Total No. of Pages :2

Seat No.

B.E. (Mechanical) (Part - IV) (Semester - VIII) (Revised) Examination, May - 2015

INDUSTRIAL AUTOMATION AND ROBOTICS (Elective - IV)

Sub. Code : 49446

Day and Date : Thursday, 14 - 05 - 2015

Total Marks: 100

Time : 2.30 p.m. to 5.30 p.m.

- Instructions : 1) Answer any three questions from section one and any three questions from section two.
 - Answer to the two sections should be written in the same answer book.
 - 3) Figure to the right indicate full marks.
 - 4) Draw neat diagrams where ever necessary.

SECTION - I

Q1) a) Explain the five levels of automation in a production plant. [8]

 Explain with example error detection and recovery in an automated system. [8]

Q2) a) Explain the different system configurations of an automated assembly system.
 [8]

 b) Explain the control functions in the operation of an automated transfer line.

Q3) a) Differentiate between the following.

[8]

- i) Flexible and fixed automation
- ii) Continuous and discrete control
- b) Explain the different part feeder mechanisms in an automated assembly line.
 [8]

Q4) Write short notes (Any Three).

- a) Dial Indexing mechanism
- b) Economic and social aspects of automation
- c) Computer process monitoring in automation
- d) Automation migration strategy
- e) Need and advantages of automation

SECTION - II

05)	a)	Explain the different configurations of robot and their work volum	nes.
2	1.000077		[8]
	b)	Explain any four dynamic properties of a robot.	[8]
Q6)	a)	Explain any two feedback devices in a robot with neat diagrams.	[8]
	b)	Explain the following with respect to grippers.	[8]
		i) Gripper force analysis	
		ii) Vacuum Grippers	
Q7)	a)	Explain the methods of defining positions in space in leadthro programming.	ugh [9]
	b)	Explain the application of robot in assembly.	[7]
08)	W	ite short notes (Any Three).	[18]

a) Type's of joints in robots

b) Robot end effectors interface

c) Robot programming languages

d) Interlocks in work cell control

e) Robot and machine interference

S - 403 [18]

Total No. of Pages : 3

B.E. (Mechanical) (Part - IV) (Semester - VIII) Examination, May -2015

INDUSTRIAL ENGINEERING

Sub. Code : 49418

Day and Date : Thursday, 07 - 05 - 2015

Total Marks: 100

Time : 2.30 p.m. to 5.30 p.m.

Seat No.

- Instructions : Attempt any three questions from each section. 1)
 - 2) Figures to the right indicates full marks.
 - Draw sketches wherever required. 3)
 - Assume suitable data, if required & mention clearly the same. 4)

SECTION - I

<i>Q1</i>) a)	What are functions of industrial engineering.				
b)	Explain "plant capacity" and methods of enhancing the same.	[6]			

Explain various production systems. 6 c)

[6] Describe various inputs and outputs of MRP. (02) a)

Company uses 2000 units per month purchase price is Rs. 4/- per unit. b) Procurement cost is Rs. 100/- per order & cost of carrying is 10% of inventory cost. Lead time is 10 days and working days are 300 in year. Safety stock is 200 units.

Calculate i) Economic order Quantity.

- Number of orders. ii)
- iii) Reorder point
- Minimum and maximum stock iv)
- V) Inventory cost.

[10]

. In , salary # IT's participant and

Q3) a) What are objectives of plant layout.

b) From following relation between population and sale of laptops, estimate 181 laptop demand for 50 million population.

Population million	4	8	17	25	28	38
Demand × 1000	30	38	70	82	95	125

Q4) a) Explain with sketches different types of conveyers and their applications. [8]

b) From following data, draw network, indicating critical path, project duration. Also calculate float in tabular form. [8]

Activity	Predecessors	Duration weeks.
1-2		5
2-4	1-2	3
1-3		3
3-5	1-3	3
3-6	1-3	2
5-8	3-5	2
6-7	3-6	6
7-8	6-7	3
8-9	5-8 & 7-8	4
4-9	2-4	2

SECTION - II

(05) a)

Which are various tools and techniques to improve Productivity. [8]

What are steps involved in value analysis. b)

-2-

[8]

[8]

[8]

[6]

- Q6) a) Describe method of drawing string diagram indicating it's purpose.[8]
 - b) What are principles of motion economy.
- Q7) a) Explain importance of anthropametrical data in human engineering.[8]
 - b) A continuous stop watch study was conducted on job consisting of three elements stop watch reading (in hundredth of minute) is given below. If allowances are 15%, calculate standard time & production for 8 hour shift.

Element	Tir	Rating			
in Charles	1	2	3	4	
1	11	77	142	224	100
2	26	93	174	239	90
3	67	133	213	277	110

- (Q8) a) What are objectives of job evalution.
 - b) What is purpose of incentive. Explain characteristic of good incontive system. [6]
 - c) Total mumber of observations taken during study was 20,000 in which machines was idle 4000 times. Calculate limit of accuracy. Also if desired accuracy is ±5% comment on number of observations. [6]

Seat	
No.	

S - 401 Total No. of Pages : 2

B.E. (Mechanical) (Semester - VIII) Examination, May - 2015 MACHINE TOOL DESIGN (Elective - III) Sub, Code : 49422

Day and Date : Tuesday, 12 - 05 - 2015 Time : 2.30 p.m. to 5.30 p.m. Total Marks: 100

Instructions: 1) Attempt any three questions from Section - I and any three questions from Section - II.

2) Assume any missing data suitably and state it clearly.

3) Figures to the right indicate full marks.

SECTION - I

Q1) a) Differentiate between machine and machine tool with suitable examples.
 Classify machine tools.
 [8]

 b) Write a layout formula for center lathe and explain the same with the help of block diagram. [8]

(Q2) a) With a neat sketch explain the feed box with tumbler gear mechanism.[8]

b) Explain the design criteria for machine tool strucutres. [8]

Q3) a) Explain with neat sketches methods of adjusting clearances in slideways.[8]

b) Explain the design considerations in case of hydrodynamic slideways.[8]

Q4) A 3 - stage, 12 - speed gear box is to be disigned for spindle speeds varying between 60rpm and 2880rpm. The second stage consists of 3 speed steps. If the gear box is driven by 5kW, 1440rpm electric motor, draw [18]

- a) Structure diagram
- b) Ray diagram
- c) Speed diagram
- d) Gearing diagram and
- e) Determine number of teeth on gears in first stage.

SECTION - II

Q5)	a)	Discuss in brief the factors to be considered for optimum spacing betw spindle supports.	een [8]
	b)	What is preloading in bearings? With neat sketches explain the meth of preloading.	ods [8]
Q6)	a)	Explain dynamic characteristics of cutting process.	[9]
	.b)	What are the various sources of vibration in machine tools? Discuss methods to overcome these vibrations.	the [8]
Q7)	a)	Explain electrical automatic control system.	[8]
	b)	Explain the method of speed control with Ward-Leonard system.	[8]
Q8)	a)	What is the use of anthropometric data in design of control systems'	?[8]
	b)	Explain the ergonomic considerations applied to the location of disp and control members.	olay [9]

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S - 398 Total No. of Pages : 3

B.E. (Mech.) (Part - IV) (Semester - VIII) Examination, May - 2015 MECHATRONICS (Revised) (New)

Sub. Code : 49417

Day and Date : Tuesday, 05 - 05 - 2015

Total Marks: 100

Time : 2.30 p.m. to 5.30 p.m.

Instructions :

Seat No.

- s: 1) Answer any three questions from each section.
 - 2) Figures to the right indicate full marks.
 - 3) Assume if necessary suitable data and state them clearly.
 - 4) Draw neat labeled diagram wherever necessary.
 - 5) Use of non programmable calculators is permissible.

SECTION - I

- Q1) a) Give various definitions of Mechatronics and explain the concept w.r.t.
 a pick and place Manipulator. [8]
 - b) Design and explain with all detailed parameters conceptually for 'soft drink bottle counting. From conveyer belt mechanism' with the help of photoelectric switch.
- (Q2) a) Explain unidirectional and bidirectional buffer with pin diagram. [8]
 - b) What is multiplexing? Explain this concept with proper examples. [8]
- Q3) a) Draw pin diagram of 8051 and explain in short its working. [8]
 - b) Explain 'sensors and condition monitoring'. [8]

Q4) Write notes on (any three):

- a) Operational amplifiers
- b) Pressure and Level switches with different recent uses
- c) Use of encoders
- d) Jk flip-flop

P.T.O.

[18]

[4]

SECTION - II

- Q5) a) 'a PLC is computer based controller that uses inputs to monitor a process and uses out puts to control a process using a programme "justify the statement.
 - b) Explain different types of switches used in PLC and its symbol. [4]
 - c) Draw ladder diagram of EX-OR gate.
- Q6) a) Prepare a ladder diagram for automatic mixing process in industry from the description given below [8]



- i) Open valve VA1 until level 1 is reached for the first liquid
 - ii) Close valve VA1
 - iii) Open valve VA2 until level 2 is reached for the second liquid
 - iv) Close valve VA2
 - v) Start the agitator MS1 for 1 minute and stop
 - vi) Open valve VA3 for 2 minutes to empty the mixed liquid
 - vii) Repeat or end the mixing process as per requirement.

[18]

- b) Prepare ladder diagram from the condition given below and also derive a Boolean equation for the same- [8]
 - i) Input 1 is to OFF
 - ii) Input 2 or 3 is to ON
 - iii) Input 4 and 5 both are to ON
 - iv) One or more of the imputs 6, 7 or 8 is to ON, to turn ON MOTOR1.
- Q7) a) Explain dealy-ON-timer relay and delay-Off -timer relay with timing diagram and symbol.
 [8]
 - b) Draw PLC ladder logic to control following operation- [8]
 - i) Pressing any of the three switches A/B/C will turn LAMP ON
 - ii) If switch D master control switch is ON it turns LAMP OFF and turns BUZZER ON and none of the three switches have any control.

Q8) Write short notes on (any three):

- a) Scan-Update-Scan cycle with respect to PLC
- b) ATC/APC as a mechatronic system
- c) System block diagram of PLC
- d) Always ON and Always OFF contact
- e) Selection criteria for PLC

-3-

S - 1345 Total No. of Pages : 2

B.E. (Mech.) (Semester - VIII) Examination, May - 2015

MEMS

Sub. Code: 49421

Day and Date : Tuesday, 12 - 05 - 2015

Total Marks: 100

Time : 02.30 p.m. to 05.30 p.m.

Scat No.

Instructions : 1) Attempt any three questions from each section.

- 2) Figures to right indicate full marks.
- 3) Assume necessary data if required.

SECTION - I

01)	a)	Differentiate dry etching and wet etching.	[8]
	b)	List the applications of MEMS in industries. Explain any two in detail.	10]
02)	a)	Discuss chemical vapor deposition techniques in mems.	[8]
~	b)	Discuss different steps in surface micromachining with the example	e of
	0)	poly silicon cantilever beam.	[8]
02	-	Evaluin fabrication of microstructures using polymeric compounds L	GA
(23)	a)	Process.	[8]
	b)	Discuss Piezoresistors and piezoelectric crystals.	[8]
04	(a (Explain the photolithography applied to Microsystems.	[8]
2.1	b)	Provide a detailed note on the production of single crystal silicon.	[8]

SECTION - II

05)	a)	Explain the working principle of micro accelerometers in detail.	. [8]
-	b)	Discuss different sensors used in MEMS industry. Explain any	two in
	-1	detail.	[10]

- Q6) a) List out and discuss the design considerations of Microsystems. [8]
 b) With the help of suitable sketches explain micromotors and grippers.[8]
 Q7) a) Explain different actuating principles used in microactuators. [8]
 b) Discuss different micro pressure sensors used in MEMS industry. [8]
 Q8) Write short note on : [16]
 a) Micro pump
 - b) Shape memory alloys
 - c) Micro valves.
 - d) Levels in MEMS packaging

030303

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Total No. of Pages : 3

Seat No.

B.E. (Mechanical) (Part - II) (Semester - VIII) Examination, April - 2016

MECHATRONICS (Revised) (New)

Sub. Code : 49417

Day and Date : Sunday, 17 - 04 - 2016

Total Marks: 100

Time : 3.00 p.m. to 6.00 p.m.

Instructions: 1) Answer any three questions from each section.

Figures to the right indicate full marks.

3) Assume suitable data if necessary and state clearly.

SECTION - 1

<i>Q1)</i> a)	Define Mechatronics. Explain the integration of various syste	ms w.r.t.
	pick and place robot.	[8]
b)	Differentiate between microprocessor and microcontroller.	[8]

Q2) a) Suggest suitable sensors for sensing following quantities; also state the transduction principle of the sensor suggested by you.
 [8]

- i) Acceleration
- ii) Temperature
- iii) Fluid level
- iv) Displacement
- b) What are different signal conditioning processes? Explain any one in detail.
 [8]
- Q3) a) Draw a labeled diagram of architecture of microprocessor (µP)-8085.[8]
 - b) Explain in detail the terms related to interfacing input output ports. [8]

Q4) Write notes on (any three):

P - 355 [18]

- a) Boolean Algebra
- b) Flip flops
- Op-Amp as summing amplifier
- d) Multiplexing
- Number systems in digital logic

SECTION - II

- Q5) a) Draw a labeled block diagram of PLC and explain each component in detail.
 [8]
 - b) Define Programmable Logic Controller (PLC). State the advantages, limitations and applications of PLC. [8]
- Q6) a) In a PLC based automatic ball sorting system, there are three types of balls viz. metal, plastic and glass, are to be sorted. If metallic ball is sensed, actuator A 1 will be actuated and will retract touching the limit switch LS1. If plastic ball is sensed, actuator A2 will be actuated and will retract touching the limit switch LS2. If the ball is of glass, no actuators would be actuated. When the balls in the hopper are reduced below low level, a RED Light should glow along with a buzzer so the operator would fill it to get a continuous sorting operation.
 - Explain Up counter and Down counter with the symbol and applications.
 [8]
- Q7) a) For a PLC based tea and coffee vending machine explain the role of following elements: [8]
 - i) Timers
 - ii) Counters
 - iii) Internal Relays
 - b) Explain Physical components Vs Program components with the help of example. [8]

Q8) Write notes on (any three) :

P - 355 [18]

- a) Fail Safe Circuit
- b) Symbols used in ladder programming with addressing
- c) Disagreement circuit and Latching circuit
- d) AND-OR and OR-AND circuit
- e) Selection criteria for PLC



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Seat No. ≤ ⊂ ij # 1

B.E. (Mechanical) (Semester - VIII) Examination, April - 2016 INDUSTRIAL ENGINEERING

Sub. Code : 49418

Day and Date : Wednesday, 20 - 04 - 2016

Total Marks : 100

Time : 3.00 p.m. to 6.00 p.m.

- Instructions : 1) Solve any three questions from section I and any three questions from section - II.
 - 2) All questions are to be written in the same answer book.
 - 3) Figures to the right indicate full marks.
 - 4) Assume suitable data if necessary and state it clearly.

SECTION - 1

- Q1) a) State the tools and techniques of plant layout and explain any one.
 (8) Explain various functions of PPC.
 (8)
- Q2) a) Explain line balancing and machine selection with respect to process planning. [8]
 - b) From the following correlation, establish forecast for 60 lakhs students.

[8]

No. of students (lakhs)	15	22	25	36	42
Sales of books (hundreds)	65	80	96	130	185

Q3) a) Consumption of keys is 2000 per month. Each key cost Rs. 5/-. For placing order it costs Rs. 50/- and to stock keys costing is 10% of cost of key. Factory works for 300 days in year. Procurement time is 5 days and safety stock is 300 keys. [10]

Find

- Economic order quantity,
- ii) Number of orders,
- iii) Minimum and maximum stock,
- iv) Reorder point,
- v) Total cost including material.

b) Explain make or buy decision technique.

P.T.O.

[6]

P - 356

[8]

- Q4) a) Select proper material handling system for transporting coal from receiving station of furnace of steam power plant with justification.
 [8]
 - b) From the following data draw network, determine critical path, project duration and floats of all activities. [10]

Activity	1-2	1-3	1-4	3-5	4-5	5-6	2-6	5-7	7-8	6-8	8-9
Duration	8	5	13	12	6	7	6	9	2	8	6

SECTION - II

Q5) a) What is excess work content and explain various causes of excess work [8]

b) What is value and how the value can be subdivided?

- Q6) a) Explain method study symbols and draw a flow process chart using these symbols. [8]
 - b) What is micromotion study? Explain use of therbligs and SIMO chart ir micromotion study. [8]
- Q7) a) From the following cumulative stop watch measurement data find ou standard time and output for 8 hr. shift considering total allowance o 15%. Also calculate efficiency for actual output of 280. Eliminati erroneous readings.

	Cycle in min.				
Element	1	2	3	4	P.R.
1	0.45	1.82	3.37	5.00	80
2	0.80	2.18	3.75	5.80	100
3	1.32	2.75	4.30	6,35	120
4	1.52	2.97	4.54	7.00	130

b) State the applications of ergonomics and what is ergometer and its type: [8] Q8) a) What are possible methods of job evaluation, explain any one. [8]

- Work sampling study shows total number of observations 6000 in which idle were 400 times. Performance rating is 90%. Total number of parproduced 1000. Allowances 15%. Study time duration was 5000 minutes
 - Calculate
 - i) Standard time.
 - ii) Estimate accuracy at 95% level of confidence.
 - iii) If desired accuracy is 5% comment on result.

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Total No. of Pages : 2

Total Marks: 100

Seat No.

B.E. (Mechanical) (Part - IV) (Semester - VIII) Examination, April - 2016

POWER ENGINEERING

Sub. Code : 49419

Day and Date : Friday, 22 - 04 - 2016

Time : 03.00 p.m. to 06.00 p.m.

