Total No. of Printed Pages:2

SUBJECT CODE NO:- K-14

FACULTY OF ENGINEERING AND TECHNOLOGY

B.E. (Mech) Examination Oct/Nov 2016

Automobile Engineering

(Revised)

[Time:Three Hours] **[Max.Marks:80]**

Please check whether you have got the right question paper.

N.B
I. Question number 1 and Question number 6 are compulsory.
II. Solve any two questions From remaining Questions From each section A & B.
III. Draw neat sketches wherever necessary.
IV. Assume suitable data, if required.
V. Figures to the right indicate Full marks.

Section A

Q.1 Give the detail classification of an Automobile. 10

Q.2
a) With the help of suitable diagram explain the construction and working of centrifugal clutch. 07
b) What is the principle of Friction clutch? Explain with neat sketch construction and working of single plate clutch. 08

Q.3
a) What is the necessity of gearbox in Automobile? Explain construction and working of sliding Mesh gearbox with the help of diagram. 07
b) Describe in detail various types of gear selector Mechanism used in Automobiles. Discuss also advantages and disadvantages of each. 08

Q.4
a) What is rigid axle suspension system? With neat sketch explain semi-elliptic type of leaf spring. 07
b) Differentiate clearly between the functions of a spring and a shock absorber. Explain the construction and working of a telescopic type of shock absorber with the help of a diagram. 08

Q.5 Write short notes on (any three) 15
a) Recent developments in engine.
b) Clutch plate.
c) Universal joints.
d) Anti Roll bar.
e) Overdrive.

Section B

Q.6 What is the necessity of power steering in Automobile? Sketch any power steering system and explain its working. 10

Q.7
a) Explain the terms: over steer, under steer, cornering force and slip angle. 07
b) Describe the construction of different types of wheels. Mention their relative merits and demerits. 08

Q.8 a) Explain the general arrangement and layout of air brake system. 07

b) Explain the functions and requirements of automobile brakes. Explain Drum brake with neat sketch. 08

Q.9 a) How air bags works? How do the air bags and seat belts enhance the safety of occupants of a car? 07

b) What is the function of ignition system in motor vehicle? Give the neat sketch of battery ignition system & explain how does it operates. 08

Q.10 Write short notes on(any three) 15

a) Dashboard instruments.
b) Tubeless types.
c) Tandem master cylinder.
d) Disc brake.
e) Pollution control norms.

Total No. of Printed Pages:3

SUBJECT CODE NO:- K-42

FACULTY OF ENGINEERING AND TECHNOLOGY

B.E. (Mech) Examination Oct/Nov 2016

Project Management and Operations Research

(Revised)

[Time:Three Hours] **[Max.Marks:80]**

Please check whether you have got the right question paper.

N.B
i. Attempt any three questions from each section.
ii. Assume suitable data if necessary.
iii. Figures to the right indicate full marks.

Section A

Q.1 a) Define a model as used in OR. & explain different types of models used in O.R. 06

b) An aero plane can carry a maximum of 250 passengers. A profit of Rs.1500 is made on each executive class ticket & a profit of Rs.900 is made on each economy class ticket. The airline reserves of least 30 seats for executive class. However at least four times as many passengers prefer to travel by economy class then by executive class formulate this problem at LPP in order to maximize the profit for the airline. 07

Q.2 Using Big-M method. 13

Maximize $z= 3x_1-x_2$

Subject to $2x_2+ x_2\geq 2$

$X_1+3x_2\leq 3$

$X_2\leq 4$

& $x_1,x_2 \geq 0$

Q.3 Using two phase method 13

Minimize $z = x_1+x_2+x_3$

Subject to $x_1-3x_2+4x_3=5$

$X_1-2x_2\leq 3$

$2x_2-x_3\geq 4$

& $x_1, x_2 , x_3\geq 0$

Q.4 For the transformation problem given below, find the IBFS by using lowest cost Method (LCM) & then find the optimum solution using u-v method. 14

	M1	M2	M380	supply.
W1	26	23	10	61
W2	14	13	21	49
W3	16	17	29	90
Reque.	52	68	80	

2016

Q.5 a) The following table shows the cost of matching 5 jobs on 5 machines. 07

Machine	A	B	C	D	E
1	30	37	40	28	40
2	40	24	27	21	36
3	40	32	33	30	35
4	25	38	40	36	36
5	29	62	41	34	39

jobs

Find the minimum cost of machining through optimal assignment.

b) A truck owner finds from his past records that the maintenance costs per year of a truck whose purchase price is Rs.8000 are given as: 06

Year	1	2	3	4	5	6	7	8
Maintenance Cost(Rs)	1000	1300	1700	2200	2900	3800	4800	6000
Resale price Rs.	4000	2000	1200	600	500	400	400	400

Determine at which time it is profitable to replace the truck.

Section B

Q.6 a) Explain the queuing system. With reference to the arrival pattern, service mechanism queue discipline & customers behavior. 06

b) Vehicles pass through a tollgate at a rate of 90 per hour. The average time to pass through the gate is 36 seconds. The arrival rate & the service rate follow Passion distribution. There is a complaint that the vehicles wait for long duration. The authority is willing to install one more gate to reduce the average time to pass through the toll gate to 30 seconds, if the idle time of the toll gate is less than 10% & the average queue length at the gate is more than 5 vehicles . Discuss whether the installation of second gate is justified or not. 07

Q.7 a) The pay of matrix for the players A & B is given below. 06

		Player B	
		B1	B2
Player A	A1	5	1
	A2	3	4

Find the value of the game by the method of oddments. Also find the probabilities of strategy for the players A & B

b) Six jobs are to be processed on two machines A & B. Time taken by each jobs on each machines is given below: 07

	1	2	3	4	5	6
m/c A	5	3	2	10	12	6
m/c B	3	2	5	11	10	7

Determine the optimum sequence of jobs that minimizes the total elapsed time to complete jobs.

