the induction hardening process.	[8]
~~~~~~

5 a) What are the castable types of Aluminium alloys you know? Give the composition and industrial uses of LM6 alloys. [8]

b) Give examples of non-heat treatable type of aluminium alloys. What are their applications. [8]

6 a) Name the important properties of Titanium. [8]

b) Discuss the properties and applications of Beryllium bronzes. [8]

7 a) Why composite materials are considered now a days as structural materials in engineering applications? [6]

b) Discuss the influence of fiber length, orientation and composition on fibre reinforced composites. [10]

Code No: RT21031 **R13** SET - 4

II B. Tech I Semester Supplementary Examinations, June - 2015
METALLURGY AND MATERIAL SCIENCE
(Com. to ME, AME)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answer **ALL** the question in **Part-A**
3. Answer any **THREE** Questions from **Part-B**

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PART –A

1	a)	Write a short note on Directional solidification.	[3]
	b)	What do you mean by intermediate alloy phase?	[3]
	c)	Give the classification of stainless steels?	[4]
	d)	Discuss briefly Nitriding of steels.	[4]
	e)	Explain the effects of quenching media on the hardness of steels.	[4]
	f)	What is the role of matrix in a composite material? Discuss various types of matrix materials.	[4]

PART -B

2	a)	Explain chemical compounds, metallic compounds and interstecial compounds with suitable examples.	[9]
	b)	Explain the effect of alloying elements on the properties of steel as substitutional and interstecial alloying elements.	[7]
3	a)	Draw a neat sketch of Fe-Fe_3C diagram and label all important points, lines and phases in it.	[10]
	b)	Explain the solidification of hypo eutectic cast Iron.	[6]
4	a)	Explain the following: (i) Natural aging (ii) Artificial aging (iii) Delayed aging (iv) Solution treatment in Age hardening process	[16]
5	a)	Explain about Alpha and Alpha-Beta Alloys of Titanium .	[8]
	b)	Which Aluminium casting alloy develops the highest mechanical properties?. Why?	[8]
~~~~~~

6	a)	Explain about Alpha and Alpha-Beta Alloys of Titanium .	[8]
	b)	Which Aluminium casting alloy develops the highest mechanical properties?.Why?	[8]
7	a)	Define the term composites. What factors influence the final properties of composites? Explain.	[8]
	b)	Explain about Glass Fibre-Reinforced Polymer composites.	[8]

Correction in II B.Tech I Semester Subject Name: METALLURGY AND MATERIAL SCIENCE (RT21031)

Change of question in Set No = 4

Replace 5th question with following question

5. a) Briefly describe the effect of alloying elements on Fe-Fe_3C system?
   b) Draw the TTT diagram of eutectoid steels? Describe its features

Code No RT21033 **R13** SET - 1

II B. Tech I Semester Supplementary Examinations, June - 2015
THERMODYNAMICS
(Com. to ME, AE, AME)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **THREE** Questions from **Part-B**

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PART-A

1. a) What do you understand by macroscopic and microscopic viewpoints?
   b) Define the specific heats at constant volume and constant pressure.
   c) State Kelvin-Planck and Clausius' statement of second law.
   d) What is pure substance? Draw PV diagram for a pure substance.
   e) Explain the terms Dry bulb temperature and Wet bulb temperature.
   f) State the four processes of Diesel Cycle? (4M+4M+4M+4M+3M+3M)

PART-B

2. a) The following data refer to 12-cylinder, single-acting, two-stroke marine diesel engine:
   Speed= 150 rpm, Cylinder diameter = 0.8 m, Stroke of piston = 1.2 m
   Area of indicator diagram = 5.5×10^{-4} $m^{2,}$ Length of diagram=0.06m
   Spring value= 147 Mpa per m
   Find the net rate of work transfer from the gas to the pistons in kW.
   b) With the help of neat sketch explain the working of constant pressure gas thermometer. (8M+8M)