Instructions :

- 1) Solve any three questions from each section.
 - 2) Figures to the right indicate full marks.
 - 3) Assume suitable data if necessary.

SECTION - I

Q1)	a)	Explain in detail the factors considered for the selection of site for	Hydro
		electric power plant,	[8]
	b)	Explain the present power position in India & in Maharashtra.	[8]
Q2)	a)	Explain various tariff methods.	[8]
	b)	The energy consumption of a consumer per month is 2300KW-F	Ir. The

- b) The energy consumption of a consumer per month is 2300K w-Hr. The maximum demand is 12KW. Using Hopkinson demand rate as given below, Find : [8]
 - i) Monthly bill of the consumer and unit energy cost,
 - ii) Lowest possible bill for a month of 30 days and unit energy cost for the given energy consumption.

The Hopkinson charges are:

Demand Rates;	0-5 KW = Rs. 200/KW
	6-10 KW = Rs. 150/KW
	11-15 KW = Rs. 120/KW
Energy Rates:	First - 100 KW-hr = Rs. 2 KW-hr.
	Next - 500 KW-hr = Rs. 1.5 KW-hr
	Next - 2000 KW-hr = Rs. 1.0 KW-hr

Excess over 2000 KW-hr = Rs. 0.8 / KW-hr

		- 33/
<i>Q3)</i> a)	Explain the Nuclear power plant with neat sketch along v characteristics.	with its [8]
b)	Differentiate peak load plants & base load plants.	[8]

[18]

[18]

- Q4) Write short notes on the following: (Any Three)
 - a) Thermoelectric steam plant.
 - b) Combined cycle power plant.
 - c) Pumped storage plants.
 - d) Load duration curve.

SECTION - II

- Q5) a) What is the importance of measurements with respect to power plants? Explain the techniques used for measurement of water purity. [8]
 - b) Explain the measurement of smoke & dust by reflected dust monitor. [8]
- Q6) a) What are the methods used to control 'NO,' in the flue gas? Explain any one. [8]
 - b) Explain in detail maintenance procedures of thermal power plants. [8]
- Q7) a) What are the methods used to store the thermal energy? Explain any one. [8]
 - b) Define collection efficiency for 'ESP'. Explain its working & construction by drawing a neat sketch.
 [8]
- Q8) Write short notes on (Any three) :
 - a) Acid Rain
 - b) Dosimeter
 - Energy Management techniques
 - d) Power plant maintenance.



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			P - 359
Seat No.	1	T	otal No. of Pages : 2
B.F	E. ((Mechanical) (Part - IV) (Semester - VIII) April - 2016	Examination,
N	110	CRO ELECTRO MECHANICAL SYSTEM (I	Elective - III)
		Sub. Code : 49421	
Day Time Instr	and e : 0 ucti	I Date : Sunday, 24 - 04 - 2016 3.00 p.m. to 06.00 p.m. ons : 1) Attempt any three questions from each section. 2) Figures to the right side indicate full marks.	Total Marks : 100
		SECTION - I	
Q1)	a)	Differentiate microsystem and microelectronics.	[8]
	b)	What is ideal material for substrate? What is its manufac	cturing process?[8]
Q2)	a)	Explain Ion implantation and diffusion.	[8]
	b)	How sputtering is different than epitaxy?	[8]
Q3)	a)	What is LIGA?	[8]
•	b)	What are pressure sensors?	[8]
Q4)	W	rite short notes on :	[18]
	a)	Piezoresistors and Piezoelectricals	
	b)	CVD	
	c)	Photolithography	

D	2	5	0
r -	2	ω	2

SECTION - II

Q5)	a)	Explain micromotors and micropumps.	[8]
	b)	Describe microvalves and shape memory alloys with applications.	[8]
Q6)	a)	What are parameters involved in interfacing?	[8]
	b)	Explain Mechanical design in MEMS.	[8]
Q7)	a)	What are general considerations in packaging design?	[8]
	b)	What is sealing and three dimensional packaging?	[8]
Q8)	Wri	te short notes on :	[18]
	a)	Levels in packaging	
	b)	Electro osmosis and electro phoretic osmosis	
	c)	Surface bonding	



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B.E. (Mechanical) (Semester - VIII) Examination, April - 2016 ENTERPRISE RESOURCE PLANNING (Elective - IV)

Seat

No.

Sub. Code : 49424

Day and Date : Tuesday, 26 - 04 - 2016 Time : 03.00 p.m. to 06.00 p.m. Total Marks: 100 Instructions : 1) Solve any Six questions. 2) Figures to the right indicate full marks. Define ERP. Discuss in brief the various reasons for growth in ERP Q1) a) market. Discuss in brief how the business integration is achieved by ERP b) system. Discuss in brief the advantages and limitations of BPR. (22) (a) What is DSS (Decision Support System)? How it is evolved? Discusa-D) in brief the characteristics of DSS.

Discuss in brief the significance of MRP in modern manufacturing. Q3) a) Discuss closed loop MRP. [8]

What is JIT (Just In Time)? Discuss in brief the applicability of JIT b) philosophy in modern manufacturing. [10]

What are the various modules of ERP? Discuss in brief the Quality Q4) n) management module. 8

Explain the functioning of ERP for reduction in lead time. b): [8]

P.T.O.

181

[8]

[8]

[8]

P - 362

181

[8]

[8]

[8]

[8]

[18]

Discuss in brief various tangible and intangible benefits of ERP system.[8] Q5) a) What are the various activities involved in maintenance management? b) Discuss in brief how they are incorporated in ERP? What are the various phases in ERP implementation? Discuss in brief (26) a) the package evaluation phase. Discuss in brief the purpose and significance of Gap Analysis in ERP b) implementation life cycle. Discuss in brief the ERP market potential in India as compared to Q7) III international level. Discuss in brief the ERP package implementation case study for b) PEOPLESOFT ERP package giving brief account of product & technology and system features.

Q8) Write short notes on (Any THREE)

- a) MIS (Management Information System)
- Causes of ERP failures. b)
- ¢) SCM (Supply Chain Management)
- d) End user training in ERP
- DRP (Distribution requirement Planning) e)

6000

-2-

P - 363 Total No. of Pages :2

Seat No.

B.E. (Mechanical) (Semester - VIII) Examination, April - 2016 CRYOGENICS

Sub. Code : 49425

Day and Date : Tuesday, 26 - 04 - 2016.

Time : 03.00 p.m. to 06.00 p.m.

Total Marks : 100

- Instructions: 1) Attempt any three questions from each section.
 - 2) Figures to the right indicate full marks.
 - 3) Assume suitable data and assumptions if required.

SECTION - 1

- Q1) a) What is Cryogenics? Explain the role of cryogenic fluids in engineering field. Show the position and range of the cryogenic temperature on logarithmic scale.
 [8]
 - Explain the behavior of materials at low temperatures in terms of their mechanical and thermal properties. [8]
- Q2) a) Draw schematic diagram of an Ideal liquefaction system, also represent it on T-S diagram and develop expression for work requirement per unit mass of gas compressed. [10]
 - b) Give a brief account of electrical and magnetic properties on the material over cryogenic temperature range? [8]
- Q3) a) What are the different pay off functions to indicate the performance of liquefaction systems. [4]
 - b) Explain the different principles used in production of low temperatures.
 [8]
 - c) What is the difference between liquefaction system and refrigeration system. [4]
- Q4) a) Give detailed classification of Pulse Tube Cryocooler. [8]
 - b) Explain the working of a Stirling/Philips refrigeration system with the help of a schematic diagram and T-S plot and write expression for its COP. [8]

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SECTION - II

Q5)	a)	Discuss the principles of Gas Separation.	[0]
	b)	Explain with neat sketch Linde single column separation system.	[8]
06)	a)	With help of a diagram explain the principle and working	[8]
		i) Constant volume gas Thermometer.	
		ii) Magnetic Thermometer.	
	b)	Explain cryogenic liquid level measurement by using	[8]
		i) Electrical Resistance gauge.	
		ii) Capacitance liquid level probes.	
Q7	') a)	Draw a neat sketch of Dewar Vessel and explain the functions of eler of the vessel.	nents [8]
	b)	State the various types of insulations used in cryogenic-fluid sta vessel and explain any two of them.	orage [8]

Q8) Write short note on (Any Three)

[18]

- a) Cryogenics in space Technology.
- b) Cryogenics in Biology.
- c) Cryogenics in Medicine.
- d) Super conducting Devices.

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Seat No.

B.E. (Mechanical) (Part - IV) (Semester - VIII) Examination, April - 2016

INDUSTRIAL AUTOMATION AND ROBOTICS (Elective - IV)

Sub. Code : 49546

Day and Date : Tuesday, 26 - 04 - 2016.

Time : 03.00 p.m. to 06.00 p.m.

Total Marks : 100

- Instructions : 1) Answer any three questions from section I and any three questions from section II.
 - 2) Answer to the two sections should be written in the same answer book.
 - Figures to the right indicate full marks.
 - 4) Draw neat diagrams wherever necessary.

SECTION - I

- Q1) a) Explain the three phases of a typical automation strategy. [8]
 - b) Explain the five levels of automation in a production plant. [8]
- Q2) a) Explain the control functions in the operation of an automated transfer line.
 [8]
 - b) Explain the following with respect to continuous control system. [8]
 - i) Regulatory control
 - ii) Feed forward control
- Q3) a) Explain with a suitable example 'low cost automation'. [8]
 - b) Explain the linear transfer system in automated production lines. [8]

P - 365 [18]

Q4) Write short notes (any three)

- a) Inline transfer devices.
- b) Dial indexing mechanism.
- Automation migration system. c)
- d) Fix and programmable automation.
- Closed loop control system. e)

SECTION - II

Q5)	a)	Explain the following dynamic properties with respect to robot.	[8]
		i) Spatial resolution	3.273
		ii) Load carrying capacity	
		iii) compliance	
	b)	Explain the factors to be considered in robotic work cell design.	[8]
Q6)	a)	Explain the application of robot in processing industries.	[8]
	b)	Explain the different methods of defining positions in space to act the robot arm and wrist.	uate [8]
Q7)	a)	Explain the remote centre compliance device in robot assembly.	[8]
	b)	Explain the functions performed by work cell controller.	[8]
Q8)	Wri	ite short note (any three)	[18]
	a)	Tactile sensors in robot.	
	b)	Robot motion interpolation.	

- Application of robot in material handling. c)
- d) Machine interference in robot design.
- Robot programming language VALII. e)

2-2-

S - 1343Total No. of Pages : 3

Seat No.

B.E. (Mech.) (Semester - VIII) Examination, May -2015 POWER ENGINEERING (Revised)

Sub. Code : 49419

Day and Date : Saturday, 09 - 05 - 2015

Total Marks : 100

Time : 02.30 p.m. to 05.30 p.m.

Instructions: 1) Solve any three questions from each section.

> Figures to the right indicate full marks. 2)

3) Assume data if necessary.

SECTION - I

- Explain in detail the factors considered for the selection of site for hydro (01) a) electric power plant. 181
 - b) Discuss the role of NTPC in power development and present status of thermal power generation in India. [8]
- Explain the working of a nuclear power plant. What are the different fuels (02) a) used in such a power plant? [8]
 - A power station has to supply load as follows. b)

[8]

Time	0-6	6-9	9-18	18-21	21-22	22-24
(Hrs)						
Load(MW)	20	40	60	80	60	20

Draw load curve.

Draw load duration curve.

Choose suitable generating units to supply the load.

Calculate load factor, plant capacity factor.

- Q3) a) Enlist the private companies in power sector and explain any one in detail.
 [8]
 - b) A steam power station has an installed capacity of 120 MW and a maximum demand of 100 MW. The coal consumption is 0.4 kg per kWh and cost of coal is Rs.80 per tonne. The annual expenses on salary bill of staff and other overhead charges excluding cost of coal are Rs.50 × 10⁵. The power station works at a load factor of 0.6 and the capital cost of the power station is Rs. 4 × 10⁵. If the rate of interest and depreciation is 10% determine the cost of generating per kWh. [8]

04) Write short notes on (Any three):

- a) MHD power generation.
- b) Combined cycle power plant.
- c) Structure of IEGC.
- d) Pumped storage power plant.

SECTION - II

05)	a)	Explain magnetic wind method for measurement of oxygen in	1 flue gases.
-	100		[8]
	b)	Describe with neat sketch, the principle, construction and	working of
	1.54	superconducting magnetic energy storage device.	[8]

- (26) a) Describe the different methodologies of power plant maintenance. [8]
 - b) What are the methods used to control NO_x in the flue gas ? Explain any one.
 [8]
- 07) a) Describe with neat sketch measurement of smoke and dust in flue gases.[8]
 - b) What do you understand by thermal pollution? Explain the effects of thermal pollution. [8]

[18]

Q8) Write short notes on (Any three):

- a) Energy management and energy audit.
- b) Dosimeter.
- c) Electrostatic precipitator.
- d) Fuel cell.

S - 1343 [18]

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SC-55 Total No. of Pages : 2

Seat No.

> B.E. (Mech.) (Part - IV) (Semester - VIII) (New) Examination, November - 2019 MECHATRONICS Sub. Code : 68508

Day and Date : Wednesday, 13 - 11 - 2019 Time : 2.30 p.m. to 5.30 p.m.

Total Marks : 100

Instructions : 1) All questions are compulsory.

- 2) Answer to all questions must be written in one answer book.
- 3) Figure to the right indicate full marks to question.
- 4) Assume any data if necessary and state it clearly.

Q1) Solve any two of the following:

- Suggest a suitable sensor for sensing following quantities; also state the a) WK-12995 transduction principle of sensor suggested by you. [8]
 - i) Mass

ii) Cryogenic Temperature

iii) I.C. engine exhaust

iv) Blood Pressure

List sensors used in smart Phone and Explain any two. b)

- [8]
- Explain Digital to Analog converters (DAC) signal conditioning process. c)

[8]

[8]

Q2) Solve any two of the following.

- What is Interfacing? Explain following w.r.to. a)
 - i) Series Interfacing.
 - ii) Parallel Interfacing.

List operational amplifier, Explain Op Amp. Used in domestic Inverter.[8] b)

Discuss role of Multiplexer in Data Acquisition system. c)

P.T.O.

[8]

Q3) Solve any two of the following.

- What are flip flop circuits? Explain D flips flop. a) [8]
- Carry out Addition (27 + 5), Subtraction (73-15), Multiplication (37×3) b) and Division (295/7) For Two decimal Numbers in Binary numbers. [8]
- Discuss Instruction type and set, Addressing modes Microcontroller c) MCS 51. [8]

Q4) Solve any two of the following.

- Explain Internal relays and holding contacts with ladder programming a) diagrams. [8]
- Explain with neat sketch, ladder programme Traffic Lights Control signal b) system for four roads. [8]
- Discuss Mechatronics design of an automatic car park system c) [8]
- Differentiate Traditional Vs Mechatronic design and its impact on real Q5) a) life. [8]
 - Design the program for a pneumatic system for control by a PLC to give b) the cylinder sequence A+, B+, B-, A- and which will give a LED display indicating, in the presence of a fault such as a sticking cylinder, at which point in the cycle the fault occurred. Explain the action of all elements in the system. [12]

Q6) Solve any two of the following.

- This problem is essentially part of the domestic washing machine program. a) Devise a ladder program to switch on a pump for 100s. It is then to be switched off and a heater switched on for 50s. Then the heater is switched off and another pump is used to empty the water. [8]
- With the help of suitable block diagram, explain simple assembly task b) 5UK-72995 [8] involving a five parts. [8]

-2-

c) Write a note on PLC timer function with example. SUK-12299

SC - 58 Total No. of Pages : 2

Seat No.

B.E. (Mechanical) (Semester - VIII) Examination, November - 2019 ENERGY AND POWER ENGINEERING Sub. Code : 68509

Day and Date : Thursday, 14 - 11 - 2019 Time : 2.30 p.m. to 5.30 p.m. Total Marks : 100

SUK-AN369

[8]

- Instructions : 1) All questions are compulsory. 2) Figures to the right indicates full
 - 2) Figures to the right indicates full marks.
- Q1) a) What are the potential renewable energy sources? State the advantages and disadvantages. [8]
 - b) Define following terms (any four)
 - i) Solar Constant
 - ii) Solar insolation
 - iii) Declination angle
 - iv) Hour angle
 - v) Azimuth
 - vi) Latitude

OR

D)	State different types of solar collectors and its application	[8]
Q2) a)	Give different applications of PV Cells	[4]
b)	Give detail classification of fuel cells and its applications	Q[10]
c)	Differentiate between standalone and grid connected energy s	ystem [4]
1.5	Ster Ster	
9	5	P.T.O.

- Compare vertical axis and horizontal axis wind turbine SUK-A1368 [8] O3) a)
 - b) Define following terms (any four)
 - i) Cut Speed
 - ii) Rated Speed
 - iii) Bety Limit
 - Rotor Efficiency iv)
 - Cutout speed / furling speed v)
 - vi) Capacity factor
- O4) Answer any two
 - Classify the hydro electric power plants and explain any one in detail. a)
 - Describe the impact of co-generation plants in sugar industry on power b) scenario in Maharashtra.
 - Explain gas turbine-steam turbine combined power plant. c)
- Q5) a) Answer any two

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- Explain the magnetic wind method used for measurement of oxygen i) in flue gases.
- Differentiate between peak load plants and base load plants. ii)
- Explain with sketch the following loads: domestic, commercial, iii) industrial, municipal, irrigation, traction.
- A generating station has the following daily load cycle: b)

the second s			The substantian second			
ïme (Hours) :	0 - 6	6 - 10	10 - 12	12 - 16	16 - 20	20 - 24
oad (MW) :	40	50	60	50	70	40

Draw the load curve and find

- i) maximum demand
- Units generated per day ii)

load factor

SC - 58

[16]

[12]

[8]

- iii) average load and iv)
- Explain the process of energy audit in a commercial establishment. Q6) a) [8]
 - Discuss the issues of human resources in power sector. b) SUNA [6]

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SC - 61 Total No. of Pages : 3

Seat			
No.			