Q.8 a) Explain the various costs associated with the inventory. 06

b) A constructor has to supply 10,000 bearings per day to an automobile manufacturer. He finds that when he starts a production sum, he can produce 25,000 bearings per day. The cost of holding a 07

bearing in stock for one year in Rs.2 & the set up cost of a production run is Rs.1800. How frequency should production run be made.

Q.9 A project consists of the following activities. find the optimum project time & corresponding minimum total project cost by crashing appropriate activities 14

Indirect cost per day is Rs.400

Activity	Time(week)		Cost Rs.	
	Normal	crash	Normal	crash
1-2	9	4	1300	2400
1-3	15	13	1000	1380
2-3	7	4	7000	7540
2-4	7	3	1200	1920
2-5	12	6	1700	2240
3-6	12	11	600	700
4-5	6	2	1000	1600
5-6	9	6	900	1200

Q.10 Table below shows activities & their durations of completion 13

a) Find the expected durations & variance of all the activities.
b) Find the expected project duration.
c) Find the probability of completing the project on before 20 marks.

activity	Predecessor Activity	Durations		
		t_o	t_m	t_p
A	-	1	2	3
B	-	2	2	8
C	A	6	7	8
D	B	1	2	3
E	A	1	4	7
F	C,D	1	5	9
G	C,D,E	1	2	3
H	F	1	2	9

Some sample values of P corresponding to standard normal variate Z are given below.

p	0.4357	0.4370	0.4302	0.4394	0.4406
z	1.52	1.53	1.54	1.55	1.56

Total No. of Printed Pages:3

SUBJECT CODE NO:- K-72
FACULTY OF ENGINEERING AND TECHNOLOGY
B.E. (Mech) Examination Oct/Nov 2016
Refrigeration and Air Conditioning
(Revised)

[Time:Three Hours] **[Max. Marks:80]**

Please check whether you have got the right question paper.

N.B i) Solve three questions from each section.
ii) Figure to the right indicates full marks.
iii) Use of refrigerant table, steam tables and psychrometric charts is allowed.
iv) Assume suitable data necessary.

Section A

Q.1 a) Discuss the limitation of simple VCC achieving very low temperature. 03
b) Explain the Ton of refrigeration and show it is equivalent to 3.5 kW. 03
c) A Carnot refrigerator requires 1.5kW per ton of refrigeration to maintain a temperature of 30^0C. 06
Determine :-
1) C.O.P of the refrigerator.
2) The temperature at which the heat is rejected.
3) The amount of heat rejected in kJ/min.
4) C.O.P, if the cycle is used as a heat pump.

Q.2 A vapour compression machine is used to maintain a temperature of -20^0C in a refrigerated space. The ambient temperature is 38^0C. The compressor takes in dry saturated vapour of F_{-12}.a minimum temperature difference is required at the evaporator as well as at condenser. There is no sub cooling of liquid. If the refrigerant flow rate is 2 kg/min, find 12
i) Tonnage of refrigeration
ii) Power requirement
iii) Ratio of C.O.P of cycle to C.O.P of Carnot cycle.

Q.3 A compound refrigeration system using R-12 as refrigerant consists of three evaporator of capacities 30 TOR at-10^0C, 20TOR at 0^0C and 10TOR at 10^0C. The vapours leaving the evaporator are dry and saturated. The system is provided with individual expansion valves and individual compressor. The condenser temperature is 40^0C and the liquid refrigerant leaving the condenser is sub cooled to 30^0C. Assuming isentropic compression in each compressor, 13
a) Determine the mass of refrigerant flowing through each evaporator;
b) The power required to drive the system and
c) The C.O.P of the system.

Q.4 An aircraft moving with speed of 1200 km/hr uses simple air refrigeration cycle for air conditioning. The ambient pressure and temperature are 0.4 bar and -10^0C respectively. The pressure ratio of compressor is 4. The heat exchanger effectiveness is 0.95. The isentropic of efficiencies of compressor and condenser are 0.8 each. The cabin pressure and temperature are 1.06 bar and 25^0C, determine temperature and pressure at all points of the cycle. Also find the volume flow rate through compressor inlet, expander outlet 120 TOR and C.O.P of the system. Take C_p=1.005kJ/kgK; R=0.287kJ/kgK and C_p/C_v=1.4 for air. 13

Q.5 Write short note on the following. (<u>any three</u>) 14

a) Limitations of Carnot cycle used for refrigeration
b) Boot-strap air cooling system
c) DART
d) State different types of air refrigeration cycle. Write about Bell Coleman cycle
e) Compare simple vapour compression with multistage vapour compression cycle

Section B

Q.6 a) Explain Lithium –Bromide water vapour absorption system with neat sketch. 07

b) With the help of neat sketch, explain practical vapour absorption system. 06

Q.7 a) Explain thermodynamic properties of refrigerant? 06

b) Explain the procedure for designations of refrigerant? 06

Q.8 a) Explain the following term. 06

i) Bypass factor
ii) RSHF
iii) GRSHF

b) For a dry bulb temperature 30^0C and relative humidity of 60% calculate the following for air when the barometric is 740 mm of Hg. 06

i) Partial pressures of water vapour & dry air
ii) Dew point temperature
iii) Specific humidity
iv) Enthalpy