3. a) A stationary mass of gas is compressed without friction from an initial state of 0.3 m^3 and 0.105 MPa to a final state of 0.15 m^3 and 0.105 MPa, the pressure remaining constant during the process. There is a transfer of 37.6 kJ of heat from the gas during the process. How much does the internal energy of the gas change?
   b) Derive the steady flow energy equation of an open system (8M+8M)
~~~~~~

4. a) A cyclic heat engine operates between a source temperature of 800 ^{o}C and a sink temperature of 30^{o}C. What is the least rate of heat rejection per kW net output of the engine?
   b) Establish the equivalence of Kelvin Planck and Clausius Statements (8M+8M)

5. a) A vessel of volume 0.04 m^3 contains a mixture of saturated water and saturated steam at a temperature of 250^{o}C. The mass of the liquid present is 9 kg. Find the pressure, mass, specific volume, enthalpy, the entropy and the internal energy.
   b) Steam initially at 1.5 MPa, 300 ^{o}C expands reversibly and adiabatically in a steam turbine to 40 ^{o}C. Determine the ideal work output of turbine per kg of steam. (8M+8M)

6. a) Derive the expression for an entropy change of an Ideal gas
   b) Explain the Psychrometric process
   i) Sensible heating and Cooling
   ii) Cooling and dehumidification (8M+8M)

7. a) An engine working on the Otto cycle is supplied with air at 0.1 MPa, 35 ^{o}C. The compression ratio is 8. Heat supplied is 2100 kJ/kg. Calculate the maximum pressure and temperature of the cycle, the cycle efficiency, and the mean effective pressure.
   (For air, C_p = 1.005, C_v = 0.718, and R = 0.287 kJ/kg K).
   b) With a neat sketch explain the working of simple vapour compressing refrigeration cycle and derive the expression for cop (8M+8M)

Code No RT21033 **R13** SET - 2

II B. Tech I Semester Supplementary Examinations, June - 2015
THERMODYNAMICS
(Com. to ME, AE, AME)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answer **ALL** the question in **Part-A**
3. Answer any **THREE** Questions from **Part-B**

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PART-A

1. a) What is the difference between closed system and open system? Give example
   b) State the first law for a closed system undergoing a cycle.
   c) Define what is refrigerator and heat pump?
   d) What do you understand by triple point?
   e) Explain the terms Specific humidity and relative humidity.
   f) What is an air standard cycle? Explain any one cycle

(4M+4M+4M+4M+3M+3M)

PART-B

2. a) A cooling tower nozzle disperses water into a stream of droplets. If the average diameter of the droplets is 60 microns, estimate the work required for atomizing 1 kg of water isothermally at the ambient conditions. Given; surface tension of water in contact with air = 0.07 N/m, density of water = 1000 kg/m^3. Water is assumed to enter the nozzle through a pipe of 15 mm diameter.
   b) Why does free expansion have zero work transfer? Explain (8M+8M)

3. a) 1.5 kg of liquid having a constant specific heat of 2.5 kJ/kg K is stirred in a well-insulated chamber causing the temperature to rise by 15°C. Find ΔE and W for the process.
   b) In a steam power station, steam flows steadily through a 0.2 m diameter pipeline from the boiler to the turbine. At the boiler end, the steam conditions are found to be: p = 4 MPa, t = 400°C, h = 3213.6 kJ/kg, and v = 0.073 m^3/kg. At the turbine end, the conditions are found to be: p = 3.5 MPa, t = 392°C, h = 3202.6 kJ/kg, and v = 0.084 m^3/kg. There is a heat loss of 8.5 kJ/kg from the pipeline. Calculate the steam flow rate. (8M+8M)
~~~~~~

4. a) Explain about absolute thermodynamic temperature scales.
   b) A reversible power cycle R and an irreversible power cycle I operate between the same two reservoirs. Each receives Q_H from the hot reservoir. The reversible cycle develops work W_R while the irreversible cycle develops work W_I. i) Evaluate the rate of entropy generation σ for cycle I in terms of W_I, W_R and the temperature T_C of the cold reservoir. ii) Demonstrate that σ must be positive. (8M+8M)

5. a) A large insulted vessel is divided into two chambers, one containing 5 Kg of dry saturated steam at 0.2 MPa and the other 10 kg of steam, 0.8 quality at 5 Mpa. If the partition between the chamber is removed and the steam is mixed thoroughly and allowed to settle. Find the final pressure, steam quality and entropy change in the process
   b) A steam boiler initially contains 5 m^3 of steam and 5 m^3 of water at 1 MPa. Steam is taken out at constant pressure until 4 m^3 of water is left. What is the heat transferred during the process. (8M+8M)