B.E. (Mech.) (Part - IV) (Semester - VIII) (Revised) Examination, November - 2019 NOISE AND VIBRATION Sub. Code : 68510

Day and Date : Friday, 15 - 11 - 2019 Time : 2.30 p.m. to 5.30 p.m. Total Marks: 100

[8]

[8]

- Instructions : 1) All questions are compulsory.
 - Assume suitable data whrever necessary.
 - Draw neat sketches wherever necessary.
- Q1) a) What is vibration? How vibrations are classified?
 - b) Find the natural frequency of system shown in figure considering mass of pulley. [8]



OR

A vibrating system is defined by following parameters;

m = 3kg, k = 100 N/m, c = 3 N-s/m *

Determine:

- The damping factor
- ii) The natural frequency of Damped vibrations
- iii) Logarithmic Decrement
- iv) The ratio of two consecutive amplitudes and
- v) The number of cycles after which the original amplitude is reduced to 20%
SC - 61

[8]

Q2) a) Explain Magnification factor and its frequency response curve. [8]

 b) Derive the equation of motion for system shown in figure. Also determine the equation for critical damping coefficient. [10]



Q3) a) Explain co ordinate coupling.

OR

With neat sketch explain Centrifugal Pendulum Absorber. [8]

 b) Determine the natural frequency of oscillation of the double pendulum as shown in figure. [8]

Take m1 = m2 = 5 kg, L1 = L2 = 0.25 m.



Q4) a) Explain Flexibility influence coefficient matrix, and stiffness ifluence coefficient matrix. [8]

OR

Derive the equation of motion for multi degree spring mass system. [8]

SC - 61

- b) Using Holzer's method, find the natural frequencies of the system shown in fig. 4b. Assume m₁ = m₂ = m₃ = 1kg and k₁ = k₂ = k₃ = 1 N/m. Solve up to four iterations. [10]
- Q5) a) Explain in brief with neat sketch the instruments Accelerometer, Vibrometer. State whether it is used to measure of displacement, velocity and/or frequency.
 - b) A vibrometer having a natural frequency of 5 rad/sec and ξ (Zeta) = 0.25 is attached to a structure that performs a harmonic motion. If the difference between the maximum and minimum recorded values is 10 mm, find the amplitude of motion of the vibrating structure when its frequency is 50 rad/sec.

Q6) Attempt any two

- Define the following terms : Sound pressure level, Sound power level, Sound intensity level and explain why we should need decibel sound level scale.
- b) Show that as the distance from a point source doubles, the sound intensity level increases by 6 dB?
- c) Explain non-auditory effects of noise on people.

×

-3-

x

x

Fig.4b

[16]

SC-64 Total No. of Pages : 2

Total Marks : 100

Seat No.

B.E. (Mechanical) (Semester - VIII) (Revised)

Examination, November - 2019 INDUSTRIAL ENGINEERING (Elective-III)

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Sub. Code : 68511

Day and Date : Tuesday, 19-11-2019

Time : 2.30 p.m to 5.30 p.m.

Instructions :	1)	All questions are compulsory.
	2)	Figures to the right indicate full marks.
	3)	Assume suitable data if necessary.
Q1) Attempt	any t	wo

a) Discuss the scope and objectives of industrial engineering? [8] b) What is productivity and explain its relationship with production [8]

c) Explain the various productivity measurement models [8]

Q2) Attempt any three

a)	Define work study and what are the components of work study?	[6]
b)	Explain how job is selected for method study	[6]
c)	Explain what is critical examination in method study	[6]
d)	Explain the construction and application of travel chart	[6]

Q3) Attempt any two

	P.7	ю.
c)	Compare cycle graph and chronocycle graph	[8]
b)	What is anthropometry? How anthropometry data is used in design	[8]
a)	What are the principles of motion economy	[8]

[8]

Q4) Attempt any two

- a) Why it is necessary to give allowances? What are different types of allowances? [8]
- b) What is work sampling? Explain briefly the steps in work sampling study
- A worker operating on a machine performs the following elements. The description of element, their observed time and ratings are given. Calculate standard time for the component (Unit in minutes) [8]

Element	Observed Time	Rating	Relaxation Allowances (%)
01	0.3	80	10
02 0.7		90	12
03 0.9		0.9 100	
04	0.9	80	10
05	0.12	110	11 50

Q5) Attempt any two

a)	Explain the modern trends in plant location	[8]
		191

- b) Explain the factors that influence the location for the sugar industries[8]
- c) Explain the procedure for plant layout [8]

Q6) Attempt any three

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a)	What is the difference between value engineering and value analysis	161
b)	What are steps involved in value analysis?	161
c)	Describe various methods of job description	161

d) What is merit rating and how it helps the industries [6]

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SC-67 Total No. of Pages : 2

Seat No.

B.E. (Mechanical)(Part-IV) (Semester - VIII)

Examination, November - 2019

ADVANCED I.C. ENGINES (Paper-VI) (Elective-III) Sub. Code : 68515

Day and Date : Tuesday, 19-11 - 2019

Total Marks : 100

Time : 2.30 p.m to 5.30 p.m.

Instructions :	1)	All questions are compulosry.
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Use of non programmable calculator is allowed.

3) Figures to the right indicates full marks.

Q1) Answer Any Two

- a) With a suitable sketch explain the starting & idling circuit of a Carter carburetor [8]
- b) What are the types of Recent Spark Plugs? Explain importance of Spark timing.
 [8]

c) Enlist fuel characteristics and explain S.I. Engine fuel rating [8]

- Q2) a) Explain Fuel spray behavior. What are the main factors affecting the penetration of fuel spray in Compression Ignition engine? [8]
 - b) What do you mean by Turbo lag? Explain advanced turbocharging method to overcome this difficulty. [8]

Q3) Write a short note on any three of following.

[3×6=18]

- Discuss turbulence characteristics of S.I. engine combustion
- b) Discuss thermodynamic analysis of S.I. Engine combustion
- c) Combustion Chamber optimization strategy for C.I. engine
- d) Different types of Indirect injection combustion chambers for C.I. engine.

P.T.O.

Q4) Answer Any Two:

- a) Give brief account of CNG used as alternative fuel, What modifications are required in engine to use CNG as fuel? Explain. [8]
- Explain the methods by which hydrogen can be used in SI and CI engine
 [8]
- c) What are the merits and Demerits of Alcohols as alternative fuel of I.C. engine? [8]
- Q5) a) Explain in detail construction & working of Flame Ionization Detector (FID) analyzer for measurement of HC [8]
 - b) Explain in detail construction & working of NDIR (Non-dispersive infrared) analyzer for measurement of CO & CO₂
 [8]

Q6) Write a short note on any three of following

[3×6=18]

- a) Euro emission norms
- b) Three way catalytic converter
- c) Low heat rejection engine.
- d) Lean burn engine

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Seat No.

B.E. (Mechanical) (Part - IV) (Semester - VIII) Examination, November - 2019 INDUSTRIAL AUTOMATION ANDROBOTICS (ELECTIVE - IV) Sub. Code : 68518

Day and Date : Wednesday, 20 - 11 - 2019 Time : 2.30 p.m. to 5.30 p.m. Total Marks: 100

- Instructions : 1) All questions are compulsory.
 - 2) Figures to the right indicate full marks.
 - 3) Make suitable assumption if necessary and mention them clearly.
- Q1) a) With neat block diagram explain basic elements of an automated system.[8]
 - b) Explain the features and applications of the following [8]
 - i) Flexible automation
 - ii) Programmable automation
 - iii) Fixed automation

OR

Explain the ten strategies for industrial automation and process development. [8]

- Q2) a) Explain the following with respect to continuous control system. [8]
 - i) Regulatory control
 - ii) Adaptive control
 - b) Explain analysis of transfer line without storage buffer. [8]
- Q3) a) Explain the different types of vibratory and non vibratory part feeder mechanisms in automated assembly. [8]
 - b) Explain the four automated assembly system configurations. [10]

P.T.O.

	SC ·	- 69
Q4) a)	Explain following terms with respect to Robot - Spatial resolution, I carrying capacity, Compliance, Precision of movement.	Load [8]
	OR	
	Explain factors to be considered in robot work cell design.	[8]
b)	Explain the common robot configurations and their work volumes.	[8]
Q5) a)	Explain following gripper mechanisms	[8]
	i) Magnetic grippers	
	ii) Vacuum grippers	
b)	Direct and inverse kinematics solutions in robotics.	[8]
Q6) a)	Explain a robot program as a path in space.	[8]
b)	Explain the powered lead through and manual lead through programm methods in robot.	ning
	10	

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SC-70 Total No. of Pages : 2

Seat No.

B.E. (Mechanical) (Semester - VIII) Examination, November - 2019 CRYOGENICS (Elective - IV) Sub. Code : 68519

Day and Date : Wednesday, 20 - 11 - 2019	Total Marks : 100		
Time : 2.30 p.m. to 5.30 p.m.			

Q1) a)	Explain in detail the specific applications of Cryogenics.	[6]
b)	Explain the ideal properties of Cryogenic fluids.	[5]

- c) Discuss the thermoelectric properties of material at cryogenic scale. [5]
- Q2) a) Explain in brief the various processes of expansion. [6]
 - b) Solve any Two of following.
 - i) FOM and different payoff functions.
 - ii) Explain with neat sketch ideal liquefaction system, using T-S diagram.
 - iii) Differentiate between simple Linde Hampson system and precooled Linde Hampson system.

Q3) Write short notes on (any three)

- a) Thermal properties of cryogenic material.
- b) Claude system for liquefaction of Hydrogen.
- c) Pulse Tube Cryocooler.
- d) Regenerative cryocoolers.
- e) G-M Cryocooler with neat sketch.

[10]

[18]

SC-70

Q4) a)	Explain with neat sketch ideal refrigeration system also discuss the Ste regenerative heat exchanger cycle, using T-S diagram.	rling [6]
b)	Draw the neat sketches of Solvay and G-M refrigeration systems.	[5]
c)	Differentiate between pulse tube Cryocooler and sterling Cryocoole	r. [5]
Q5) a)	Explain basic cryogenic fluid storage vessel with neat sketch.	[6]
b)	Solve any Two of following.	[10]
	i) Comparison of various insulations used in Cryogenic fluid stor	age.

- ii) Mechanical Vacuum pump.
- iii) Temperature composition diagram.

Q6) Write Short Notes on (any three)

- a) Design parameters of Dewar vessels.
- b) Principles of gas separation.
- c) Cryogenic air separation plants.
- d) Ion pumps.
- e) Principles of Rectifier column.

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-2-

[18]

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Total No. of Pages : 2

Seat				
No.				
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B.E. (Mech.) (Part - II) (Semester - VIII) Examination, November - 2018 MECHATRONICS (New) Sub. Code : 68508

Day and Date : Monday, 12 - 11 - 2018

Time : 10.00 a.m. to 01.00 p.m.

Total Marks : 100

Instructions: 1) All questions are compulsory

- Answer to all questions must be written in one answer book.
- 3) Figures to right indicate full marks to question
- Assume any data if necessary and state it clearly

Q1) Solve any two of the following.

- a) Explain role of measurement system in Mechatronics system. [8]
- b) List Velocity sensors. Discuss Tachogenerator. [8]
- c) Suggest suitable two sensors for each with Justifications to sense. [8]
 - i) Pressure
 - ii) Flow.

Q2) Solve any two of the following.

a)	Explain with suitable circuit the concept of analog to digital conversion		
	(ADC).	[8]	
b)	What are types of wave forms? Discuss any two types.	[8]	
c)	Explain buffer and hand shaking with sketch.	[8]	

Q3) Solve any two of the following.

a)	Compare mechanical system and Mechatronics system architecture, applications, advantages and limitations.	w.r.t.	design, [8]
b)	Explain pin diagram of 8051.		[8]
c)	Discuss Digital Circuit and logic gates.		[8]

P.T.O.

- Q4) Solve any two of the following.
 - a) Explain Basic components and other symbols of PLC and merits of PLC.
 [8]
 - b) With the help sketch explain disagreement circuit and nesting of ladders.[8]
 - c) Discuss Fail safe circuit with industrial application.
 [8]
- Q5) Solve the following
 - a) Compare Microprocessor and Microcontroller and discuss organization of microcontroller system. [8]
 - b) Draw a physical wiring diagram and Ladder programming diagram for logic gates [12]
 - i) OR logic
 - ii) AND logic
 - iii) AND and OR logic

Q6) Solve any two of the following.

- a) Devise a ladder program that can be used with a solenoid valve controlled double acting cylinder. i.e. a cylinder with a piston which can be moved either way by means of solenoids for each of its two positions, and which moves the piston to the right, holds it there for 2 s and then returns it to the left. [8]
- b) Explain SCADA and its application. [8]
- c) Design a Mechatronic System for Part loading and unloading. [8]

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SE - 102 Total No. of Pages : 2

	4.

B.E. (Mech.) (Part - IV) (Semester - VIII) (Revised) Examination, November - 2018

ENERGY AND POWER ENGINEERING

Sub. Code : 68509

Day and Date : Tuesday, 13 - 11 - 2018

Total Marks : 100

Time : 10.00 a.m. to 01.00 p.m.

- Instructions : 1) All questions are compulsory.
 - 2) Figure to the right indicates full marks.
 - 3) Make suitable assumptions if required and state them clearly.
- Q1) a) Attempt any Two.
 - Compare cylindrical parabolic and concentrating paraboloid solar collector on the basis of
 - I) Temperature
 - II) Concentration ratio
 - III) Suitability
 - IV) Expected life
 - V) Cost
 - ii) What do you understand by energy storage? Which type of energy storage systems are suitable for peak shaving in electrical utility?
 - Draw a neat sketch of flat plate collector and analyse its use for different application.

b) Solve the following :

Calculate Local Apparent Time (LAT) and declination at a location latitude 16.7° N, longitude 74.24° E at 12.30 IST on July 24.Equation of time correction= - (1'06")

Q2) Attempt any two from the following.

- With the help of block diagram explain the operation of stand alone solar system with battery with AC and DC load.
- b) Explain the I-V characteristics of a solar cell. What is effect of temperation on the performance of solar cell?
- c) Classfy Fuel for fuel cells and write different applications on the basis of fuel used?

P.T.0

[10]

[8]

[16]

[16]

Q3) Attempt any two.

- How the wind mills are classified? Explain with schematic diagram of a a) HAWT?
- b) Discuss the working principle of closed cycle OTEC plant with neat sketch. Write their advantages and disadvantages.
- c) Explain with neat sketch hybrid wind -biomass power plant. State their advantages.

Q4) Answer any two.

- Discuss in brief the power generation in private sector in India. a)
- b) Explain with neat sketch the combined cycle power plant.
- c) Discuss in detail the Indian Electricity Grid Code.
- (05) a) Solve the following :

The cost of water softener plant used is 1,20,000 Rupees when newly installed. The life of the plant is considered as 10 years. The salvage value of the plant will be 8% of its cost when newly installed. The repair, maintenance and labour costs of the plant per year are 8000 Rupees. The cost of chemical used per year is 5000 Rupees. Taking interest on sinking fund as 8%, find the annual cost of the plant.

b) Solve any one :

- Compare and contrast peak load and base load plants i)
- ii) Describe with neat sketch construction and working of ESP

06) Write short notes on (Any two)

a) Energy marketing

SUK-95855

- b) Navigating the financial, legal and accounting environment in power sector
- c) Human resource in power sector

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-2-

[16]

[12]

[14]

SUK-9595

[8]

SE - 103 Total No. of Pages : 3

Seat		
No.		

B.E. (Mechanical) (Part - IV) (Semester - VIII) Examination, November - 2018 NOISE AND VIBRATION

Sub. Code : 68510

Day and Date : Wednesday, 14 - 11 - 2018

Total Marks : 100

Time : 10.00 a.m. to 01.00 p.m.

Instructions :

- 1) All questions are compulsory.
- 2) Use of scientific calculator is allowed.
- 3) Assume suitable data wherever necessary and mention it clearly.
- Q1) Solve any two of the following :
 - a) Show that equivalent mass of simple spring mass system subjected to free vibration is summation of main mass and one third of mass of the spring.
 - b) Find the natural frequency of the system shown in Fig. No.1. Take G = 8.4×10¹⁰ N/m³. In order to get natural frequency 50 Hz, what must be shaft diameter? [8]



Figure No. 1

Figure No.2 shows a pulley of mass M pivoted at its centre. Mass 'm' vibrates with small amplitude from its mean position. Find the natural frequency of the system in terms of given parameters. [8]



Figure No.2

P.T.O.