Q.9 The following data refers to air conditioning of a building; 13

Outside design condition = 45^0C DBT, 26^0C WBT
Inside design conditions = 25^0C DBT, 50% relative humidity
Room sensible heat gain = 80000 kJ/hr
Room latent heat gain = 20000 kJ/hr
Bypass factor of the cooling coil =0.2

The return air from the room is mixed with the outside air before entry to cooling coil in the ratio of 4:1. Determine

1. Room sensible heat factor
2. The conditions of air entering the auditorium
3. The amount of fresh air mass flow rate
4. Apparatus dew point temperature
5. Refrigerating load on cooling coil

Q.10 Write short note on the following. (<u>any three</u>) 14

a) Human comfort parameters
b) Domestic refrigerator
c) Sling psychrometer
d) Cold storage
e) Summer air conditioning system.

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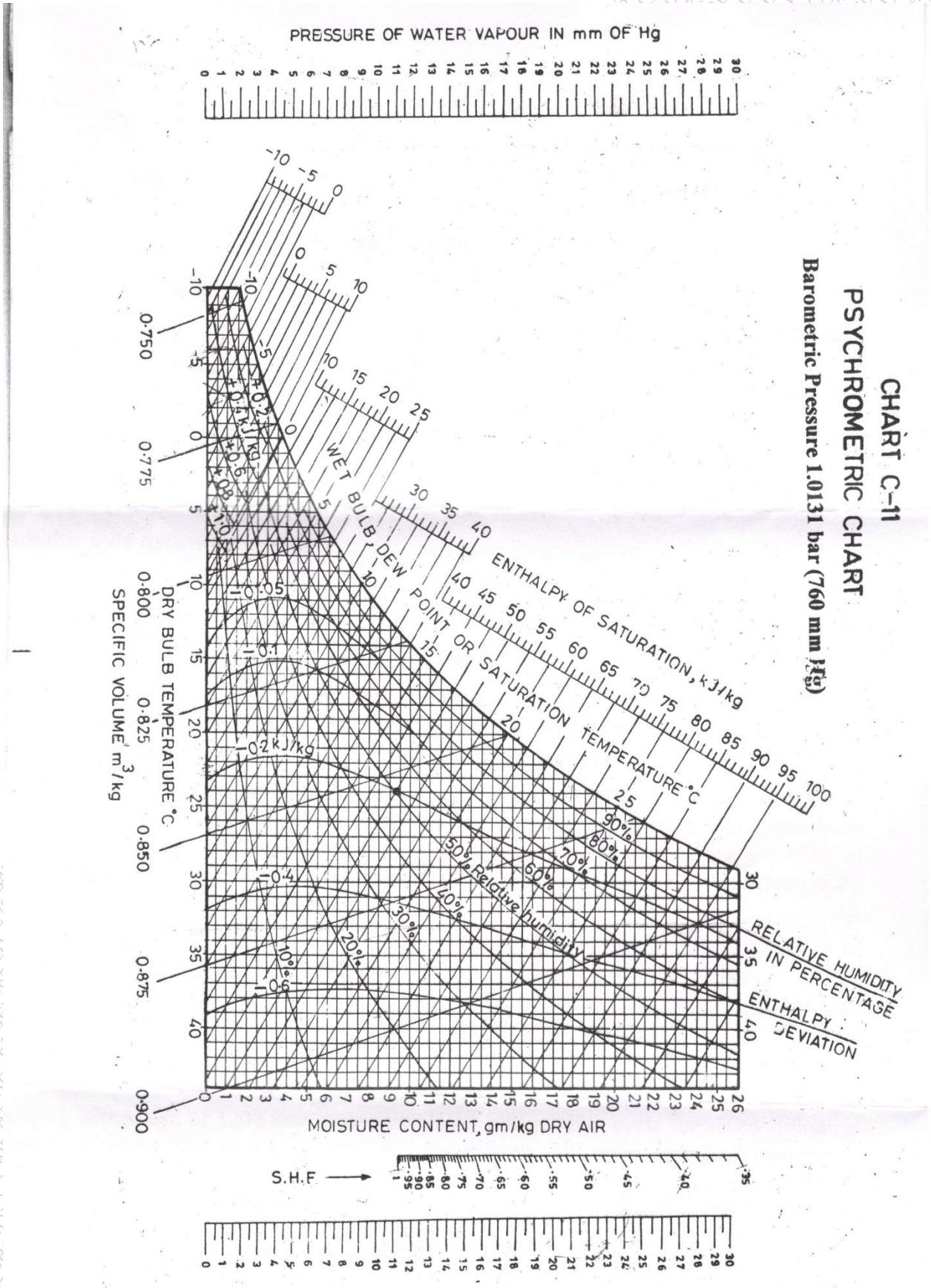

Total No. of Printed Pages:2

SUBJECT CODE NO:- K-108
FACULTY OF ENGINEERING AND TECHNOLOGY
B.E.(Mech) Examination Oct/Nov 2016
Computational Fluid Dynamics [Elective-II]
(Revised)

[Time:Three Hours] **[Max. Marks:80]**

Please check whether you have got the right question paper.

N.B i) Attempt any three questions from each section. (Section A and B).
ii) Figures to the right indicate full marks.
iii) Draw diagrams or graphs wherever required.
iv) Assume suitable data, if necessary.

