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## EIGHTH SEMESTER

**B.E. (ME)**

**MID SEM EXAMINATION**

**March.**

**2006**

### **ME-411 INDUSTRIAL ENGINEERING**

*Time: 1 Hour 30 Minutes*

*Max. Marks : 20*

**Note :** Answer **ALL** questions.  
Assume suitable missing data, if any.

- 1 Explain with the help of a figure, 'Historical developments in production system' alongwith the Industrial Engineering tools. 2
- 2 Define and Explain the importance of production planning and control. 2
- 3 Discuss the historical evolution of quality concepts. 2
- 4 How acceptance sampling, process control and design of experiments help quality control. 2
- 5 Differentiate and explain quality thinking in older days and modern days. 2
- 6 Define work study. Explain the objectives of work study. 2
- 7 With the help of a chart show the relationship between method study and work-measurement. 2
- 8 Write the basic procedure for method study and explain the first step of selection of the work. 2

- 9 Define : (i) Flow diagram (ii) String diagram  
(iii) Cycle graph (iv) Chrono-cycle graph. 2
- 10 Explain the principles of Economy in relation to arrangement  
of work place. 2

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## EIGHTH SEMESTER

**B.E. (ME)**

**MID SEM EXAMINATION**

**March.**

**2006**

### ME-412 AUTOMOTIVE ENGINEERING

*Time: 1 Hour 30 Minutes*

*Max. Marks : 20*

**Note :** Answer **ALL** questions.

Assume suitable missing data, if any.

- 1[a] Discuss the requirements for the power plant of an automobile. 2½
- [b] What is the necessity of a Gear box in a vehicle? 2½
- 2 Explain the working of a differential. What is limited slip differential? 5
- 3 Explain the working of a torque converter. How it is different from a fluid flywheel? Also draw its characteristics curve. 5
- 4 Write short notes on the following :
- [a] Castor
  - [b] Camber
  - [c] Self rightening torque
  - [d] Kingpin inclination
  - [e] Centre point steering. 5

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## EIGHTH SEMESTER

**B.E. (ME)**

**MID SEM EXAMINATION**

**March 2006**

### ME-416 COMBUSTION ENGINE EMISSIONS

Time: 1 Hour 30 Minutes

Max. Marks : 20

**Note :** Answer **ALL** questions.

- 1 Justify the following statements with reasons
  - [a] "In SI engines hydrocarbon emissions increase when very lean mixture is used" 1½
  - [b] "CO emissions in SI engines are very high during cold start and idling". 1½
  - [c] "Advanced ignition timing increases NO<sub>x</sub> emissions in spark ignition engines". 1½
  - [d] "CNG engine produces lower power as compared same size gasoline engine". 1½
- 2 Explain the variation of NO<sub>x</sub> emissions with the variation of air fuel ratio. 1
- 3 What are the various crevice regions in a SI engine combustion chamber? Explain how these crevice regions add to HC emissions from a gasoline engine tailpipe. 2½
- 4 Explain the mechanism of formation of CO in SI engines during combustion. 2½
- 5 What do you understand by vapour lock? Explain vapour lock phenomenon in a gasoline vehicle. 2

- 6 Compare the performance of gasoline and CNG at similar equivalence ratios with respect to thermal efficiency and CO emissions. 3
- 7 What are the three sources of benzene emission from a vehicle powered by gasoline? Explain how aromatics content in gasoline contribute to benzene emissions. 3

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**EIGHTH SEMESTER**

**B.E. (ME)**

**MID SEM EXAMINATION**

**March**

**2006**

**ME-417 INDUSTRIAL QUALITY CONTROL**

**Time: 1 Hour 30 Minutes**

**Max. Marks : 20**

**Note :** Answer **ALL** questions.

Assume suitable missing data, if any.