SE - 103

- Q2) a) Show that the reduction in vibration amplitude after one complete cycle of single degree free vibration with friction damping is 4F/k, where F = frictional force between mass and surface and k = stiffness of the system.
 [8]
 - b) In a spring, mass, friction damper system it has been observed that the amplitude of vibration decreases by 75% of initial value of 10 cm after 5 consecutive cycles. determine friction coefficient of friction damper if stiffness of the spring is 2000N/m and mass is 5 kg. [8]

OR

- b) Spring-mass-damper system is having a mass of 10 kg and a spring of such stiffness which causes static deflection of 5mm. The amplitude of vibration reduces by 75% to that of initial value in 10 cycles. Determine logarithmic decrement, damping present in the system and damped natural frequency. [8]
- Q3) a) Show that the magnification factor of spring-mass-damper system subjected to harmonic exciting force F_a Cos ot is given by-[9]



b) A mass of 6kg is suspended by a spring of stiffness 1200N/m is forced to vibrate by a harmonic force of 9N. Assuming viscous damping coefficient c = 70 N-s/m determine amplitude at resonance, frequency corresponding to peak amplitude peak amplitude. What would be the phase angle at resonance? [8]

OR

 b) Determine natural frequencies and mode shape of the system shown in Figure No.3.
 [8]



-2-

SE - 103

What is vibration absorber? What principal is used in dynamic vibration (04) a) absorber? [8]

OR

Describe Holzer's method used to determine the natural frequencies of three rotor system. [8]

b) By using matrix iteration method determine first natural frequency and corresponding mode shape of the following system (Figure No.4) [9]



- What are the steps involved in vibration condition monitoring? How the Q5) a) vibration monitoring helps to carry out preventive maintenance of rotating machines. [8]
 - What is FFT analyzer? What facilities are available in modern FFT b) [8] analyzer.
- What is decibel scale? What is its importance? How are the incoherent Q6) a) sound pressure levels added? [9]
 - What is octave and 1/3rd octave band analysis? What is use of this analysis b) in noise control? [9]

OR

Show that if distance from a point source doubled, the sound intensity b) level decreases by 6dB.

 $\nabla \nabla \nabla \nabla$

-3-

SE - 104 Total No. of Pages : 3

Total Marks: 100

Seat No.

B.E. (Mechanical) (Revised) (Semester - VIII) Examination, November- 2018

INDUSTRIAL ENGINEERING (Elective - III)

Sub. Code : 68511

Day and Date : Thursday, 15 - 11 - 2018

Time : 10. 00 a.m. to 01.00 p.m.

- Instructions : 1) All questions are compulsory.
 - 2) Figures to the right indicate full marks.
 - 3) Assume suitable data, if necessary.

Q1) Attempt any three:

- a) Explain characteristics of mass production system. [6]
- b) Explain effects of increases or decrease in production on productivity. [6]
- c) Mention the reasons for poor productivity.
- d) Comparative study of a automobile components for the year 2017 and 2018 are given in the table below. Compute the changes in material productivity. [6]

Particulars	2017	2018
Output (in Units)	65,000	85,000
Material input (in Rs.)	12,200	14,400

Q2) Attempt any four:

- a) Why method study should proceed work measurement. [4]
- b) Define work study. Explain the procedure of work study? [4]
- e) Explain construction and application of operation process chart with suitable example. [4]
- d) Draw two handed process chart for assembly of nut and bolt. [4]
- e) State the types of flow process chart with one application of each. [4]

P.T.O.

[6]

6

Q3) Attempt any two:

- a) State examples of principles of motion economy as related to design of tools and equipment.
 [8]
- b) What are therbligs? State its importance. Give the name, abbreviation, symbol and explanation of any 4 Therbligs. [8]
- c) Discuss various factors related to work place design. [8]

Q4) Attempt any three:

- a) Explain the following terms.
 - i) Fatigue allowance
 - ii) Performance rating

.0	Cycle	e time (in	Performance			
Elements	1	2	2 3	4	Rating in %	
А	7.2	7.6	6.8	7.2	115	
В	14	14.4	14.8	14	90	
С	10	10.4	10.8	11.2	100	
D	24,4	24.8	24	24.8	110	
E	16.8	16.4	17.2	17.2	105	

b) In the following table, times shown are stopwatch readings in minutes.[6]

Relaxation allowance as 10% Estimate the standard time of operatios and production per 8 hours of shift.

- c) What are the precautions to be taken during stop watch study? [6]
- d) Where work sampling can be useful in the area of production? [6]

Q5) Attempt any two:

	a)	Name and discuss the factors which you need to consider for the of site of textile industry.	selection [8]
	b)	How are the plant layouts related to type of production?	[8]
	c)	Which type of layout do you recommend for a manufacturi used in IC engine? Give reasons.	ng piston [8]
Q6,	Wr	ite short notes on any four:	

a)	Classify value. Explain each type of value.	[4]
b)	Value analysis of a motorcycle.	[4]
c)	Paired comparison method of merit rating.	[4]
d)	Job description.	[4]
e)	Job specification for supervisor of a machine shop.	[4]

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Sea	t	SE -1	08
No		rotar No. of Page	5:1
B.E	.(M INI	echanical) (Elective-IV) (Semester-VIII) Examination, November-20 OUSTRIAL AUTOMATION AND ROBOTICS (Paper - C))18
Day Tim Inst	and ie : 1 ructio	Date : Friday, 16- 11 - 2018 0.00 a.m. to 01.00 p.m. ons : 1) All questions are compulsory. 2) Figures to the right indicate full marks. 3) Make Suitable assumption if necessary and montion them elsewhere	100
~ ~		· · · · · · · · · · · · · · · · · · ·	£.
Q1)	a)	Explain three phases of typical automation strategy.	[8]
	b)	Discuss with an appropriate example the concept of levels of automati	on.
			[8]
	b)	Explain low cost automation with more than the	
001	~	Explain low cost automation with example and its advantages.	[8]
Q2)	a)	 Explain the following with respect to continuous control system: Regulatory control Adaptive control 	[8]
	b)	Explain different system configurations of an automated production li	ne. [8]
Q3)	a)	Explain the concept of product design for automated assembly. OR	[8]
	a)	What are the hardware components of a workstation part delivery system?	[8]
	b)	Explain various vibratory and non-vibratory devices for feeding a orientation. [1	nd 01
Q4)	a)	Explain following terms with respect to robot - Spatial resolution, Lo carrying capacity, Compliance, Precision of movement.	ad 8]
	a)	Explain types of joints in industrial robots.	81
	b)	Explain the common robot configurations and their work volumes.	81
Q5)	a)	Explain tactile sensors, proximity and range sensors, position and veloci sensors.	ity
	b)	Explain robot end effecter interface.	8]
Q6)	a)	Explain a robot program as a path in space.	8]
	b)	Explain the two lead through programming methods in robot. [1	0]

1

SE -109 Total No. of Pages : 2

Seat No.

Instructions :

B.E. (Mechanical) (Elective-IV) (Semester -VIII) Examination, November - 2018 CRYOGENICS

Sub. Code : 68519

Day and Date : Friday, 16-11 - 2018

Total Marks : 100

Time : 10.00 a.m. to 01.00 p.m.

- All questions are compulsory.
- Figure to right indicate full marks.
- 3) Make Suitable assumption if necessary and mention them clearly.
- Q1) a) Define Cryogenics. What are the ideal properties of cryogenic fluids?[6]
 - b) Discuss the Thermal properties of cryogenic material at cryogenic scale.[5]
 - c) Explain with suitable example use of cryogenic technology in space application. [5]
- Q2) a) Discuss Joule Thomson expansion and the effect of inversion curve on liquefaction of gases. [6]
 - b) Solve the following (any Two).
 - Explain Principles of Joule Thomson Expansion and Adiabatic expansion
 - Explain with neat sketch precooled Linde Hampson system of liquefaction.
 - Differentiate between Simple Linde Hampson system and precooled Linde Hampson system.

Q3) Write short notes on (any three)

- a) Thermal properties of cryogenic material.
- b) Helium generated Hydrogen liquefaction system
- c) Pulse Tube Cryocooler.
- d) Cryogenics in food preservation.

P.T.O.

[18]

[10]

SE - 109

Q4)	a)	cyc	ferentiate between Regenerative and Recuperative thermodyr les.	amic [6]		
	b)	Ex _j sch	plain the working of Pulse Tube refrigeration system with the he ematic sketch.	lp of		
	c)	Dra	w the neat sketches of Solvay and G-M refrigeration systems.	[5]		
Q5)	a)	Exp	Explain with neat sketch the Dewar vessel of cryogenic fluid storage.[6]			
	b)	Sol	ve any Two of following.	[10]		
		i)	Constant volume thermometer.	• •		
		ii)	Venturimeter flow meter.			
		iii)	General characteristics of mixture.			
Q6)	Wri	ite sh	ort notes on (any three).	[18]		
	a)	Prin	ciples of rectifier column.	ACCA		
	10.0	CRA :				

- b) Single column and double column air separation systems.
- c) Electrical resistance gauge for cryogenic liquid level measurement.
- d) Insulation used in cryogenics.

1

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Total No. of Pages : 2

Seat No.

B.E. (Mechanical) (Semester - VIII) (Revised) Examination, November - 2017 MECHATRONICS Sub. Code : 68508

Day and Date : Wednesday, 1 - 11 - 2017 Time : 10.00 a.m. to 1.00 p.m. Total Marks : 100

Instructions : 1) All questions are compulsory.

- Answer to all questions must be written in one answer book.
- 3) Figures to right indicate full marks to question.
- 4) Assume any data if necessary and state it clearly.
- 5) Use of any type of calculator is not permitted.

Q1) Solve any two of the following:

- a) What is mechatronics? What are the basic elements of mechatronics system? [8]
- b) What are optical encoders? Discuss in details incremental and absolute encoders. [8]
- c) List different types of sensors. Explain capacitive displacement sensors.

[8]

Q2) Solve any two of the following:

- a) What are inverting and non inverting amplifiers? Explain OP-AMP as summing amplifiers. [8]
- b) What are different types of multiplexers? Explain general purpose of multiplexing. [8]
- c) Explain 555 timers with suitable block diagram. [8]

Q3) Solve any two of the following:

- a) What are flip-flop logic circuits? Explain D Flip-Flop and JK Flip-Flop.[8]
- b) With the help of truth table explain [8]
 - i) AND gate ii) OR gate iii) NOR gate iv) EXOR gate
- c) Convert following decimal number to octal numbers.
 - i) 1375 ii) 4248 iii) 528 iv) 4267

[8]

[8]

[8]

Q4) Solve any two of the following:

a)	con	blain 'Update-Solve ladder-update' in context of programmable logic trollers. [8]
b)	Wit	h the help of ladder diagram explain, [8]
	i)	Always ON & Always OFF contacts.
	ii)	Disagreement Circuit.
	iii)	Holding contact.
c)	Cor	npare Physical components Vs Programming components of P.L.C.

- Q5) a) Explain delay on and delay off timers.
 - b) Develop a programmable ladder logic diagram for preparing ice in a factory under following sequence of operation; [12]
 - i) Fill the tank with water.
 - ii) Start the compressor.
 - iii) Ensure that the ice has been ready or not.
 - iv) Wait for a minute.
 - v) Open the door.

Q6) Solve any two of the following.

- a) Differentiate between traditional and mechatronics design of system. [8]
- b) Write a short note on:
 - SCADA and MEMS.
 - ii) PLC fault finding and trouble shooting.
- c) With the help of neat sketch explain pick and place manipulator. [8]

-2-

SF - 108 Total No. of Pages : 3

Seat No.

B.E. (Mechanical) (Part - IV) (Semester - VIII) Examination, November - 2017 NOISE AND VIBRATION Sub. Code: 68510

Day and Date : Friday, 03 - 11 - 2017 Time : 10.00 a.m. to 1.00 p.m.

Total Marks : 100

Instructions : 1) All questions are compulsory.

2) Use of scientific calculator is allowed.

3) Assume suitable data wherever necessary.

- 4) Figures to the right indicate full marks.
- Q1) a) Derive the equation of motion for standard spring mass system using Newton's Method, Energy method and Rayleigh's Method.
 [8]
 - b) Find the natural frequency of system shown in figure considering mass of pulley as M.



b) A mass of 4.5 kg is suspended from a spring is subjected to damped vibrations. The time for 50 oscillations is found to be 20 seconds. The ratio of initial amplitude and amplitude after 5 cycles is 2.25. Determine logarithmic decrement, damping factor, spring stiffness and damping force. [8]

P.T.O.

SF - 108

[8]

- Q2) a) Derive the expression for steady state response of a single degree freedom system involving rotating unbalance. [8]
 - b) A machine supported symmetrically on four springs has a mass of 80 kg. The mass of reciprocating parts 2.2 kg which move through a vertical stroke of 100 mm with simple harmonic motion. Neglecting damping, determine the combined stiffness of springs so that the force transmitted to the foundation is 1/20th of the impressed force. The machine crankshaft rotates at 800 rpm.

If the damping provided reduces the amplitude of successive vibrations by 30% find the force transmitted to the foundation at 800 rpm. [8]

Q3) a) Derive the mode shapes of two rotor system.

OR

- a) Explain principle of vibration absorber. Also state difference between vibration absorber and vibration isolator. [8]
- b) Derive the equations of motion for the system shown in figure and determine the natural frequencies for following data;

 $m1 = 200 \text{ kg}, m2 = 50 \text{ kg}, k1 = 1 \times 10^{6} \text{ N/m}, k2 = 2 \times 10^{4} \text{ N/m}.$ [10]



-2-

SF - 108

[8]

- Q4) a) Determine the natural frequency of two rotor system shown in fig 4a by Rayleigh's method. The Diameter of rotor is 25 mm and modulus of elasticity of material E = 2.09 × 10¹¹ N/m². [10]
 b) Write a short note on Matrix Iteration method. [8]
 Q5) a) Describe briefly the condition monitoring and fault diagnosis of pump or gears. [8]
 b) Explain with neat sketch different type of exciters used in FFT analyzer.[8]
- Q6) a) Why do we need decibel sound level scale? [2]
 - b) Explain the following terms in hearing consideration.
 - Threshold shift
 - ii) Temporary Threshold shift
 - iii) Permanent Threshold shift
 - iv) Daily dose of noise
 - c) From noise measurements made in a particular community, it has been determined that the day-night L_{eq} is 79 dB(A) and the night time L_{eq} is 59 dB(A). Using these data, determine the day-night A-weighted average sound level. [6]



SF-109

Total No. of Pages : 3

Seat No.

B.E. (Mechanical) (Part-IV) (Semester-VIII) (Revised) Examination, November - 2017 INDUSTRIAL ENGINEERING(Elective-III) Sub. Code : 68511

Day and Date : Monday, 06-11-2017 Time : 10.00 a.m. to 1.00 p.m.

Total Marks : 100

[4]

Instructions : 1) All questions are compulsory.

2) Figures to the right indicate full marks.

3) Assume suitable data, if necessary.

Q1) Attempt any four

a) Describe in brief the important techniques used by industrial engineers.

b) Discuss the applications of industrial engineering in service sector. [4]

c) Define productivity. Distinguish between production and productivity?[4]

- d) What are the methods to improve the productivity of a production systems? [4]
- e) For a company XYZ, total inputs and outputs are converted into monetary values and are as follows: [4]

Output = Rs. 5,00,000

Labour input = Rs. 1,75,000

Material input = Rs. 1,00,000

Calculate the material productivity and labour productivity.

Q2) Attempt any four

a)	What is the significance of motion economy for a meth practitioner?	hod study
b)	What are therbligs? Explain their importance?	[4]
c)	State applications of SIMO chart.	[4]
d)	Briefly explain the objectives of ergonomics.	[4]
e)	State important factors to be considered by a designer for se	election of
	controls.	[4]
		P.T.O.

[8]

Q3) Write short notes on any three

10	Criterion for selection of job for method study.	[0]
a)	Ciliarion tori	[6]
b)	Steps involved in method study.	

- c) Operation process chart for changing fuse wire in an electric board. [6]
- d) Difference between operation flow diagram and string diagram. [6]

Q4) Attempt any two

- a) List various allowances and discuss need to provide various allowances in determination of standard time. [8]
- b) In the following table, times shown are continuous stopwatch readings in minutes. Initial setting of stopwatch is at 0.00. [8]

Elements		Cycle time(in minutes)			Performance
E F	1	2	3	4	rating in %
А	1.7	8.55	15.5	22.5	105
B	2.9	9.8	16.75	23.75	90
C	4.5	11.4	18.4	25.35	110
D	6.8	13.8	20.75	27.65	100

Relaxation allowance as 15%. Estimate the standard time of operations and production per 8 hours of shift.

c) Describe various methods used for 'rating' in time study.

Q5) Attempt any four

- a) Discuss the steps involved in work sampling? [4]
 b) How do you classify the value of a product? Explain each type of [4] value. [4]
- c) What is merit rating? Why it is necessary? [4]
- d) Suggest the factors to be considered for selection of site for textile industry. [4]
- e) Which type of layout do you recommend for a manufacturing company producing flywheel of an engine? Give reasons. [4]

Q6)	Wr	ite short notes on any three	SF-109
	a)	Material handling system for molding sand in foundry	[6]
	b)	Tools used in layout planning	[6]
	c)	Value engineering	[6]
	d)	Quantitative methods of job evaluation	[6]



SF-112 Total No. of Pages : 2

B.E. (Mechnical) (Part-IV) (Semester-VIII) (Revised) Examination, November - 2017 ADVANCED I.C. ENGINES (Elective-III) Sub. Code : 68515

Day and Date : Monday, 06-11-2017 Time : 10.00 a.m. to 1.00 p.m.

Total Marks : 100

Instructions : 1) All questions are compulsory. 2) Figures to the right indicate full marks.

Q1) Answer any two.

Seat

No.

- a) What do you mean by over expansion. Draw the Miller cycle on P-V diagram and explain various processes involved in it. [8]
- b) With a suitable sketch explain the starting circuit of a Solex carburetor.[8]
- c) What are the design requirements of intake manifold in case of S.I. engines? [8]
- Q2) a) Briefly explain the electronic diesel injection system with necessary controls.
 [8]
 - b) Explain with neat sketch phenomenon of fuel spray in C.I. engine. [8]

Q3) Write a short note on any three of following.

Anyone type of combustion chamber employed in modern diesel engine.

- b) Combustion related parameter in thermodynamic analysis of C.I. engine.
- c) Chamber optimization strategy for S.I. engine.
- d) Swirl generation in C.I. engine.