6. a) Explain the Psychrometric process
      i) Adiabatic mixing of two streams
      ii) Adiabatic Evaporative cooling

   b) An ideal gas of molecular weight 30 and γ =1.3 occupies a volume of 1.5 m^3 at 100kPa and 77^0C. The gas is compressed according to the law $PV^{1.25}$ =Const. to a pressure of 3 MPa. Calculate the volume and temp at the end of compression and heating, work done, heat transferred and total change of entropy (8M+8M)

7. a) In air standard Diesel cycle, the compression ratio is 16, and at the beginning of isentropic compression, the temperature is 15 ^{o}C and the pressure is 0.1 MPa. Heat is added until the temperature at the end of the constant pressure process is 1480 ^{o}C. Calculate: (i) the cut off ratio, (ii) the heat supplied per kg of air, (iii) the cycle efficiency, and (iv) the m.e.p.
   b) With a neat sketch explain the working of Belt Coleman cycle (8M+8M)

Code No RT21033 **R13** SET - 3

II B. Tech I Semester Supplementary Examinations, June - 2015
THERMODYNAMICS
(Com. to ME, AE, AME)

Time: 3 hours Max. Marks: 70

Note 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **THREE** Questions from **Part-B**

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PART-A

1. a) What are intensive and extensive properties?
   b) Define enthalpy. Why the enthalpy of an ideal gas does depends only on temperature?
   c) Define what is Irreversibility? State the Causes of Irreversibility?
   d) What is pure substance? Draw PV diagram for a pure substance.
   e) Explain Gibbs and Helm holtz functions
   f) Why is air refrigeration cycle preferred in aircraft? (4M+4M+4M+4M+3M+3M)

PART-B

2. a) An electric motor drives a stirrer filted with a horizontal cylinder. The cylinder of 40 cm diameter contains a fluid restrained by a frictionless piston. During the stirring of fluid for 15 min the piston moves outward slowly by a distance of 30 cm against the atmospheric pressure of 1 bar. The current supplied to the motor is 0.5 amp. From a 24-V lead-acid accumulator. If the conversion efficiency from electrical work to mechanical work output is 90%, estimate the work done on the motor, stirrer and the atmosphere.
   b) A piston cylinder device with air at an initial temperature of 30°C undergoes an expansion process for which pressure and volume are related as below:

p (kPa)	100	37.9	14.4
V (m^3)	0.1	0.2	0.4

   Calculate the work done by the system. (8M+8M)