Section A

Q.1	a)	What is inviscid flow? Derive the equation for inviscid flow.	07
	b)	Explain elliptic equations to steady inviscid supersonic flow and unsteady inviscid flow.	06
Q.2	a)	Show that second order wave equation $\frac{\partial^2 u}{\partial t^2} = c^2 \frac{\partial^2 u}{\partial x^2}$ is a hyperbolic equation.	08
	b)	Explain explicit finite difference methods of supersonic flows.	05
Q.3	a)	How do you determine the accuracy of the discretization process? What are the uses and difficulties of approximating the derivatives with higher order finite difference schemes? How do you overcome these difficulties?	07
	b)	Explain the implicit time dependent methods for inviscid flows.	06
Q.4	a)	What are the merits and demerits of finite element technique? Explain.	07
	b)	Explain strong formulations of a boundary value problem for one dimensional.	06
Q.5	Write short notes on. (<u>any two</u>)		14
	a)	Discretization of partial differential equations	
	b)	Numerical dissipation	
	c)	Unstructured grids	

Section B

Q.6	a)	Explain cell vertex formulation.	06
	b)	What is multi-stage time-stepping? Explain with an example.	07
Q.7	a)	Explain Taylor series expansion method and integration over a control volume method of discretization in heat conduction.	07
	b)	What is pressure correction technique? Explain.	06
Q.8	a)	Explain stability and convergence in heat conduction.	06
	b)	What is source term? Explain with example of boundary temperature specified.	07

2016

Q.9 a) Derive the equation of convection-diffusion using control volume approach with convection-diffusion flux $f(u) = w u - \varepsilon \nabla u$ 07

Here w is the convection velocity and $\varepsilon > 0$ is the diffusion coefficient.

b) Explain the discretization of transient convection-diffusion equation. 06

Q.10 Write short notes on. (<u>any two</u>) 14

a) Flux-splitting schemes
b) Source term linearization in heat conduction
c) Finite volume formulation of diffusion

Total No. of Printed Pages:1

SUBJECT CODE NO:- K-187

FACULTY OF ENGINEERING AND TECHNOLOGY

B.E.(MECH) Examination Oct/Nov 2016

I.C. Engines

(Revised)

[Time:Three Hours] **[Max. Marks:80]**

Please check whether you have got the right question paper.

N.B
I. Solve any three questions from each section.
II. Support your answer with figure wherever possible.
III. Figures to the right indicate full marks.
IV. Assume suitable data if necessary.

Section A

Q.1	a)	Explain with neat diagram working of 4- stroke petrol engine.	07
	b)	Explain the stirling cycle with neat diagram. Obtain an equation for the thermal efficiency of the same.	07
Q.2	a)	Explain with the help of a P-V diagram the loss due to variation of specific heats in an Otto cycle.	06
	b)	State different types of nozzles used in fuel injection system. Explain any one with neat diagram.	07
Q.3	a)	Write short note on 'Alternative fuel'.	06
	b)	Explain distribution type fuel pump.	07
Q.4	a)	Explain combustion in SI- Engine.	07
	b)	Differentiate between normal and abnormal combustion in SI Engine.	06
Q.5	a)	Explain T-head and F- head combustion chamber used in SI Engine.	07
	b)	Write short note on 'Octane Rating of fuel'.	06

Section-B

Q.6	a)	Compare the knock in CI engine & SI Engine.	07
	b)	State the various factor affecting delay period. Explain any two.	07
Q.7	a)	Write short note on 'Cetane Rating' of fuel.	07
	b)	State various combustion chambers used in CI Engine. Explain any one.	06
Q.8	a)	State different methods used for measuring friction power. Explain any one.	06
	b)	A six- cylinder, gasoline engine operates on the 4- stroke cycle. The bore of each cylinder is 80mm and stroke 100mm. The clearance volume per cylinder is 70cc. At a speed of 3000 rpm the fuel consumption is 20kg/hr and the torque developed is 150N.m. Calculate. i) The brake power. ii) The bmep. iii) Brake thermal efficiency if the calorific value of fuel is 43000kj/kg. iv) The relative efficiency on brake power basis assuming the engine works on constant volume cycle. γ=1.4 for air.	07
Q.9	Write short notes on.		13
	a)	HCCI Engine.	
	b)	Stirling engine.	
Q.10	a)	State different pollutant which CI engine emits. Explain effects of any two on human.	07
	b)	Discuss 'Euro Emission Norms'.	06

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Total No. of Printed Pages:2

SUBJECT CODE NO:- K-322

FACULTY OF ENGINEERING AND TECHNOLOGY

B.E.(Mech) Examination Oct/Nov 2016

Elective-I: Energy Conservation and Management

(Revised)

[Time: Three Hours] **[Max. Marks:80]**

Please check whether you have got the right question paper.

N.B
I. Attempt any **three** questions from each section.
II. Use separate answer-book for each section.
III. Figures to the right indicate full marks.

Section A

Q.1	a)	Write on commercial and noncommercial energy.	03
	b)	Describe Energy scenario in India.	06
	c)	Explain Medium-term and long term energy strategies for the future.	04
Q.2	a)	Discuss 5 important features of energy conservation act-2001.	04
	b)	Explain with neat labeled diagram. Compare Vapor compression and Vapor absorption refrigeration cycle.	06
	c)	How water hammer is produced in a piping system and how it can be eliminated?	03
Q.3	a)	Explain the main role of UNFCC and COP on climate change.	04
	b)	Determine the amount of moisture on a wet and dry basis for a waste sludge that has 30 kg of water and 20 kg of solids.	03
	c)	Explain in detail, clean development mechanism (CDM).	06
Q.4	a)	With appropriate sketch, explain bottoming cycles of cogeneration.	06
	b)	Write any 8 energy conservation measures in pumps.	04
	c)	What is meant by the term 'wheeling' and 'heat to power' ratio, 'CHP'	03
Q.5	Write short notes on any TWO of the following:		14
	a)	Recent development of renewable energy in India.	
	b)	System curve in pumps.	
	c)	Dynamic compressors.	
	d)	Bureau of energy efficiency (BEE).	