[18]

SF-112

[8]

[18]

Q4)	Answ	er any	two.	
-----	------	--------	------	--

a)	What modifications are required in diesel engine to use biodiesel as fi	hel?	k
	Explain.	181	ł

- b) Give brief account of LPG being used as an alternative fuel in S.I. engine.
 [8]
- c) What are the merits and demerits of Alcohols as alternative fuel of I.C. engine? [8]
- Q5) a) Describe the mechanism of formation of CO, UBHC & NOx emission.
 - b) Discuss about smoke particulate emissions & its measurement. [8]

Q6) Write a short note on any three of following

- a) Variable Turbo Geometry system
- b) Three way catalytic converter
- c) SOHC & DOHC
- d) Homogenous charge compression ignition engine



SF - 114 Total No. of Pages :2

Seat No.

B.E. (Mechanical) (Semester - VIII) Examination, November - 2017 CRYOGENICS (Elective - 4) Sub, Code: 68519

Day and Date : Tuesday, 07 - 11 - 2017 Time : 10.00 a.m. to 1.00 p.m. Total Marks : 100

Instructions : 1) All questions are compulsory.

Figures to the right indicate full marks.

- Q1) a) Explain with suitable example need of Cryogenics in bio medical application. [6]
 - b) How to define cryogenic temperature. Show it properly on log scale, temperature scale of cryogenics. [5]
 - c) Discuss the thermoelectric properties of material at cryogenic scale. [5]

Q2) a) Explain with neat sketch and principles, different processes of expansion.
[6]

- b) Solve any Two of following. [10]
 - Explain various parameters to indicate the performance of liquefaction system.
 - Explain with neat sketch Claude liquefaction system, using T-S diagram.
 - iii) Differentiate between simple Linde Hampson system and precooled Linde Hampson system.

Q3) Write short notes on (any three).

- [18]
- Magnetic and electrical properties of cryogenic material.
- b) Claude system for liquefaction of Hydrogen.
- c) Helium generated Hydrogen liquefaction system.
- d) Classification of cryocoolers.
- e) G M Cryocooler with neat sketch.

- Q4) a) Explain with neat sketch the difference between the refrigeration cycles using regenerators and recuperators. [6]
 - b) Draw the neat sketches of Solvay and G M refrigeration systems. [5]
 - c) Differentiate between pulse tube Cryocooler and sterling Cryocooler.[5]
- Q5) a)
 Explain basic cryogenic fluid storage vessel with neat sketch.
 [6]

 b)
 Solve any Two of following.
 [10]
 - i) Constant pressure thermometer.
 - ii) Electrical resistance gauge for cryogenic liquid level measurement.
 - iii) Temperature composition diagram.

Q6) Write short notes on (any three).

- a) Cryogenic fluid storage and its need.
- b) Principles of gas separation.
- c) Cryogenic air separation plants.
- d) Ion pumps.
- e) Need of insulation with suitable example.

(1)O. Ω

[18]

SF-953 Total No. of Pages : 3

Total Marks : 100

B.E. (Mech.) (Part - IV) (Semester - VIII) (Revised) Examination, November - 2017 ENERGY AND POWER ENGINEERING Sub. Code : 68509

Day and Date : Thursday, 02 - 11 - 2017 Time : 10.00 a.m. to 1.00 p.m.

- 1) All questions are compulsory Interpretation.
- Figures to the right indicates full marks.
- 3) Make suitable assumptions if required and state them clearly.

Q1) a) Attempt any two:

Seat

No.

Instructions :

- Write the advantages and disadvantages of concentrating collectors over flat plate types of solar collector?
- Explain pumped energy storage with schematic drawing.
- iii) Interpret efficiency of various Collectors with appropriate drawing.
- b) Solve the following:
 - Calculate the angle of incidence of beam radiation with normal to a flat plate collector on November 30 at 9 am. Solar time for a location at 16°70'N. The collector is tilted at an angle of latitude plus 12°, with the horizontal and pointing due south.

Q2) Attempt any two from the following:

- a) With the help of block diagram explain the operation of stand-alone solar system with battery and AC load.
- b) Explain the I-V characteristics of a solar cell and define fill factor. What is significance of fill factor?
- c) Explain working principle and operation of fuel cell?

[10]

100

[16]

[8]
Q3) Attempt any two:

- a) Explain site selection criteria for the wind power plant.
- b) What is OTEC? How is electricity generated from ocean thermal energy plant? Draw a neat sketch?
- Explain with neat sketch hybrid wind diesel power plant. State their advantages.

Q4) Answer any two:

- a) Discuss in brief the thermal power development in India.
- b) Explain with neat sketch the compressed air storage power plant.
- c) Explain in brief power grid, railway grid and international grid.

Q5) a) Solve the following:

The energy consumption of a consumer per month is 2300 kWh. The maximum demand is 12 kW. Using the Hopkinson demand rate as given below find

- i) Monthly bill of the consumer and energy cost
- ii) Lowest possible bill for a month of 30 days and unit energy cost for the given energy consumption.

The Hopkinson demand rates are:

0 - 5 kW = Rs.200/kW

6 - 10 kW = Rs.150/kW

10-15 kW = Rs.120/kW

Energy rates are:

First 100 kWh = Rs. 2/kWh. Next 500 kWh = Rs. 1.5/kWh.

Next 2000kWh = Re. 1kWh. Excess over 2000 kWh = Re. 0.8/ kWh.

[16]

[12]

b) Solve any one.

- i) Draw and discuss the load curves for the following types of loads
 - 1) Residential load
 - 2) Industrial load
 - 3) Commercial load
 - 4) Urban traction load
- Describe with neat sketch measurement of CO₂ by thermal conductivity method.

Q6) Write short notes on (Any two).

[14]

- a) Energy marketing.
- b) Public sector companies in power production.
- c) Need of operator training in power plant operation.

* * *

B.E.(Mechanical) (Part-II) (Semester - VIII) Examination, November - 2016 INDUSTRIAL ENGINEERING Sub. Code :49418

Day and Date : Tuesday, 8 - 11 - 2016 Time : 2.30 p.m. to 5.30 p.m.

Total Marks : 100

Instructions :

Seat

No.

- Solve any three questions from section I and any three questions from section II.
- All question are to be written in the same answer book.
- 3) Figures to the right indicates full marks.
- Assume data if necessary and state it clearly.

SECTION-I

21) a)	Define industrial engineering and explain tools and techniques	s of industrial
	engnicernig.	[6]
· b)	Compare between production planning and control.	[5]
c)	State principles of material handling.	[6]

- Q2) a) What do you mean by capacity? Explain various planning strategies. [8]
 - b) From the following data if smoothening constant is 0.4. Find the forecast of July if forecast for January was 160.
 [8]

Month	Jan	Feb	Mar	Apr	May	June
Sales	155	190	215	220	225	230

Q3) a) Annual demand of items is 9000 units. The set up cost is Rs.30/ -Inventory carrying cost is Rs.3/ year.Items are produced at 40 units/day & working days are 300.Find:

P.T.O.

i)Economic lot size		SJ-361
ii)Time required to produce batch	-	[8]
iii)Total cost.		

[8]

- b) Describe various inputs and outputs of MRP. [8]
- Q4) a) Explain factors affecting plant location and plant layout
 - b) Draw network, determine critical path and calculate standard normal deviate of project meeting scheduled completion in 40 days following data.

Activity	1-2	1-3	1-4	2-5	3-5	5-6	4-6	6.7
Optimistic time	8	5	5	6	2	6	8	4
Most likely time	17	14	6	6	5	6	9	8
Pessimistic time	20	17	8	12	8	12	6	12

SECTION-II

- Q5) a) What is productivity? Explain the various models of productivity. [8]
 b) What are unnecessary costs, how they enter the product and how are they identified using value analysis. [8]
- Q6) a) What is string diagram? Explain its constructions and applications. [8]
 b) Explain the principles of motion economy. [8]
- Q7) a) An operator is engaged in on an assembly operation performed the following work elements. Given below individual elemental times and the average rating. [9]

Element	Cycle				-	Rating
А	0.22	0,24	0.28	0.26	0.25	80
В	0.14	0.18	0.15	0.13	0.15	100
С	0.37	0.35	0.37	0.33	0.33	120
D	0.10	0.09	0.12	0.10	0.09	90
E	0.12	0.13	0.11	0.11	0.13	100

-2-

SJ-361

[8]

Calculate standard time of the job assuming 15 % allowances. Determine output for a shift and also calculate efficiency if actual output is 500 units.

- What is anthropometry? How this data is used in design. b)
- The work sampling study was conducted for 60 Hrs.in the machine Q8) a) shop in order to estimate the standard time. The total no of observations recorded were 2500.No-working activity could be noticed for 500 observations. The ratio between manual and machine element was 3:1, The average performance rating was estimated as 85% and the total no of pieces produced during the period of study were 120. Calculate the standard time of the job assuming 15 % total allowance. Also determine accuracy for 95% confidence level. 191
 - What is merit rating, what are the advantages of merit rating and list b) various methods of merit rating? [8]

SJ-362 Total No. of Pages : 2

Seat No.

B.E. (Mech.)(Part-IV) (Semester-VIII) Examination, November - 2016 POWER ENGINEERING Sub, Code :49419

Day and Date : Wednesday, 09 - 11 - 2016 Time : 2.30 p.m. to 5.30 p.m. Total Marks: 100

- Instructions: 1) Solve any three questions from each section.
 - 2) Figures to the right indicate full marks.
 - 3) Assume data if necessary & mention clearly the same.

SECTION-1

- Q1) a) Explain in brief the present power position in India & in Maharashtra.[8]
 - b) Short note on- Nuclear power plant advantages and disadvantages. [8]
- Q2) a) Write different parameters for 'selection of type of generation'. [8]
 - b) An yearly load duration curve of a gas turbine power plant is a straight line from 45000 kW to 5000 kW. The load is taken by power plant which consist of two units of 20,000 kW each and one unit of 10,000 kW. Determine.
 - i) Load factor
 - ii) Capacity factor.
- Q3) a) Write advantages and disadvantages of Combined cycle power plant.[8]
 - b) From the following data calculate the cost of generation per unit delivered from power plant. [8]

Installed plant capacity = 200 MW

Annual load factor= 0.4, Capital cost of power plant =Rs. 280 lacs,

Annual cost of fuel, oil, salaries taxation=Rs. 60 lac,

Interest & depreciation= 13%

P.T.O.

Q4) Write short note on (Any three)

a) Structure of IEGC

b) Diesel engine power plant

- c) MHD power generation
- d) Photovoltaic power system.

SECTION-II

Q5) a)	Explain techniques of measurement of water purity.
b)	Explain the effect of CO on human health. What are the various techniques used to control CO emission? [8]
Q6) a)	What do you understand by acid rain and what are the reasons for this? How they are controlled?
b)	What are the methods for thermal energy storage? Explain any one in detail. [8]
Q7) a)	Why energy Audit is necessary Explain in detail how Energy Audit is carried out. [8]
b)	Why oxygen level in water is maintained low? Draw a circuit used to measure dissolved oxygen in the water. [8]
Q8) Wr	ite short note on (any three)
a)	Nuclear radiation detector.
b)	Social and environmental effect of hydroelectric power plant
c)	Electrostatic precipitator.
d)	CO, measurement in power plant

* * *

-2-

SJ-364 Total No. of Pages : 2

Seat No.

B.E.(Mechanical) (Part - II) (Semester - VIII) Examination, November - 2016 MICRO ELECTROMECHANICAL SYSTEM (MEMS) (Elective - III) -Sub. Code : 49421

Day and Date : Thursday, 10-11-2016 Time : 2.30p.m. to 5.30 p.m.

Total Marks: 100

Instructions: 1) Attempt any three questions from each section. 2) Figures to the right indicate full marks.

SECTION - 1

Q1)	a)	What is inertia sensor? How it is used in air bag deployment system	.[10]
	b)	Differentiate Microsystems and microelectronics.	[8]
Q2)	a)	What is photolithography? Describe in detail.	[8]
	b)	Explain procedure to creat a polysilicon cantilever beam on Si base	e.[8]
Q3)	a)	Explain in detail etching processes in detail.	[8]
	b)	Compare Ion implantion with diffusion process along with wor principles.	king [8]
Q4)	a)	What is Czochralski method for producing single crystal Si.	[8]
	b)	How piezoresistors and piezoelectric crystals are used in MEMS.	[8]

P.T.O.

SJ-364

SECTION - II

Q5)	a)	What are optical sensors?	[10]
	b)	What are the ways of transducing the deformation of diaphragm to ele output signal.	etrie [8]
Q6)	a)	What are the applications of MEMS in microfluidics.	[8]
	b)	What are design consideration in MEMS.	[8]
Q7)	a)	Explain surface bonding and wire bonding.	[8]
	b)	What are the techniques for pumping in micro fluidics.	[8]
Q8)	a)	Explain electrostatic actuation principles along with examples.	[8]
	b)	What is the working principles of microgripper and micropumps.	[8]

SJ-370 Total No. of Pages : 2

Seat	
No.	

B.E.(Mechanical) (Part-IV) (Semester-VIII) Examination, November - 2016 INDUSTRIAL AUTOMATION AND ROBOTICS (Elective-IV) Sub. Code : 49546

Day and Date : Friday, 11 - 11 - 2016 Time : 2.30p.m. to 5.30 p.m.

Total Marks: 100

Instructions :	1)	Answer any three questions from section-I and any three questions from section-IL
	12447	

- 2) Answer to the two sections should be written in the same answer book
- 3) Figures to the right indicate full marks.
- 4) Draw neat diagrams wherever necessary.

SECTION-I

Q1)	a)	Explain the automation migration strategy in industrial auto	omation. [8]
	b)	Explain the reasons used to justify the implementation of industry.	automation in
Q2)	a)	With a neat block diagram explain the elements of an automa	ted system.[8]
	b)	Explain the interrupt systems in computer process control	. [8]
Q3)	a)	Explain the hardware of a part delivery system at work automated assembly.	station in an
	b)	Differentiate between the following.	[8]
		i) Flexible and fixed automation	
		ii) Continuous and discrete control	
Q4)	Wr	ite short notes (any Three)	[18]
	a)	Reasons for automation in manufacturing industry	
	b)	Economics and social aspects of automation.	
	c)	Low cost automation.	
	d)	Social aspects of automation.	

e) Linear transfer mechanisms

P.T.O.

SECTION-II

Q5)	a)	Explain the different interlocks in a robotic work cell.	[8]
	b)	Discuss the role of robotics in automation.	[8]
Q6)	a)	Explain the following with respect to robot:	[8]
		i) Gripper force analysis.	
		ii) Magnetic Grippers -	
	b)	Classify robotic sensors and explain proximity and range sensors.	[8]
Q7)	a)	Explain the following with respect to lead through programming.	[8]
		i) Teach Pendant	
		ii) Robot program as a path in space.	
	b)	Explain the different elements of robot cycle time analysis.	[8]
Q8)	Wr	ite short notes (any Three)	18]
	a)	Magnetic grippers.	
	b)	Dynamic properties of robot	
	c)	Explain the robot end effectors interface.	
	d)	Robot configurations	
	c)	Application of robot in welding.	

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-2-

SL-300 Total No. of Pages : 2

Seat No.

B.E. (Civil) (Part - II) (Semester - VIII) (Old) Examination, May - 2017 ADVANCE CONSTRUCTION TECHNIQUES (Elective - III) Sub. Code : 49193

Day and Date : Friday, 05 - 05 - 2017 Time : 2.00 p.m. to 5.00 p.m.

Total Marks: 100

Instructions :	1)	Solve any three questions from each section.

Figures to the right indicate full marks.

3) Make assumptions wherever necessary.

SECTION - I

Q1) a)	Define & Explain Composite Construction.	[8]
b)	State the importance of Plywood Formwork.	9 ^[8]
Q2) a)	What is Land Reclamation. State the methods of Land Reclamation	ation.[8]
b)	Define Adhesive. Type of adhesives.	[8]
Q3) a)	Define MDF. State their Advantages & Disadvantages. & use.	[8]
b)	Define Geosynthetics. State Benefits & barriers.	[8]
Q4) Sho	ort note (any three)	[18]
a)	Enlist the design loads for form work.	
b)	Explain Fibre reinforced concrete & application.	Cr.
c)	Drainage for land reclamation.	5
d)	Thermosetting Adhesive.	P.T.O.

SECTION - II

Q5) a)	Explain with neat sketch the operation of Nuclear po	wer station [8]
b)	Importance of Strengthening of Foundations.	JK-50 [8]
Q6) a)	Explain the principle of Wind Mill.	2 [8]
b)	What is Slip Formwork.	[8]
Q7) a)	State the Mechanism of Revibration of concrete.	[8]
b)	Explain the necessity of Bridge Rehabilitation.	[8]
Q8) Sho	rt note (any three)	[18]
a)	What is Underpinning.	G
b)	Reinforced earth construction.	60
c)	Roller compacted Concrete.	1º
d)	Diaphragm walls.	5

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SL-342 Total No. of Pages : 2

Seat No.

B.E. (Mechanical) (Part-II) (Semester-VIII) (Revised) Examination, May - 2017 INDUSTRIAL AUTOMATION AND ROBOTICS (Elective-IV) Sub. Code : 68518

Day and Date : Friday, 05-05-2017 Time : 2.00 p.m. to 5.00 p.m.