3. a) What is generalized compressibility chart? Explain
   b) In steady flow apparatus, 135 kJ of work is done by each kg of fluid. The specific volume of the fluid, pressure, and velocity at the inlet are 0.37 m^3/kg, 600 kPa, and 16 m/s. The inlet is 32 m above the floor, and the discharge pipe is at floor level. The discharge conditions are 0.62 m^3/kg, 100 kPa and 270 m/s. The total heat loss between the inlet and discharge is 9 kJ/kg of fluid. In flowing through the apparatus, does the specific internal energy increase or decrease, and by how much? (8M+8M)
~~~~~~

4. a) Show that the efficiency of all reversible engines operating between the same temperature levels is the same.
   b) Which is the more effective way to increase the efficiency of a control engine
   i) To increase T_1 keeping T_2 constant
   ii) To decrease T_2 keeping T_1 constant
   where T_1 and T_2 are source and sink temperatures (8M+8M)

5. a) Draw the phase equilibrium diagram for a pure substance h-s and T-s plots with relevant constant property line and explain the plots
   b) Steam flows in a pipeline at 1.5 Mpa. After expanding to 0.1 MPa in a throttling calorimeter, the temperature is found to be 120 ^oC. Find the quality of steam in the pipeline. What is the maximum moisture at 1.5 MPa that can determined with this setup if at least 5^oC of superheat is required after throttling for accurate readings? (8M+8M)

6. a) An air conditioning system is designed under following conditions.
   Outdoor conditions : 30^{0}C dbt,75% RH
   Requried indoor conditions: 22^{0}C dbt,70% RH
   8/
   Amount of free air circulated : 3.33 m^3/s
   Coil dew point temperature : 14^{0}C
   The requried condition is achieved first by cooling and dehumidification and then by heating. Estimate a) the capacity of cooling coil in tones. b) capacity of heating coil in kW. c) amount of water vapour removed in kg/s.
   b) A mass of 0.25 kg of an ideal gas has a pressure of 300 kPa, a temperature of 80 ^oC, and a volume of 0.07 m^3. The gas undergoes an irreversible adiabatic process to a final pressure of 300 kPa and final volume of 0.10 m^3, during which the work done on the gas is 25 kJ. Evaluate the C_p and C_v of the gas and the increase in entropy of the gas. (8M+8M)

7. a) An air standard dual cycle has a compression ratio of 16, and compression begins at 1 bar, 50 ^oC. The maximum pressure is 70 bar. The heat transferred to air constant pressure is equal to that at constant volume. Estimate (i) the pressures and temperature at the cardinal points of the cycle, (ii) the cycle efficiency, and (iii) the m.e.p. of the cycle,
   C_v = 0.718 kJ/kg K, C_p = 1.005 kJ/kg K.
   b) with a neat sketch explain working of sterling cycle and derive the expression for its thermal efficiency (8M+8M)

Code No RT21033 **R13** SET - 4

II B. Tech I Semester Supplementary Examinations, June - 2015
THERMODYNAMICS
(Com. to ME, AE, AME)

Time: 3 hours Max. Marks: 70

Note 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **THREE** Questions from **Part-B**

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PART-A

1. a) Distinguish between terms Change of 'state', 'path', and 'process'?
   b) Define the following terms:
      i) Throttling process ii) Heat Exchangers
   c) Define what is Reversibility? State the conditions for Reversibility?
   d) What do you understand by triple point?
   e) Define an ideal gas. What is universal gas constant?
   f) Under what conditions does steady flow energy equation reduce to Euler's equation?

(4M+4M+4M+4M+3M+3M)

PART-B

2. a) What do you understand by Ideal gas temperature scale?
   b) It is required to melt 5 tonnes/h of iron from a charge at 15 °C to molten metal at 1650 °C. The melting point is 1535 °C, and the latent heat is 270 kJ/kg. The specific heat in solid state is 0.502 and in liquid state (29.93/atomic weight) kJ/kg K. If an electric furnace has 70% efficiency, find the kW rating needed. If the density in molten state is 6900 kg/m^3 and the bath volume is three times the hourly melting rate, find the dimensions of the cylindrical furnace if the length to diameter ratio is 2. The atomic weight of iron is 56. (8M+8M)

3. a) A fluid contained in a cylinder receives 150 kJ of mechanical energy by means of paddlewheel, together with 50 kJ in the form of heat. At the same time, a piston in the cylinder moves in such a way that the pressure remains constant at 200 kN/m^2 during the fluid expansion from 2 m^3 to 5 m^3. What is the change in internal energy, and in enthalpy?
   b)Write the steady flow energy equation for an open system, explain all the terms and apply the equation to i) turbine ii) Heat exchanger ii) Nozzle

(8M+8M)
~~~~~~

4. a) Derive the expression for maximum work obtainable from two finite bodies at temperature T_1 and T_2
   b) A fluid undergoes a reversible adiabatic compression from 0.5 MPa, 0.2 m^3 to 0.05 m^3 according to the law, $pv^{1.3}$ = constant. Determine the change in enthalpy, internal energy and entropy, and the heat transfer and work transfer during the process. (8M+8M)

5. a) Steam initially at 0.3MPa, 250 ^oC is cooled at constant volume. At what temperature will the steam become saturated vapour? What is the quality at 80 ^oC? What is the heat transferred per kg of steam in cooling from 250 ^oC to 80 ^oC.
   b) With a neat sketch explain the working of Throttling Calorimeter (8M+8M)

6. a) Draw the Psychrometric chart and indicate all the property line. Explain the importance of Psychrometric chart
   b) State and prove Daltons law of partial pressures and Avogadro's law of additive volumes (8M+8M)

7. a) Explain the working of an Otto cycle and derive the expression for thermal efficiency
   b) In an ideal Brayton cycle, air from the atmosphere at 1 atm, 300 K is compressed to 6 atm and the maximum cycle temperature is limited 1100 K by using a large air fuel ratio. If the heat supply is 100 MW, find (i) the thermal efficiency of the cycle (ii) work ratio, (iii) power output, (iv) energy flow rate of the exhaust gas leaving the turbine. (8M+8M)