Section B

Q.6	a)	Briefly describe 4 pillars of successful Energy management.	06
	b)	An engineering industry which was operating with a maximum demand of 1000kVA at 0.9 power factor brought down its demand to 900 kVA by power factor improvement. Find out the percentage reduction in distribution losses within the plant.	04
	c)	What is the role of electronic ballast in a fluorescent tube light?	03

2016

Q.7 a) A no load test conducted on a three phase delta connected induction motor gave the following values: No load power = 993W
Stator resistance per phase at 30˚C=0.246ohms.
No load current=14.7A.
Calculate the fixed losses for the motor. 06

b) State the equation how to calculate the Net Present Value (NPV) of an investment and identify the parameters in the equation. 04

c) Explain briefly the features and use of a Sankey diagram. 03

Q.8 a) Explain Time of Day (TOD) tariff and how it is beneficial for the power system and consumers? 06

b) Discuss micro and macro factors involved in sensitivity analysis. 04

c) An energy meter connected to a 3 phase, 18.75KW pump shows 108 units consumption for six hours of operation. The load on the motor was steady. The consumer doubted the energy meter reading and electrical parameter such as current, voltage and power factor were measured. The measured values were 430 V line volts, 25 amps line current and 0.80 powers Factor. Find out if the energy meter reading is correct. 03

Q.9 a) Define the terms, 'Energy Audit', 'ROI' and 'NPV'. 03

b) Investment for a set of interrelated energy efficiency projects identified in a medium size process plant works out to Rs.12.00lakh.
Annual savings for the first four consecutive years are Rs.300, 000, Rs.400, 000 and Rs.450, 000 respectively. The cost of capital is 12%p.a. what is the net present value (NPV)? 06

c) Write on any 6 energy conservation measures in lighting. 04

Q.10 Write short notes on <u>any Two</u> of the following: 14

a) ESCO.
b) Performance contracting.
c) VFD.
d) Harmonics.

2016

Total No. of Printed Pages:2

SUBJECT CODE NO:- K-323

FACULTY OF ENGINEERING AND TECHNOLOGY

B.E.(Mech) Examination Oct/Nov 2016

Elective-I: Power Plant Engineering

(Revised)

[Time: Three Hours] **[Max. Marks:80]**

Please check whether you have got the right question paper.

N.B
1. Solve any three questions from each section.
2. Use separate answer- book for each section.
3. Figures to the right indicate full marks.
4. Assume suitable data, if necessary and state them clearly.

Section A

Q.1	a.	Explain in detail load estimation, load duration curve and effect of variable load on power plant.	06
	b.	Explain in detail sources of energy and future trends in power industry.	06
Q.2	a.	Explain in details the general layout of a thermal power plant.	06
	b.	Explain factors considered for site selection of a thermal power plant.	06
Q.3	a.	Explain in detail the advantages of diesel power plant over thermal power plant.	06
	b.	Explain in detail two lubrication systems used in diesel engines.	06
Q.4	a.	Explain in detail cost of energy production and tariffs for electrical energy.	06
	b.	Explain performance and operational characteristics of power plant.	06
Q.5	Write short notes (any four).		16

a. Selection and size of number of units.
b. Inplant handling of coal.
c. Supercharging in diesel engines.
d. Screw conveyor and bucket elevator.
e. Cooling system for diesel engines.

Section B

Q.6	a)	Explain in detail construction and working of a hydroelectric power plant.	06
	b)	Explain in detail construction and working of single jet Pelton turbine.	06
Q.7	a)	Explain in detail working principle of PWR reactor.	06
	b)	Explain in detail the nuclear fuels used in reactors.	06
Q.8	a.	Explain in detail four different types of spillways with neat sketches.	08
	b.	Explain with neat sketches solid gravity dams and single arch dam.	04

Q.9 a. Explain in detail sodium graphite reactor. 06
b. Explain methods of radioactive waste disposal. 06

Q.10 Write short notes(<u>any four</u>) 16
a. Hydrograph.
b. Storage and pondage.
c. BWR reactor.
d. Moderator and control rods.
e. Environmental aspects of power generation.

Total No. of Printed Pages:2

SUBJECT CODE NO:- K-324

FACULTY OF ENGINEERING AND TECHNOLOGY

B.E.(Mech) Examination Oct/Nov 2016

Elective-I: Production Planning and Control

(Revised)

[Time: Three Hours] **[Max. Marks:80]**

Please check whether you have got the right question paper.

N.B
I. Solve any three questions from each section.
II. Figures to the right indicate full marks.
III. Assume suitable data if require & state it clearly.

Section A

Q.1 a) State the principles of sound production control system. 07
b) Name the various types of production systems and explain the production on system suitable for job work. 06

Q.2 a) Describe the functions of production planning & control in brief. 05
b) Find the best fit line by least square method for the following data as follows. 08

Year:	1975	1976	1977	1978	1979	1980	1981
Demand: (in 1000 units)	85	75	80	72	65	60	55

Also estimate the demand for 1984.