Total Marks: 100

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[8]

[8]

Instructions :	1)	All questions are compulsory.	
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- 2) Figures to the right indicate full marks.
- 3) Make suitable assumption if necessary and mention them clearly.
- Q1) a) With neat block diagram explain basic elements of an automated system.
 - b) Explain the features and applications of the following.
 - i) Flexible automation
 - ii) Programmable automation
 - iii) Fixed automation

OR

b) Explain three phases of typical automation strategy.
 [8]

- Q2) a) Explain the following with respect to continuous control system: [8]
 - i) Regulatory control ii) Adaptive control
 - b) Explain analysis of transfer line without storage buffer. [8]
- Q3) a) Explain the different types of part feeder mechanisms in automated assembly. [8]

OR

- a) Explain the following parts in assembly automation.
 i) Hoppers
 ii) Orientation mechanisms.
- b) Explain the four automated assembly system configurations. [10]

P.T.O.

[8]

[10]

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- Explain the common robot configurations and their work volumes. [8] Q4) a) OR
 - Explain with a suitable sketch, the various parts of an industrial robot.[8] a)
 - Explain different joints and their degrees of freedom in robot system.[8] b)
- Explain the factors to be considered in design and selection of gripper. Q5) a) [8]

OR

- Explain in detail types of grippers. a)
- Explain the remote center compliance (RCC) device in robot assembly.[8] [8]
- Q6) a) Explain a robot program as a path in space.
 - Explain WAIT, SIGNAL and DELAY commands in industrial robot.[10] b)

OR

Elaborate in detail industrial robot applications. b)

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SL-348 Total No. of Pages : 2

B.E. (Mech.) (Semester-VIII) (Old) Examination, April - 2017 POWER ENGINEERING Sub. Code : 49419

Day and Date : Saturday, 29-04-2017 Time : 2.00 p.m. to 5.00 p.m.

Seat

No.

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Total Marks : 100

[8]

Instructions :	1)	Attempt any three questions from each section
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- 2) Figures to the right indicate full marks.
- Assume suitable data if necessary. 3)

SECTION-I

Q1) a)	(1) a) Discuss in short NIPC, NHPC, NPCIL & IGEC.	
b)	Give the Indian Electricity Grid Code in brief.	[8]

- Explain the general layout of I.C. Engine power plant by drawing a neat Q2) a) sketch. [8]
 - A generating power plant supplies the following loads to various b) consumers as listed below: [8] Industrial = 750mw; commercial = 350mw

Domestic power = 10mw & Domestic light = 50mw

If the maximum demand on the station is 1000mw & energy generated is 50×105mwh per year, Determine (i) Diversity factor, (ii) Annual load factor.

Explain MHD- steam plant. Q3) a) [8] b) Explain various Tariff methods. [8]

Q4) Write short note on (Any Three).

- Load curve & load duration curve a)
- Thermoelectric steam plant b)
- Peak load & base load plants c)
- Gas Turbine power plants d)



[18]

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[18]

SECTION-II

- Q5) a) Explain how the smoke density is measured. [8]
 - Explain with neat sketch the method for measurment of pH value of water.
 [8]
- Q6) a) Explain the Battery Technology in storage of energy. [8]
 - b) What do you mean by Ultracapacitors? Explain with the help of neat sketch.
 [8]
- Q7) a) What do you mean by thermal pollution? Explain the effects of thermal pollution.
 [8]
 - b) What do you mean by 'barticulate matter'? What are the effects of the same on environment? Explain the methods to control it. [8]
- Q8) Write short note on the following (Any Three).
 - a) Nuclear Radiation detector.
 - b) Energy management techniques.
 - c) Energy marketing.
 - d) Cooling water system in power plants.

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SL-350 Total No. of Pages :2

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B.E. (Mechanical) (Part - II) (Semester - VIII) (Old)

Examination, May- 2017

MICRO ELECTRO MECHANICAL SYSTEM (Elective - III) Sub. Code: 49421

Day and Date : Wednesday, 03- 05 - 2017 Time :2.00 p.m. to 5.00 p.m.

Total Marks : 100

Instructions : 1) Attempt any three questions from each section.

> 2) Figures to the right indicate full marks.

SECTION-I

Q1)	a)	What is inertia sensor? How it is used in air bag deployment system	.[10]
	b)	Differentiate Microsystems and microelectronics.	[8]
Q2)	a)	What is photolithography? Describe in detail.	[8]
	b)	Explain procedure to creat a polysilicon cantilever beam on Si base	e.[8]
Q3)	a)	Explain in detail etching processes in detail.	[8]
	b)	Compare Ion implantion with diffusion process along with wor principles.	king [8]
Q4)	a)	What is Czocharalski method for producing single crystal Si.	[8]
	b)	How piezoresistors and piezoelectric crystals are used in MEMS.	[8]
		SECTION-II	

- Q5) a) What are optical sensors?
 - What are the ways of transducing the deformation of diaphragm to b) electric output signal. [8]

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[10]

		SL-	350
Q6)	a)	What are the applications of MEMS in microfluidics.	[8]
	b)	What are design considerations in MEMS.	[8]
Q7)	a)	Explain surface bonding and wire bonding.	[8]
	b)	What are the techniques for pumping in Microfluidies.	[8]
Q8)	a)	Explain electrostatic actuation principles along with examples.	[8]
	b)	What is the working principles of microgripper and micropumps.	[8]

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SL - 1003 Total No. of Pages : 2

B.E. (Mechanical) (Part - IV) (Semester - VIII) (Revised) Examination, May - 2017 ADVANCED I.C. ENGINES Sub. Code : 68515

Day and Date : Wednesday, 03 - 05 - 2017

Time : 02.00 p.m to 05.00 p.m.

Total Marks: 100

Instructions : 1) All questions are compulsory.

> 2) Figures to right indicate full marks to the question.

- With the neat sketch explain the working of multi point fuel injection *Q1*) a) system. [8]
 - List different sensors and actuators used in petrol injection system and b) explain their functions. [9]

Q2) Answer Any Two:

Seat

No.

- a) What is ECU? Explain the role of ECU unit in improving the engine performance. [8]
- Explain the design considerations for intake manifold and describe air b) and fuel flow phenomenon in S.I. engines [8]
- With neat sketch, explain the distributor type diesel injection system.[8] c)
- Describe thermodynamic analysis of S.I engine combustion. (03) a) [9] b)
 - With neat sketch, explain the method of swirl measurement. [8]
- What is fuel cell? Which types of fuel cells are used in Automobiles? [9] Q4) a)
 - With neat sketches explain the construction and working of LPG and b) CNG conversion kits. [8]

SL - 1003

Q5) Answer Any Two:

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- a) Explain the formation mechanism of HC, CO and NO, emissions. [8]
- b) Compare Euro and Bharat emission norms. [8]
- c) Explain in detail chemical methods used to control the engine exhaust emissions.
 [8]
- Q6) a) With neat sketch, explain the working of three way catalytic converter.[9]
 - Explain the advantages of homogeneous charge compression ignition engine over conventional engine. [8]



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Total No. of Pages : 2

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B.E. (Mechanical Engineering) (Semester - VIII) Examination, May - 2017

INDUSTRIAL AUTOMATION AND ROBOTICS (Elective - IV)

Sub. Code : 49546

Day and Date : Friday, 05 - 05 - 2017 Time : 02 00 p m to 5 00 p m

Total Marks: 100

Time : 02.00 p.m. to 5.00 p.m.

- Instructions: 1) Answer any three questions from each section.
 - Figures to the right indicate full marks.
 - 3) Draw schematic diagrams wherever necessary.

SECTION-I

Q1) a) Explain basic strategies for Automation & Production systems. [8]

- b) Differentiate between process Industries & Discrete Manufacturing Industries.
 [8]
- Q2) a) What are the different system configurations of automated production lines.
 [8]
 - b) Give common reasons for downtime on an automated production line & explain each one briefly.
 [8]
- Q3) a) Explain various vibratory & non- vibratory devices for feeding & orientation in parts delivery at workstations.
 [8]
 - b) Explain the analysis of transfer lines without storage buffers. [8]

Q4) Write short notes (Any Three)

- a) Instantaneous control.
- b) Economical & social aspects of automation.
- c) Advanced automation functions.
- d) Differentiate between Fixed & Flexible programmable automation.

[18]

SECTION-II

Q5)	a)	What are the common Robot Configurations?	6 [8]
	b)	What are the dynamic properties of robot stability?	5 [8]
Q6)	a)	How the selection of gripper is done & what are the design co	onsiderations
	b	Evoluin I and showed and the training	[8]
	0)	Explain Lead through methods in detail.	[8]
Q7)	a)	What are the common Robot configurations?	[8]
	b)	What are the dynamic properties of robot stability?	[0]
		p optimite of record sublinity.	[0]
Q8)	Wr	ite short notes (any three)	[18]
	a)	SCARA	11
	b)	Control resolution	
	c)	Force & Torque sensors	C3
	d)	Active & passive compliance	0
	e)	Robot applications.	
		2 avi	

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Total No. of Pages : 2

Seat No.

Instructions :

B.E. (Mechanical) (Semester - VIII) Examination, May - 2017 CRYOGENICS (Elective)

Sub. Code : 68519

Day and Date : Friday, 05 - 05 - 2017 Time : 02.00 p.m. to 5.00 p.m.

Total Marks : 100

1) All questions are compulsory.

2) Figures to the right indicate full marks.

- Q1) a) Explain with suitable example need of Cryogenic in manufacturing process.
 [6]
 - b) Discuss the Mechanical properties of cryogenic material at cryogenic scale. [5]
 - c) Discuss the range of field of Cryogenics on a log scale thermometer.[5]
- Q2) a) What are the different pay off functions to indicate the performance of liquefaction system.
 [6]
 - b) Solve any two of following.
 - i) Explain with neat sketch Simple Linde Hampson liquefaction system.
 - Draw schematic sketch of ideal liquefaction system also discuss it on T-S diagram.
 - Explain principles of Joule Thomson Expansion and Adiabatic expansion.

Q3) Write short notes on (any three)

- a) Cryogenics in food preservation
- b) Pulse tube Cryocooler
- c) Thermal properties of cryogenic material.
- d) Claude system for liquefaction of Hydrogen.
- e) Helium generated Hydrogen liquefaction system.

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[18]

- Q4) a) Explain with neat sketch ideal refrigeration system also discuss the refrigeration systems with regenerative heat exchangers. [6]
 - Explain the working of sterling refrigeration system with the help of schematic sketch, also write expression for its COP. [5]
 - c) Explain the working of pulse tube refrigeration system with the help of schematic sketch. [5]
- (05) a) Explain with neat sketch the function of elements of Dewar vessel. [6]
 - b) Solve any two of following.
 - i) General characteristics of mixture.
 - ii) Venturimeter flow meter.
 - iii) Constant volume thermometer.
- Q6) Write short notes on (any three)

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[10]

- a) Electrical resistance gauge for cryogenic liquid level measurement.
- b) Need of insulation with suitable example.
- c) Principle of gas separation.
- d) Linde single column system for air separation.

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Total No. of Pages : 2

B.E(Mech) (Part- IV) (Semester -VIII) Examination, April-2017 NOISE & VIBRATION Sub. Code : 68510

Day and Date : Saturday, 29 -04 - 2017 Time : 02.00 p.m to 05.00 p.m. Instructions : 1) All questions are set

Seat

No.

Total Marks: 100

[8]

- All questions are compulsory.
 - Assume suitable data wherever necessary.
 - Draw neat sketch wherever necessary.

Q1) a) Explain the causes and effects of vibration.

b) Derive the equation of natural frequency of the system shown in figure.[8]



OR

- b) A mass of 1 kg is to be supported on a spring having stiffness of 9800 N/m. The damping coefficient is 4.9 N-s/m. Determine the natural frequency of the system. Also find the logarithmic decrement and the amplitude after 3 cycles if the initial displacement is 0.3 cm. [8]
- Q2) a) Explain logarithmic decrement and derive the equation for the same. [8]
 b) A 75 kg machine is mounted on springs of stiffness 11.76 × 10⁵ N/m with damping factor of 0.2. A 2 kg piston within the machine has a reciprocating motion with stroke of 0.08 m and a speed of 3000 rpm. Assuming the motion of piston to be harmonic, determine the amplitude of vibration of the machine and the vibratory force transmitted to the foundation.

P.T.O.

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Q3) a) Explain semi-definite system related to two degree of freedom motion[8] OR

Explain Torsional Vibration Absorber with neat sketch.

 b) Derive the equation of natural frequency and mode shapes for the system of two masses fixed tightly on stretched string as shown in figure. [8]



Q4) a) Write a short note on Matrix Iteration method. OR

Derive the equation used in Holzer's method.

- b) Determine the natural frequency of three rotor system shown in fig 4b.by Rayleigh's method. Given: E=2.1*10¹¹ N/m², Diameter of shaft 20mm.[11]
- Q5) a) Explain in brief the condition monitoring and fault diagnosis of pump or gears. [9]
 - b) Explain with neat sketch different type of exciters used in FFT analyzer.[7]
- Q6) Attempt any TWO

a) Explain the following terms in hearing consideration.

- i) Threshold shift
- ii) Temporary Threshold shift
- iii) Permanent Threshold shift
- iv) Daily dose of noise
- b) Explain auditory effects of noise on people.
- c) From noise measurements made in a particular community, it has been determined that the day-time L_{eq} is 79dB(A) and the night time L_{eq} is 59dB(A). Using these data, determine the day-night A-weighted average sound level.



[7]

[16]

SL - 1007 Total No. of Pages : 3

B.E. (Mechanical) (Semester - VIII) Examination, April 2017 MACHATRONICS (Revised)

Sub. Code : 68508

Day and Date : Tuesday, 25 - 04 - 2017

Time : 02.00 p.m. to 05.00 p.m.

Seat

No.

- Instructions : 1) All questions are compulsory.
 - 2) Answer to all questions must be written in one answer book.
 - Figure to the right indicate full marks.
 - Assume any data if necessary and state it clearly.
 - 5) Use of any type of calculator is not permitted.
- Q1) Solve any two of the following.
 - a) Suggest a suitable sensor for sensing following quantities; also state the transduction principle of sensor suggested by you.
 [8]
 - i) Force
 - ii) Temperature
 - iii) Displacement
 - iv) Sound

b) With the help of neat sketch and suitable example, explain tactile sensors.

c) What is signal conditioning? Explain Analog to Digital converters (ADC)[8]

Q2) Solve any two of the following.

- a) What is protection? Explain following protection circuits.
 [8]
 - Zener diode protection circuit.
 - ii) Transistor opto isolators
- b) Explain polling and interrupts.
- c) What is Data Acquisition system? Discuss Multiplexers. [8]

Total Marks : 100

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[8]

- Q3) Solve any two of the following.
 - a) What are flip flop circuits? Explain master slave flip flop. [8]
 - b) Draw a labeled diagram of architecture of 8051 microcontroller. [8]
 - c) Write a note on Selection and Applications of Microcontroller [8]
- Q4) Solve any two of the following.
 - a) Explain input output updating w.r.t. programmable logic controllers.[8]
 - Explain important functions of each of the following components of PLC; [8]
 - i) Central processing unit,
 - ii) I/O Modules
 - iii) Programming device,
 - iv) Power supply unit
 - c) Explain the following machine control terminology
 - i) RUN ii) STOP
 - iii) JOG iv) Cycle
 - v) INCH
- Q5) a) Draw and explain PLC ladder logic diagram for 'Two handed anti tie down anti repeat operation'. [8]
 - b) Construct a PLC ladder diagram for the following objective [12]
 i) Fill the tank
 - i) Heat and stir the liquid for 30 minutes
 - iii) Empty the tank and repeat step1



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or.	1	U	U	1

Q6) Solve any two of the following.

- For a PLC based traffic control light application explain. a) 500 [8] Internal relays i)
 - Counters ii)
 - iii) timers
- With the help of suitable block diagram explain part loading and unloading b) system. [8] c) [8]
 - Write a note on fault finding and trouble shooting.

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Total No. of Pages : 3

Total Marks : 100

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B.E. (Mech.) (Part-IV) (Semester -VIII) (Revised)

Examination, April - 2017

ENERGY AND POWER ENGINEERING

Sub. Code : 68509

Day and Date : Thursday, 27 - 04 - 2017

Time : 02.00 p.m. to 05.00 p.m.

Seat

No.

- Instructions: 1) All questions are compulsory.
 - 2) Figures to the right indictes full marks.
 - 3) Make suitable assumptions if required and state them clearly.

QI) a) Attempt any two:

- Compare flat plate and evacuated tube solar collector on the basis of .
 - a) Construction
 - b) Efficiency
 - c) Heat output per day
 - d) Expected life
 - e) Cost
- ii) Outline the need of thermal energy storage and list the types.
- Draw a neat sketch of cylindrical parabolic concentrating collector and analyse its use for different application.
- b) Solve the following.

Calculate the angle of incidence of beam radiation on a plane surface, tilted by 45° from the horizontal plane and pointing 30° west of south located at Mumbai at 1:30 PM (IST) on 15th November. The longitude and latitude of Mumbai are 72° 49'E and 18°54'N respectively. The standard latitude for IST is 81° 44'E.

P.T.O.

[10]

SL - 1058 [16]

Q2) Attempt any two from the following:

- a) Analyse solar PV cell on the basis of type of active material UKSI
 - Single crystal Silicon Solar Cell i)
 - Multicrystalline Silicon Solar Cell ii)
 - Amorphous Silicon Solar Cell iii)
 - Organic Solar cell iv)
- What is the importance of Maximum Power Point Tracking (MPPT) in a b) PV system? outline various strategies used for operation of an MPPT.
- Describe the classification of fuel cells. Comment on relative performance c) of various types of fuel cells.

(03) Attempt any two:

- Illustrate wind energy conversion systems (WECS) a)
- Discuss the working principle of closed cycle OTEC plant with neat b) sketch. Write their advantages and disadvantages.
- Explain the concept of hybrid wind-PV power plant. State their advantages c)

Q4) Attempt any two:

- Discuss the role of NTPC in power development and present status of a) thermal power generation in India.
- b) Explain the working of a compressed air storage power plant.
- Explain in brief power grid, railway grid and international grid. c)

Q5) a) Attempt any two:

- Explain the measurement of CO, by thermal conductivity method. i)
- Explain magnetic wind method for measurement of oxygen in flue ii) gases.

Explain the measurement of smoke and dust by reflected dust Ш) monitor.

[16]

[12]

[16]

SL - 1058 [8]

[14]

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b) Solve the following.

Time (Hrs)	0-6	6-10	10-18	18-21	21-22	22-24	50
Load	20	40	60	80	60	20	35-

Draw laod curve. i)

Draw load duration curve. ii)

Choose suitable generating units to supply the load. iii)

Calculate load factor. iv)

v) Plant capacity factor.

Q6) Answer any two:

SUKSO

Enlist the private companies in power sector and explain any one in a) detail. NY-SO

Explain the procedure for detailed energy audit. b)

c) Explain the supply chain in energy sector in India.



Total No. of Pages : 3

Seat No.

B.E. (Mechanical) (Part - II) (Semester - VIII) (Revised) Examination, May - 2017 INDUSTRIAL ENGINEERING (Elective - III) Sub. Code : 68511

Day and Date : Wednesday, 03 - 05 - 2017 Time : 2.00 p.m. to 5.00 p.m.

Total Marks : 100

[4]

P.T.O.

Instructions : 1) All questions are compulsory.

- 2) Figures to the right indicate full marks.
- 3) Assume suitable data, if necessary.

Q1) Attempt any four:

- a) Describe briefly various activities of industrial engineering.
- b) Discuss the applications of industrial engineering in manufacturing sector.
- c) Define productivity? How it differs from efficiency and effectiveness?[4]
- d) What are the factors affecting the productivity of a production systems?[4]
- e) An Automobile manufacturing company producing 10,000 units of flywheel for a month by employing 100 workers in a 8 hour shift. The company gets an additional order to supply 1500 units of flywheel. The management has decided to employ additional workers. What will be the productivity levels when the number of additional workers employed are
 - i) 8
 - ii) 12

Q2) Attempt any four:

a)	State principles of motion economy.	[4]
b)	Describe micro-motion study. Give examples for its applications.	[4]
c)	State application of cyclegraph and chronocycle graph.	[4]

161

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e)	State some important environmental fa efficiency of workers.	ctors affecting productivity and [4]
		st.
Q3) W1	rite short notes on any three:	50.

Briefly explain different types of control used in man-machine system.[4]

a)	Objectives of method study.	[0]
b)	Difference between work study and work measurement.	[6]
c)	Flow process chart and its types.	[6]
(b	Multiple activity chart.	[6]

Q4) Attempt any two:

d)

a) Explain the various allowances used in determination of	standard unie.	ol
--	----------------	----

b)	The actual time for various elements in minutes for a study	conducted in	
~	a machining operation is shown in the following table.	S	

Elements	Cyc	Cycle time (in minutes)			Performance	
	1	2	3	4	Prating in %	
1	1.8	1.9	1.7	1.8	110	
2	3.5	3.6	3.7	3.5	100	
3	2.5	2.6	2.7	2.8	105	
4	6.1	6.2	6.0	6.2	90	
5	4.2	4.1	4.3	4.3	115	

Personal allowance is allowed for 50 minutes in a shift of 8 hours, other allowances as 10%. Estimate the standard time of operations and production per 8 hours of shift. [8]

c) Compare various methods of 'rating' in time study.

[8]

9

Q5) Attempt any four:

a)	What are the advantages of work sampling over time study?	[4]
b)	Discuss the steps involved in value analysis.	[4]
c)	Describe various non-quantitative methods of job evaluation.	[4]
d)	Suggest the factors to be considered for selection of site for petroche refineries.	mical [4]
e)	Which type of layout do you recommend for a manufacturing con producing impeller of a pumps? Give reasons,	ipany [4]

Q6) Write short notes on any three:

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a)	Material handling system for molten metal in foundry.	[6]
b)	Techniques used for layout planning.	[6]
c)	Difference between Value Analysis & Value engineering.	[6]
d)	Various methods of merit rating.	6 [6]
	1 AL 7	

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	SV-10	03
Total No.	of Pages	: 2

No.		
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B.E. (Mechanical) (Semester - VIII) (Revised) Examination, May - 2018 MECHATRONICS Sub. Code : 68508

Day and Date : Friday, 04 - 05 - 2018 Time : 02.30 p.m. to 05.30 p.m.

Total Marks : 100

Instructions :

- 1) All questions are compulsory.
- Answer to all questions must be written in one answer book.
- 3) Figure to right indicate full marks to question.
- Assume any data if necessary and state it clearly.
- 5) Use of any type of calculator is not permitted.
- Q1) Solve any two of the following :
 - a) Explain with block diagram basic elements of measurement system. Discuss LVDT.
 [8]
 - b) Give various definitions of mechatronics and explain the concept w.r.t. a pick and place manipulator.
 [8]
 - c) Explain with neat sketches Pneumatic limit valves and backpressure sensors. [8]

Q2) Solve any two of the following :

- a) Explain with suitable circuit the concept of Digital to Analog Conversion (DAC).
 [8]
- b) What is signal conditioning? Explain filtering process and filters. [8]
- c) What is unidirectional and bidirectional buffer with pin diagram. [8]

Q3) Solve any two of the following :

- a) Compare microprocessor and microcontroller w.r.t. architecture, applications, advantages and limitations.
 [8]
- b) Explain microcontroller 8051 with internal architecture. [8]
- c) Explain in brief Boolean algebra and its relevance in PLC ladder programming. [8]

P.T.O.

[8]

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Q4) Solve any two of the following :

- a) Explain different types of switches used in PLC and its symbols. [8]
- b) With the help explanatory sketch and ladder diagram explain single cycle operation. [8]
- c) What are internal relays? How they are incorporated in ladder diagram, explain.
 [8]
- Q5) a) Explain various types counters used in PLC. [8]
 - b) Draw a physical wiring diagram and programming diagram for alarm system which operates as below; [12]
 - i) if one input is on, nothing happens
 - ii) if any two light are on, a red pilot light goes on
 - iii) if any three inputs are on, the fire department is noticed

Q6) Solve any two of the following :

- a) Explain with block diagram basic elements of piece counting machine.
- b) With the help of ladder diagram explain fail-safe-circuit. [8]
- c) Write a note on Automatic tool and pallet changer as a mechatronics system.
 [8]

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SV - 104 Total No. of Pages : 3

Total Marks : 100

B.E. (Mech.) (Part - IV) (Semester - VIII) (Revised) Examination, May - 2018 ENERGY AND POWER ENGINEERING Sub. Code: 68509

Day and Date : Monday, 07 - 05 - 2018 Time :2.30 p.m. to 5.30 p.m.

- Instructions: 1) All questions are compulsory.
 - 2) Figures to the right indicate full marks.
 - 3) Make suitable assumptions if required and state them clearly.
- Q1) a) Attempt any two:

Seat No.

- Define declination angle, hour angle and Zenith angle.
- ii) Write procedure to test solar collector as per BIS standard?)
- Draw a neat sketch of evacuated tube collector and analyse its use for different application.
- b) Solve the following:

Calculate the angle of incidence of beam radiation with normal to a flat plate collector, pointing the south location in Kolhapur (16°7'N,74°24'E) at 10.00 hours solar time on October 29. The collector is tilted at an angle of 35° with the horizontal. Also calculate day length.

- Q2) Attempt any two:
 - With the help of block diagram explain the operation of grid connected solar system for residence.
 - b) Explain the I-V characteristics of a solar cell and define fill factor. What is the significance of fill factor?
 - c) Explain the principle of operation of Phosphoric Acid Fuel Cell,

P.T.O.

[16]

[8]

[10]

Q3) Attempt any two:

- a) How the wind mills are classified? Explain with schematic diagram of a VAWT?
- b) Discuss the working principle of open cycle OTEC plant with neat sketch. Write their advantages and disadvantages.
- Explain with neat sketch hybrid wind- PV power plant. State their advantages

Q4) Attempt any two:

- Discuss the role of NHPC in power development and present status of hydroelectric power generation in India.
- b) Explain with neat sketch the pumped storage power plant.
- Explain the working of power grid for smooth transmission of power from power stations to end user.

Q5) a) Solve the following:

A load duration curve of a system is a straight line, the maximum and minimum loads being 100 MW and 20 MW respectively. The load is supplied by base load and peak load plants.

The cost of both is given as :

For base load plant: Rs. 200/kW-year + Rs. 0.05/kWh

For peak load plant: Rs. 50/kW-year + Rs. 0.10/kWh

For minimum overall cost

- i) Draw the load duration curve.
- Determine the load shared by peak load plant.

iii) Annual load factors for both stations.

[12]

[16]

[8]

- b) Solve any one:
 - i) Explain various tariff methods.
 - Describe with neat sketch measurement of smoke and dust in flue gases.

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Q6) Write short notes on (Any two):

[14]

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- a) Supply chain in power sector.
- b) Human resource in power sector.
- c) Energy audit.

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-3-

SV - 105 Total No. of Pages : 3

B.E. (Mech.) (Part - IV) (Semester - VIII) Examination, May - 2018 NOISE AND VIBRATION Sub. Code: 68510

Day and Date : Friday, 11 - 05 - 2018 Time : 2.30 p.m. to 5.30 p.m.

Total Marks : 100

Instructions: 1) All questio

Seat No.

- 1) All questions are compulsory.
- 2) Assume suitable data wherever necessary.
- 3) Draw neat sketch wherever necessary.
- Q1) a) Enlist different methods of vibration analysis. Using Equilibrium method derive equation of motion for standard spring mass system. [8]

b) Derive the equation of natural frequency for system shown in figure. [8]



OR

b) A vibrating system consists of a mass of 50 kg, a spring of stiffness 30 kN/m and a damper. The damping provided is only 20% of the critical value. Determine the damping factor, critical damping coefficient, natural frequency of damped vibrations, logarithmic decrement and the ratio of two consecutive amplitudes. [8]

P.T.O.

[8]

[8]

- Q2) a) Derive the equation of Force Transmissibility. Also explain plot of transmissibility versus frequency ratio.
 - b) A single cylinder vertical petrol engine of total mass 320 kg is mounted upon a steel chassis and causes static deflection of 2 mm. The reciprocating parts of engine have a mass of 24 kg and move through a vertical stroke of 150 mm with SHM. A dashpot attached to the system offers a resistance of 490 N at a velocity of 0.3 m/s. Determine,
 - i) The speed of driving shaft at resonance and
 - ii) The amplitude of steady state vibration when the driving shaft rotates at 480 rpm. [10]
- Q3) a) Explain torsionally equivalent shaft.

OR

- a) With the help of neat sketch explain Dry Friction Damper. [8]
- b) Derive the equation of natural frequency and mode shapes for the system of two masses shown in figure. [8]



Q4) a) Derive the equation of motion for multi degree spring mass system. [8] OR

Explain Maxwell reciprocal theorem.

- b) Determine the natural frequencies of the system shown in fig. 4b using Matrix Iteration Method. Solve up to first mode shape. [10]
- Q5) a) Explain in brief with neat sketch the instruments Vibrometer, Frahm's. tachometer. State whether used to measure displacement, velocity and/ or frequency.
 - b) An undamped vibration pick up has a natural frequency of 1 cps. It is used to measure a harmonic vibration of 4cps. If the amplitude indicated by the pickup is 0.125 cm, what is the correct amplitude? [8]

Q6) Attempt any two:

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SV - 105 [16]

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- a) Write short note on Octave band analysis and its importance.
- b) Discuss Subjective and objective assessment of sound.
- c) At a distance of 4 m from a point source, the sound pressure level is 92 dB. Assuming a free progressive spherical wave, and standard atmospheric conditions, calculate the sound pressure level at source.



Fig 4h

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SV - 106 Total No. of Pages : 3

B.E.	(Mechanical) (Part - IV) (Semester - VIII) (Revised)
	Examination, May - 2018
1	INDUSTRIAL ENGINEERING (Elective - III)
- 5	Sub. Code: 68511

Day and Date : Monday, 14 - 05 - 2018 Time :2.30 p.m. to 5.30 p.m.

Total Marks: 100

4

Instructions : 1) All questions are compulsory.

Seat

No.

- 2)
- Figures to the right indicate full marks.
- 3) Assume suitable data, if necessary.

Q1) Attempt any four:

- Describe briefly various functions of industrial engineering. a)
- Discuss the applications of industrial engineering in establishing a foundry b) unit. [4]
- Define productivity . Describe any two models used in productivity c) measurement. [4]
- What are the benefits to various stake holders from productivity? d) [4]
- A manufacturing unit is producing 22,000 units of a engine per month by e) employing 200 workers in 8 hours shift. The company gets an additional order to supply 3000 engines. The management has decided to employ additional workers. What will be the production and productivity levels when the number of additional workers employed is [4]
 - i) 20
 - 30 ii)

P.T.O.

Q2) Attempt any four: a) How is the work study useful in improving productivity? [4] Differentiate between method study & work measurement. [4] b) Illustrate the steps of conducting method study. [4] c) Draw Flow process chart for any one of the welding process. d) [4] Draw two handed process chart for cutting a glass tube. e) [4] Q3) Write short notes on any three: Principles of motion economy related to work place layout. a) [6] b) MEMO motion study. [6] SIMO Chart. c) [6] Design of machinery from ergonomics point of view. d) [6] Q4) Attempt any three: Define time study & explain its objectives. [6] a) [6] b) Describe various methods used for rating in time study. c) In the following table, times shown are continuous stopwatch readings in minutes. Initial setting of stopwatch is at 0.00. 6

Elements	Cycle time (in minutes)				Performance
	1	2	3	4	rating in %
А	1.7	8.55	15.5	22.5	105
В	2.9	9.8	16.75	23.75	90
С	4.5	11.4	18.4	25.35	110
D	6.8	13.8	20.75	27.65	100

Relaxation allowance as 15%. Estimate the standard time of operations and production per 8 hours of shift.

d) State and explain the areas of production where work sampling can be useful. [6]

Q5) Attempt any four:

a)	Name and discuss the factors which you need for selection of a	plant
	site for food processing industry.	[4]
b)	What are the various types of layouts? State the application of each	h. [4]
c)	Explain the tools used in designing the plant layout.	[4]
d)	Define material handling. State the objective of material handling.	[4]
e)	Which type of layout do you recommend for a gear manufacture company? Give reasons.	uring [4]

Q6) Write short notes on any four:

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a)	Steps involved in value analysis.	[4]
b)	Applications of value analysis.	[4]
c)	Procedure of job evaluation.	[4]
d)	Objectives of merit rating.	(95 [4]
e)	Ranking method of merit rating.	5 [4]

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Total No. of Pages : 2

B.E. (Mechanical) (Part - IV) (Semester - VIII) (Revised) Examination, May - 2018 ADVANCED I.C. ENGINES (Elective - III) Sub. Code : 68515

Day and Date : Monday, 14-05-2018 Time : 2.30 p.m. to 5.30 p.m. Total Marks: 100

[18]

P.T.O.

Instruction : 1) All questions are compulsory.

2) Figures to the right indicate full marks.

Q1) Answer any two

Seat No.

- a) Draw the sketch of a Carter downdraught carburetor. How do the idle & low speed circuit work in this carburetor. [8]
- b) Describe briefly Multipoint fuel injection system.
 [8]
- c) Enlist fuel characteristics and explain S.I. engine fuel rating. [8]

Q2) a) Explain different types of sensors used in electronic fuel injection system for C.I. engine. [8]

- b) Explain advanced turbo-charging system of C.I. engine. [8]
- Q3) Write a short note on any three of following.
 - a) S.I. engine combustion phenomenon.
 - b) Different types of direct injection open combustion chamber for C.I. engine.
 - c) Generation of swirl during induction.
 - d) Swirl chamber for Indirect injection C.I. engine.

[8]

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Q4) Answer any two

- a) What are the Advantages & Disadvantages of Hydrogen as alternative fuel in S.I. engine.
 [8]
- b) What modifications are required in S.I. engine to use ethanol as fuel? Explain.
 [8]
- c) Explain Combustion & Emission characteristics of biodiesels as alternative fuels for C.I. engine. [8]
- Q5) a) Enlist methods of controlling emissions & explain anyone method with neat sketch. [8]
 - b) Give brief account of emissions from C.I. engines.

Q6) Write a short note on any three of following.

a) Six stroke engine

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- b) Gasoline Direct Injection system
- c) National emission norms
- d) Variable Valve timing engine

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-2-

SV-111 Total No. of Pages : 2

B.E. (Mechanical) (Semester - VIII) Examination, May - 2018 CRYOGENICS (Elective - IV) Sub. Code : 68519

Day and Date :Wednesday, 16 - 05 - 2018 Time : 2.30 p.m. to 5.30 p.m.

Seat No.

Total Marks : 100

- Instructions: 1) All questions are compulsory.
 - 2) Figures to the right indicate full marks.
 - 3) Make suitable assumption if necessary and mention them clearly.
- Q1) a) Define Cryogenics. What are the ideal properties of cryogenic fluids?[6]
 - b) Discuss the Thermal properties of cryogenic material at cryogenic scale.
 [5]
 - c) Explain with suitable example use of cryogenic technology in space application. [5]

Q2) a) What is FOM and pay off functions to indicate the performance of liquefaction system? How they are related. [6]

b) Solve any Two of following:

- Explain Principles of Joule Thomson Expansion and Adiabatic expansion.
- Explain with neat sketch precooled Linde Hampson system of liquefaction.
- Differentiate between Simple Linde Hampson system and precooled Linde Hampson system.

P.T.O.