Q.3 a) Describe 'exponential smoothing method' of sales forecasting. State its advantages & limitations. 07
b) Name & describe the various factors affecting sales forecasting. 06

Q.4 a) A manufacturer purchases items in lot of 800units which is a four month's requirement. The cost per unit is Rs.100 and the ordering cost is Rs.120 per order. The inventory carrying cost is estimated as 20% of the average inventory investment. 08
i) Determine the annual variable inventory cost managing the inventory.
ii) How much saving can be obtained from the EOQ purchase?

b) Describe briefly VED analysis of inventory control. 06

Q.5 a) Explain the working of MRP system. Describe the outputs of MRP system. 08
b) Explain two bin systems for inventory control. 05

Section B

Q.6	a)	Define routing. Explain the routing procedure in brief.	07
	b)	Explain the factors affecting routing procedure.	06
Q.7	a)	What is scheduling? How does it differ from loading? State the objectives of scheduling.	08
	b)	State the various activities of dispatching.	05
Q.8	a)	Differentiate between 'Centralized dispatching' and 'dis- centralized dispatching'.	06
	b)	Describe the follow up or control phase of PPC.	07
Q.9	a)	Discuss the applications of computer in PPC.	04
	b)	Define just In time production. State the prerequisite to achieve JIT production.	09
Q.10	a)	What are the various types of water? How they can be eliminated?	07
	b)	Write a short note on lean production system.	07

Total No. of Printed Pages:1

SUBJECT CODE NO:- K-325
FACULTY OF ENGINEERING AND TECHNOLOGY
B.E.(Mech) Examination Oct/Nov 2016
Elective-I: Advanced Materials and Manufacturing
(Revised)

[Time: Three Hours] **[Max. Marks:80]**

Please check whether you have got the right question paper.

N.B
i) Solve any three questions from each section.
ii) Draw a neat sketch wherever required.
iii) Assume suitable data wherever required.
iv) Figures to the right indicate full marks.

Section A

Q.1 a) What is reinforcement in composite materials? What are its property requirements? 07
b) Explain the fibre glass. Polymer composite? 06

Q.2 a) What are different factors affecting the properties of a polymer? Explain. 06
b) Show in what way the crystallinity of polymers can be controlled by a proper choice of polymerization method. Give example. 07

Q.3 a) What are ceramic materials? Name some important ceramic materials. 06
b) Define the term refractories, classify it and state properties. 07

Q.4 a) What are different tool materials? State its property requirements. 06
b) Why the name sport material is given to material? Explain with example. 07

Q.5 Write short note on any two 14
i) Magnetic materials
ii) Elastomers
iii) Metal matrix composite

Section B

Q.6 a) What is evaporative casting? Explain. 07
b) How the defect in casting can be taken care of 06

Q.7 a) State the requirement for metallic coating. 06
b) Explain how the process of electroplating is carried out. 07

Q.8 a) Explain the principle of EDM process, also explain the set up required. 07
b) State the applications and explain the process of water jet machining. 06

Q.9 a) What is rapid prototyping? What are the components of set up required. 07
b) Explain FDM process. 06

Q.10 Write short note on any two 14
i) LOM
ii) Laser beam machining
iii) PVD

2016

SUBJECT CODE NO:- K-326

FACULTY OF ENGINEERING AND TECHNOLOGY

B.E.(Mech) Examination Oct/Nov 2016

Elective-I: Modern Management Techniques

(Revised)

[Time:Three Hours] **[Max. Marks:80]**

Please check whether you have got the right question paper.

N.B i) Figures to the right indicate full marks.
ii) Attempt any three questions from section A and any three questions from section B.
iv) Assume suitable data wherever necessary.

Section A

Q.1 a) "Ishikawa Diagram is a valuable tool which enables a team to identify, explore and graphically display all the possible causes related to the problem". Justify the statement. 07

b) What is prioritization matrix? Explain steps to draw a prioritization matrix and why do you consider it to be any of the 7 (seven) new QC tools? 06

Q.2 a) Explain evolution of six -sigma approach. 06

b) Explain various types of scatter diagram along with illustrative examples and their interpretations. 07

Q.3 a) Narrate the types of wastes which are likely in a factory. 07

b) Explain role of setup time and lot size in JTI. 06

Q.4 a) Explain Poka-Yoke concept and its purpose. 07

b) What is BPR? Explain needs of BPR. 06

Q.5 Write short notes on any two:- 14

a) kaizen concept with example
b) five-why process analysis
c) Pareto analysis with conclusion

Section B

Q.6 a) Explain how interaction and relationship between customer requirements and product requirements are evaluated in house of quality. 07

b) How competitors are evaluated in house of quality? 06

Q.7 a) What is value? Explain value analysis procedure? 07

b) What is FAST analysis? 06

Q.8 a) Describe the stages for introduction of TPM in an organisation. 07

b) What are the four developments training after overall equipment effectiveness? 06

Q.9 a) Define QWL? Explain managerial role for improving QWL. 07

b) Explain the concept of Lateral thinking. 06

Q.10 Write short notes on any two:- 14

a) Practical thinking techniques
b) Workplace layout
c) Creativity and innovation
d) Steps for TPM Implementation

Subject Code : 109

FACULTY OF ENGINEERING & TECHNOLOGY
B.E. (Mechanical) (Revised) Examination
NOVEMBER/DECEMBER, 2016
(Elective – II)
Industrial Engineering

Time: Three Hours Max. Marks : 80

"Please check whether you have got the right the question paper"

Note: i) *Solve any three questions from each section.*
ii) *Figures to the right indicate full marks.*
iii) *Assume suitable data wherever necessary and state it clearly.*