[10]

SV-111 [18]

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- Q3) Write short notes on (any three):
 - Superconducting devices. a)
 - Cryogenics in bio medical application. b)
 - Pulse Tube Cryocooler. c)
 - Helium generated Hydrogen liquefaction system. d)____
 - Claude system for liquefaction of Hydrogen. e)
- Explain with neat sketch ideal refrigeration system also discuss the Sterling Q4) a) regenerative heat exchanger cycle, using T - S diagram. [6]
 - Explain the working of Pulse Tube refrigeration system with the help of b) schematic sketch. [5]
 - Draw the neat sketches of Solvay and G M refrigeration systems. [5] c)
- Explain with a neat sketch the Dewar vessel of cryogenic fluid storage.[6] Q5) a)
 - Solve any Two of the following: b)
 - Temperature composition diagram. i)
 - Turbine flow meter. ii)
 - Magnetic thermometer. iii)

Q6) Write shote notes on (any three):

[18]

[10]

- Components of vacuum systems. a)
- Capacitance liquid level prober for cryogenic liquid level measurement. b)
- Principles of rectifier column. c)
- Single column and double column air separation systems. d) UK-SGA82
- Insulation-used in cryogenics. e)

SV-108 Total No. of Pages : 2

B.E. (Mech.) (Part - IV) (Semester - VIII) (New) Examination, May- 2019 MECHATRONICS Sub. Code: 68508

Day and Date : Tuesday, 14 - 05 - 2019

Time: 10.00 a.m. to 1.00 p.m.

Seat

No.

Total Marks: 100

[8]

[8]

Instructions : 1) All questions are compulsory.

Answer to all questions must be written in one answer book.

- 3) Figure to the right indicate full marks to question.
- 4) Assume any data if necessary and state it clearly.

Q1) Solve any two of the following.

a) What do understand by multidiscipline scenario? Explain the same. [8]

- b) Discuss with neat sketch proximity sensor.
- c) List displacement Sensors and explain LVDT.

Q2) Solve any two of the following.

a)	What do you mean by filtering? Discuss any two filters?	[8]
b)	What is interfacing? List requirements of interfacing.	[8]
c)	Explain sample and hold circuit.	[8]

Q3) Solve any two of the following.

- a) What do you understand by means of digital logic? Explain Sequential Logic.
 [8]
- b) Explain organization of microcontroller System.
 [8]
- c) Convert following decimal number to Hexadecimal numbers. [8]
 1.234 2.3562 3.0.14 4.6768.

Q4) Solve any two of the following.

a)	Differentiate physical and Programming Comp	onents in case of	PLC
	and discuss merits and demerits.	-63	[8]
b)	Discuss Machine control terminology.	1.0	181
c)	Explain PLC Timer functions with application.	1.20	[8]
0		P	T.O.

- Discuss any two input devices and any two output devices in PLC. [8] Q5) a)
 - Develop a programmable ladder logic diagram for detecting, Sorting and b) packaging unit, list input and output Devices used in circuit. Ref. Figure [12] 5B.
 - Sense component i) |
 - Sort component for rejection and acceptance (ii)
 - iii) Open acceptance flapper.
 - Send component for packaging. iv)



Figure 5B

DETECTING, SORTING AND PACKAGING UNIT

O6) Solve any two of the following.

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- Discuss Mechatronics System design for automatic tool and pallet a) [8] changers.
- Discuss steps involved in writing ladder diagram for large process. [8] b)
- Device ladder programs for systems that will carry out the following c) [8] tasks.
 - Switch on a pump when the water level in a tank rises above 1.2m i) and switch it off when it falls below 1.0m.
 - Switch on a pump, then 100s later switch on a heater, then a further ii) 30s later switch on the circulating motor. UK-918-

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SV-109 Total No. of Pages : 2

B.E. (Mech.) (Semester - VIII) Examination, May- 2019 **ENERGY & POWER ENGINEERING**

Sub. Code: 68509

Day and Date : Thursday, 16 - 05 - 2019

Total Marks : 100

[8]

Time : 10.00 a.m. to 1.00 p.m.

Seat No.

O3) a)

Instructions :	1)	All questions are compulsory.
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2) Figure to the right indicate full marks to question.

Q1) a) Explain types of Solar Collectors with examples. [1]	10	L
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- Define the following. b)
 - Altitude Angle i)
 - Incident Angle ii)
 - Hour Angle iii)
 - iv) Declination Angle

OR

Classify the methods of Solar energy storage. Explain any one types of sensible heat storage system. [8]

- Explain working of Solar PV System with sketch both ongrid and offgrid Q2) a) [8] system.
 - Explain with neat sketch working of fuel cell list advantages of the fuel b) cell. [8]

OR

List types of fuel cells and applications of fuel cell.

Explain main consideration in relation of site for wind energy conversion

- system. State advantages and disadvantages of wind energy. [8] [8]
- Explain working of OTEC with neat sketch. b)

OR

Explain any one Hybrid System with neat sketch.

[8]

[8]

P.T.O.

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Q4) Answer any two.

[16]

- Explain with neat sketch, the working principle of nuclear power plant.
- Explain the power generation in private sector with respect to capacity, method of power generation, location and future expansion.
- Explain how the combined cycle plant can maximise the utilisation of power plant under varying load.
- Q5) a) Answer any two.

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[12]

504-79385

- Explain the various tariff methods.
- Explain with a sketch the radiation detector.
- iii) Explain the working of PH meter fuel analyser.
- b) Two electrical units used for same purpose are compared for the economical working:
 - i) Cost of first unit is Rs. 5000 and it consumes 100kW.
 - ii) Cost of second unit is 14000 and it consumes 60 kW.

Each of them has a useful life of 40000 hours. Which unit will prove economical if the energy is charged at Rs.80 per kW of maximum demand per year and 5 paise per kW-hr? Assume both units run at full load. [8]

Q6) a)	Describe the supply chain in power sector in India.	[8]
b)	Explain the process of energy audit in a foundry.	[6]

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SV - 110 Total No. of Pages : 3

B.E. (Mechanical) (Part - IV) (Semester - VIII) Examination, May - 2019 NOISE AND VIBRATION Sub. Code: 68510

Day and Date : Monday, 20 - 05 - 2019 Time : 10.00 a.m. to 1.00 p.m.

Seat No.

Total Marks : 100

- Instructions : 1) All questions are compulsory.
 - 2) Use of scientific calculator is allowed.
 - 3) Assume suitable data wherever necessary and mention it clearly.
 - Figures to the right indicate full marks.
- Q1) a) What are the different causes of vibration in machines? What are the effects of the vibration? [8]
 - b) What do you understand by the term equivalent stiffness of springs? How to find equivalent stiffness of the springs of different combinations? Find the equivalent stiffness of the system shown in Fig. No.1 and find the natural frequency of the system.



OR

P.T.O.

b) Find the natural frequency of the system shown in Figure No.2. What will be the natural frequency of the system if mass "m" is placed at the end of lever. [8]



- Q2) a) Derive the equation for logarithmic decrement of single degree, damped, free vibration of simple spring-mass-damper system. Make use of usual notation. [8]
 - b) A mass of 20 kg is suspended from a spring of stiffness 39000N/m. A dashpot is fitted to mass and it is found that the amplitude of vibration diminished from its initial value of 24 mm to 6 mm in two complete cycles. Find the resistance offered by the dashpot at velocity of 0.3 m/ s and frequency of damped vibration. Compare this value with frequency of free vibtration. [8]
- Q3) a) Show that the response of steady state vibration of single degree, forced vibration of spring- mass- damper system having harmonic excitation F₀ Sin ωt or F₀ Cos ωt is given by equation [8]

$$K = \frac{\text{Fo/K}}{\sqrt{\left[1 - \left(\frac{\omega}{\omega n}\right)^2\right]^2 + \left(\frac{2\zeta\omega}{\omega n}\right)^2}}.$$

b) A rotating machine of total mass of 200kg is mounted on a set of springs of total stiffness 25000 N/m and a viscous damper with damping coefficient 1000N-s/m. Machine rotates at a speed of 300 r.p.m. The rotor of the machine is having unbalance in it and produces unbalance force of magnitude 500N. Find amplitude of steady state vibration, force transmitted to the foundation and phase lag. [9]

OR

A mass of 5 Kg suspended by a spring stiffness of 1000N/m is forced to vibrate by a harmonic force of 10 N. Assuming viscous damping coefficient c=75 N-s/m, determine amplitude at resonance, the peak amplitude and frequency at peak amplitude [9]

Q4) a) What principal is used in the un-damped dynamic vibration absorber? What are the applications of vibration absorber.

OR

Explain the Rayeigh's method used to determine natural frequencies of multi degree free vibrating system. [8]

 b) Determine the lowest natural frequency of vibrating system shown in figure no. 3 by matrix iteration method. [9]



Figure No.3

- Q5) a) What is frequency analysis? What is role of frequency analysis in fault diagnosis? [8]
 - b) What are the types of exciters? Describe working and use of electromagnetic exciter. [8]
- Q6) a) Derive the relationship between sound pressure level, sound intensity level and sound power level. [9]

OR

What are the auditory and non auditory effects of noise on human being? What are the sound pressure limits during day and night time in India?[9]

b) A Spherical source of sound radiates uniformly in to a large volume of air at NTP condition. The frequency of sound wave is 300 Hz and sound power radiated from source is 40 mW. At a radial distance of 1.5 m from the source determine sound intensity, r.m.s acoustic pressure and particle velocity. [9]

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SV-111 Total No. of Pages : 3

B.E. (Mechanical) (Part - IV) (Semester - VIII) (Revised) Examination, May -2019 INDUSTRIAL ENGINEERING (Elective - III) Sub. Code : 68511

Day and Date : Wednesday, 22 - 05 - 2019 Time : 10.00 a.m. to 1.00 p.m. Total Marks : 100

Instructions: 1) All questions are compulsory.

- 2) Figures to the right indicate full marks.
- 3) Draw a neat-labelled diagrams wherever necessary.
- 4) Assume suitable data, if necessary.

Q1) Attempt any Three.

Seat No.

- a) Explain characteristics of continuous production system. [6]
- b) Comment "Increase in production may or may not increase in productivity". [6]
- c) What do you mean by productivity? How does it differ from efficiency & effectiveness. [6]
- d) Comparative study of a automobile components for the year 2017 and 2018 are given in the table below. Compute the changes in labour productivity.

Particulars	2017	2018
Output (in Units)	60,000	80,000
Labour input (In Rs.)	12,000	14,000

Q2) Attempt any four.

- a) How is job selected for method study?
- b) Define work study. What are components of work study?
- c) Explain construction and application of flow process chart with suitable example. [4]
- d) Draw two handed process chart for filling a fountain pen.
- c) Compare flow diagram and string diagram and state the application of each?
 [4]

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[4]

[4]

[4]

SV-111

[8]

[6]

Q3) Attempt any two.

- a) State examples of principles of motion economy as related to work place layout.
 [8]
- b) Give the name, abbreviation and symbol of any 8 Therbligs. [8]
- c) Discuss various factors related to work environment.

Q4) Attempt any three

Explain the following terms

i) Rating

- ii) Time study equipments
- b) In the following table, times shown are stopwatch readings in minutes. Initial setting of stopwatch is at 0.00.

	Cycle time (in minutes)				Performance	
Elements	1	2	3	4	rating in %	
A	3.6	3.8	3.4	3.6	105	
В	37	7.2	7.4	7	90	
Cal	5	5.2	5.4	5.6	110	
D)	12.2	12.4	12	12.4	100	
) E	8.4	8.2	8.6	8.6	115	

Relaxation allowance as 15%. Estimate the standard time of operations and production per 8 hours of shift.

- c) Discuss the need for various allowances in determining the standard time? [6]
- d) Describe Principles and techniques of work measurement and their applications? [6]

Q5) Attempt any two

- a) Name and discuss the factors which you need to consider for the selection of site of sugar industry. [8]
- b) Explain the tools and techniques of layout planning.
- Which type of layout do you recommend for a manufacturing flywheels used in automobiles? Give reasons.
 [8]

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Q6) W	rite short notes on any four.		
a)	Phases in value analysis	A. 80	
b)	Value analysis of a hievele	1,32	[4]
c)	Benefits of merit rating	JUG B	[4]
d)	Job analysis		[4]
e)	Job specification for foundation	1	[4]
	to roundry supervisor	1	4]

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SV-114 Total No. of Pages : 2

B.E. (Mechanical Engineering) (Part - IV) (Semester - VIII) Examination, May -2019 ADVANCED I. C. ENGINES (Elective - III) Sub. Code : 68515

Day and Date : Wednesday, 22 - 05 - 2019 Time : 10.00 a.m. to 1.00 p.m. Total Marks : 100

Instructions: 1) All questions are co	ompulsory.
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- Figures to the right indicates full marks.
- 3) Draw neat sketches wherever necessary.
- 4) Use of nonprogrammable scientific calculator is permitted.
- Q1) a) With the neat sketch explain Multi-Point fuel injection system used in S.I. engines and its advantages. [9]
 - b) Explain in detail the design requirements of intake manifold of S.I. engines?
 [8]

Q2) answer any two.

Seat No.

- a) With a schematic layout explain the electronic engine management system used in C.I. Engines. [8]
- Explain the spray formation phenomena and spray characteristics of C.I. engine. [8]
- c) With neat sketch, explain the method of swirl measurement. [8]
- Q3) a) Explain the S.I. combustion chamber optimization strategy. [8]
 - b) Describe thermodynamic analysis of C.I. engine combustion. [9]

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04)	(8)	With the block discourse within the second	5, 114
21)	, a)	biodiesel manufacturing	ess used for
		orouteser manaracturing.	[9]
	b)	With a schematic layout, explain the modifications require	d in petrol
		engine to use LPG as a fuel.	[8]
	0	8°	
Q5)	a)	Explain the mechanism of formation of CO, UBHC and NOx	emissions.
			[9]
	b)	Compare International and National Emission Norms	[8]
			101
Q6)	Ans	swer any Two.	
	a)	Explain homogeneous charge compression ignition engine.	[8]
	b)	Describe the advantages of variable valve timing over the cor	ventional
		valve timing.	5 [8]
	c)	With neat sketch explain the working of six stroke engine.	[8]
	9		

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SV-115 Total No. of Pages : 2

B.E.(Mechanical) (Part - IV) (Semester - VIII Examination, May - 2019 INDUSTRIAL AUTOMATION AND ROBOTICS (Elective - IV) Sub. Code : 68518

Day and Date : Friday, 24 - 05 - 2019 Time : 10.00 a.m. to 1.00 p.m.

Total Marks : 100

Instructions :

Seat

No.

- 1) All questions are compulsory.
- 2) Figures to the right indicate full marks.
- Make suitable assumption if necessary and mention them clearly. 3)

Explain three phases of typical automation migration strategy. Q1) a) [8]

Discuss with an appropriate example the concept of levels of automation.[8] b)

Explain any two linear transfer systems in automated production lines.[8] Q2) a) Explain analysis of transfer line with storage buffer. b) [8]

Explain the concept of product design for automated assembly. Q3) a) [8]

OR

- Explain part delivery system in automated assembly line. a) [8]
- Explain various vibratory and non vibratory devices for feeding and b) orientation. 504-2918 [10] UK-AON

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- Q4) a) Explain the common robot configurations and their work volumes. [8]
 b) Explain different joints and their degree of freedom in robot system. [8]
 Q5) a) Explain direct and inverse kinematics solutions in robotics. [8]
 - b) Explain the remote center compliance (RCC) device in robot assembly.[8]
- Q6) a) Explain applications of Robot. [8]
 b) Explain WAIT, SIGNAL and DELAY commands in industrial robot. [10]

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SV-116 Total No. of Pages : 2

B.E.(Mechanical) (Semester - VIII) Examination, May - 2019 CRYOGENICS (Elective-IV) Sub. Code : 68519

Day and Date : Friday, 24 - 05 - 2019 Time : 10.00 a.m. to 1.00 p.m.

Total Marks : 100

Instructions :

Seat No.

- 1) All questions carry equal marks.
- Figures to the right indicate full marks.
- Make suitable assumption if necessary and mention them clearly.
- Q1) a) Discuss the range of field of Cryogenics on a log scale thermometer. [6]
 - b) Discuss the Thermal properties of cryogenic material at cryogenic scale.[5]
 - c) Explain with suitable example need of Cryogenics in space applications.[5]

Q2) a) Differentiate between Joule Thomson expansion and Adiabatic expansion. [6]

b) Solve the following (any two).

SUK-9843

[10]

- Difficulties in Liquefaction of gases like Neon, Hydrogen and Helium.
- Differentiate between Simple Linde Hampson system and precooled Linde Hampson System.
- iii) Helium generated Hydrogen liquefaction system.

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[10]

[18]

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Q3) Write short notes on (any three).

- a) Super conducting devices.
- b) Pulse Tube Cryocooler.
- Draw schematic sketch of ideal liquefaction system also discuss it on T-S diagram.
- d) Claude system for liquefaction of Hydrogen.
- Q4) a) Explain with neat sketch classification of Thermodynamic cycles. [6]
 b) Explain the working of Sterling refrigeration system with the help of schematic sketch, also write expression for its COP. [5]
 - c) Explain the working of recuperative cryocooler neat sketch. [5]
- Q5) a) Explain with neat sketch the storage device for cryogenic fluid. [6]
 - b) Solve any two of following.
 - i) Temperature composition diagram.
 - ii) Turbine flow meter.
 - iii) Magnetic thermometer.

Q6) Write short notes on (any three).

SUK-98120

- Capacitance liquid level prober for cryogenic liquid level measurement.
- b) Principles of rectifier column.
- c) Single column and double column air separation systems.
- d) Insulation used in cryogenics.

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