SECTION - A

Q.1	(a)	Enlist the factors influencing productivity. Explain how each factor will affect productivity.	**06**
	(b)	Define work-study. Explain work simplification, human consideration in work – study.	**07**
Q.2	(a)	Describe the various kinds of productivity measurement.	**06**
	(b)	State and explain in brief the steps involved in method study procedure.	**07**
Q.3	(a)	Explain the utility of outline process chart in method study. Differentiate between outline process chart and flow process chart.	**09**
	(b)	Define micromotion study and state its objective.	**04**
Q.4	(a)	State the principles of motion economy related to the use of human body.	**06**
	(b)	Explain in brief the following recording techniques. (i) String diagram (ii) Travel chart	**08**
Q.5	(a)	Why the work content is divided into elements? What are the various types of elements.	**07**
	(b)	Describe various methods of job evaluation giving their advantages and limitations.	**06**

SECTION - B

Q.6	(a)	Outline the general procedure for a work sampling study to determine the extent of delays and personal time.	**07**
	(b)	Write a short note on method time measurement.	**06**
Q.7	(a)	Write a short note on the following : (i) Types of displays (ii) Physiological aspects of mascular work.	**08**
	(b)	What are the various workplace requirements? Explain in the context of workplace design.	**06**

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Q.8	(a)	Explain Toyota production system.	07
	(b)	Write a short note on push and pull system in JIT.	06
Q.9	(a)	Describe Kaizen umbrella for quality improvement.	06
	(b)	Explain Kaizen in relation with innovation and PDCA cycle.	07
Q.10	(a)	Define single minute exchange of dies. Discuss its procedure and effects.	09
	(b)	Describe work station heights and seat geometry.	04

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Total No. of Printed Pages:2

SUBJECT CODE NO:- K-219
FACULTY OF ENGINEERING AND TECHNOLOGY
B.E.(MECH] Examination Oct/Nov 2016
Automatic Control System
(Revised)

[Time: Three Hours] **[Max. Marks:80]**

Please check whether you have got the right question paper.

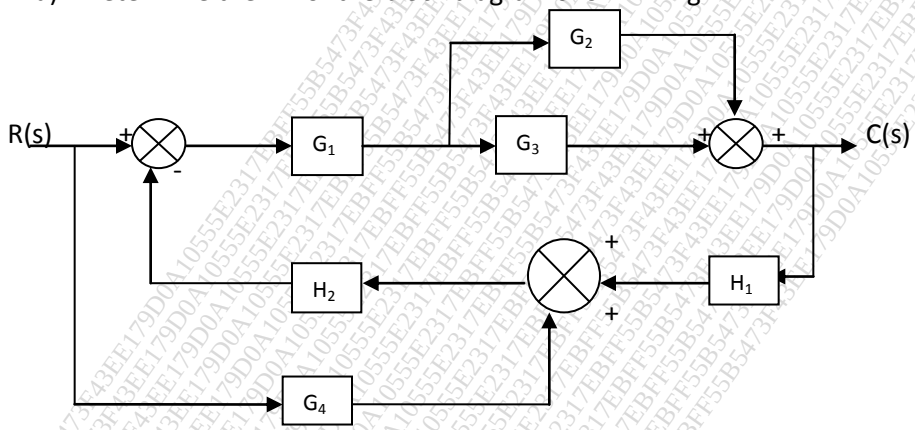
N.B i) Solve any three questions from each section.
ii) Draw neat sketches if required.
iii) Assume suitable data if necessary.

Section A

Q.1 a) Differentiate between open & closed loop system. 07
b) Write down the requirement of ideal control system. 06

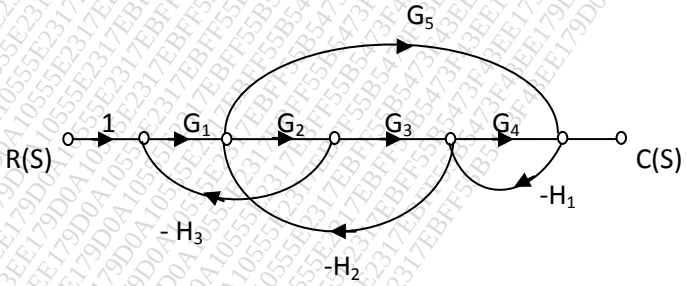
Q.2 a) Explain in detail force- current analogy 07
b) Write a short note on fluid system. 06

Q.3 a) Determine the T.F of the block diagram shown in fig. 10



b) Explain significance of block diagram reduction technique. 04

Q.4 a) For the SFG shown in fig obtain T.F. 07



b) Explain P+I+D control action 06

Q.5 a) Explain hydraulic P+I+D controller 07
b) Write a short note on stepper motor & its application 06

2016

Section B

Q.6	a)	What is standard test signals. Explain various types of standard test signals.	07
	b)	Write a note on effect of damping ration on response of second order system.	06
Q.7	a)	Given the T.F. G(s) =$\frac{100}{s^2+15s+100}$ find the peak time, % overshoot, Ts and Tr.	07
	b)	Define different time domain specifications.	06
Q.8	a)	Write a short note on phase & gain margin.	06
	b)	Determine the stability to $S^6 + 2S^5 + 8S^4 + 12S^3 + 20S^2 + 16S + 16$	07
Q.9	a)	For the unity feedback control system $G(s) = \frac{10}{s(s+1)(s+5)}$ sketch the bode plate and determine the gain & phase margin.	10
	b)	Write down the advantages of Bode plots.	03
Q.10	a)	Draw the Root Locus for the following system $G(s).H(s) = \frac{k}{s(s+6)(s+10)}$	09
	b)	Write down the rules for construction of the Root Locus.	05

SUBJECT CODE NO:- K-250
FACULTY OF ENGINEERING AND TECHNOLOGY
B.E.(MECH) Examination Oct/Nov 2016
Metrology and Quality Control
(Revised)

[Time: Three Hours] **[Max. Marks:80]**

Please check whether you have got the right question paper.

N.B i) Attempt any three questions from each section.
ii) Assume suitable data of necessary.
iii) Figures to the right indicate full marks.

Section A

Q.1	a)	Explain the principles of metrology and measurement standards.	07
	b)	Explain and differentiate Linear and Angular measurement with the help of suitable example.	06
Q.2	a)	What is slip gauge? Explain the procedure of slip gauge measurement.	07
	b)	Explain with suitable example Taylor's principles of Gauge Design.	06
Q.3	a)	Describe the Parkinson's gear tester and state its limitation.	07
	b)	State the various sources of errors in manufacturing gears and name the various types of errors in gears.	06
Q.4	a)	Explain the construction and working of LVDT.	07
	b)	List down the advance measurement Techniques and explain any one.	06

Q.5 Write short notes on (Any three) 14

1) Tracibility of standard
2) Laser interferometer surface finish measurement
3) IS 919-1963
4) Profile projector

Section – B

Q.6	a)	Explain quality of design with the help of suitable example.	07
	b)	Explain importance and use of quality circles in quality control.	06
Q.7	a)	Explain '5 S'.	06
	b)	What is statistical quality control? Explain in detail.	07
Q.8	a)	What is Acceptance sampling? Explain with example.	07
	b)	What is OC curve and its characteristics.	06
Q.9	a)	Explain the use of control chart for variables and attributes with the help of suitable example.	07
	b)	Define the term 'Standardization' and write down its aims and explain codification system.	06

Q.10 Write short notes on any three. 14

1) Universal measuring machine
2) ISO 9000
3) Kaizan Technique
4) Pareto analysis

2016

Total No. of Printed Pages:2

SUBJECT CODE NO:- K-283
FACULTY OF ENGINEERING AND TECHNOLOGY
B.E.(Mech) Examination Oct/Nov 2016
Turbo Machines
(Revised)

[Time:Three Hours] **[Max. Marks:80]**

Please check whether you have got the right question paper.

N.B i) Solve three questions from each section.
ii) Figures to the right indicate full marks.

SECTION A

Q.1 a) Define a turbo machine with a neat sketch explain the parts of turbo machine. 07
b) Briefly explain the significance of specific speed related to fluid machines. 06

Q.2 a) Show that a curve radial vane the work done per second is given by $\rho aV[V_{w1} u_1 \pm V_{w2} u_2]$ the notation carry usual meaning. 07
b) A jet of water of diameter 52 mm strikes a fixed plate in such a way that the angle between the plate and the jet is 32^0. The force exerted in the direction of the jet is 1500N. Determine the rate of flow of water. 06

Q.3 a) Define and explain hydraulic efficiency, mechanical efficiency and overall efficiency of a turbine. 06
b) What do you mean by the characteristic curve of turbine? Name the important types of characteristics curves. 07

Q.4 A Pelton wheel is to be designed for a head of 65 m when running at 225 rpm. The pelton wheel develops 98 KW shaft power. The velocity of buckets = 0.45 times the velocity of the jet, overall efficiency = 0.85 and coefficient of the velocity is equal to 0.98. Find (i) Diameter of jet (ii) Diameter of wheel (iii) width and depth of buckets (iv) Number of buckets on the wheel. 13

Q.5 Write short notes on any three of the followings 14
a) Types of draft tubes and its significance
b) Reaction turbine
c) Propeller turbine
d) Selection of turbine for particular case

SECTION B

Q.6 a) What is the difference between single-stage and multistage pumps? Describe multistage pump with impeller in parallel and in series. 06
b) A centrifugal pump is running at 1050 rpm. The outlet vane angle of the impeller is 45^0 and velocity of flow at outlet is 2.8 m/s. The discharge through the pump is 208 liters/s when the pump is working against a total head of 23 m. If the manometric efficiency of the pump is 82%. Determine (i) the diameter of the impeller, (ii) the width of the impeller at outlet. 07

Q.7 In a single row wheel impulse turbine the mean diameter of the blades 1.08 m and the speed is 310 rpm. The nozzle angle is 20^0 and the ratio of blade speed to steam speed is 0.49 and the relative velocity and outlet from the blades to that at inlet is 0.85. The outlet angle is made 3^0 less than the inlet angle. The steam flow is 11 kg/s. Draw the velocity diagram for the blade and determine the following. (a) Tangential thrust on the blades (b) axial thrust on the blade (c) power developed in the blades (d) blade efficiency. 13

Q.8
a) Sketch Brayton cycle in p-v and T-s plot and derive a relation for its thermal efficiency in terms of pressure ratio. 06
b) Discuss the influence of reheating, regeneration and inter-cooling on the performance of the gas turbine cycle. 07

Q.9
a) What are the difference between impulse and reaction steam turbine. 06
b) A nozzle expands steam from 16 bar and 320^0c to 7 bar. If the flow rate is 1.04 kg/s, find the throat and exit area. What should be coefficient of velocity, if exit velocity is 552 m/s? 07

Q.10 Write short notes on any three of following 14
1) Priming in pump
2) Ericsson cycle
3) Nozzles and diffusers
4) Characteristics of centrifugal pump