- 1 Discuss different tools and techniques of Total Quality Management. **5**
- 2 Discuss different components of cost for maintaining product quality. **5**
- 3 Discuss different types of control charts used for attributes. **4**
- 4 In the manufacturing of precision pins in which the diameter of the pin is the quality characteristic to be controlled, 10 samples of five pins each were collected after a laps of every thirty minute period.  $\bar{x}$  and R for each sample., were calculated and the results are recorded as below.

Sample No.	1	2	3	4	5	6	7	8	9	10
$\bar{x}$	50.04	50.24	50.14	50.08	50.28	50.16	50.30	50.10	50.16	50.10
R	0.07	0.08	0.03	0.05	0.04	0.09	0.04	0.04	0.05	0.07

- (i) Determine the control limits on  $\bar{x}$  and R chart
- (ii) Plot the averages and ranges on the  $\bar{x}$  and R chart
- (iii) Determine process capability.

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## EIGHTH SEMESTER

**B.E. (ME/PE)**

**MID SEM EXAMINATION**

**March.**

**2006**

### ME-419/PE-421 MATERIALS MANAGEMENT

*Time: 1 Hour 30 Minutes*

*Max. Marks : 20*

**Note :** Answer **ALL** questions.

Assume suitable missing data, if any.

- 1 An organization is to decide about the number of expensive spares of a particular type to be ordered along with the procurement of the main equipment. Each spare costs Rs.15,000 and the opportunity cost of non-availability is estimated to be 20 times this cost. A surplus spare can be salvaged at 60% of the purchase price. During planning period, the demand for the spare is estimated according to the following probability distribution :

Demand :	0	1	2	3	4	5	6
Probability :	0.6	0.2	0.1	0.05	0.04	0.01	0.00

What should be the optimal number of spares to be ordered?

4

- 2 What are the indicators of low material productivity?

4

- 3 Material manager is presently procuring four items with the following details :

Item	Annual demand (units)	Unit Price (Rs/unit)	No. of orders/year
1	8000	4	3
2	4000	5	2
3	500	10	3
4	300	3	4

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Can this policy be improved? How much inventory reduction is possible by rationalization? Use OPC. 5

4 Define and explain "Six rights". 3

5 What are the assumptions of Wilson's EOQ model? 4



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## EIGHTH SEMESTER

**B.E. (ME)**

**MID SEM EXAMINATION**

**March 2006**

### ME-421 EXPERIMENTAL STRESS ANALYSIS

Time: 1 Hour 30 Minutes

Max. Marks : 20

**Note :** Answer **ALL** questions.

Assume suitable missing data, if any.

- 1 A square of 200mm is scribed on a mild steel plate (having  $E=210 \text{ kN/mm}^2$ ). Find the major and minor diagonal of the deformed body, if the plate has been applied  $\sigma_x = 60 \text{ N/mm}^2$   $\sigma_y = 45 \text{ N/mm}^2$  and shear stress  $q = 20 \text{ N/mm}^2$  downward on right hand side. Take  $\frac{1}{m} = 0.27$ . Also find the orientation of the major axis of the deformed body. 10
- 2 What is the significance of un-cracked areas of the brittle-coating field at the conclusion of a brittle coating test? Are these regions of any importance with respect to the stress gradient aspects of a given design? 5
- 3 How the rectangular and triangular rosettes are useful in determining the strain in particular specimen? Derive the expression for strains for a rectangular rosette. 5

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## EIGHTH SEMESTER

B.E. (ME)

MID SEM EXAMINATION

March 2006

### ME-425 ANALYSIS & SYNTHESIS OF LINKAGES

Time: 1 Hour 30 Minutes

Max. Marks : 20

**Note :** Answer **ALL** questions.  
Assume suitable missing data, if any.

- 1 Design a linkage to generate a function  $y = x^{1.5}$ . Assume input range  $60^\circ$  starting from  $60^\circ$  to  $120^\circ$  and output link range is  $90^\circ$  starts with  $60^\circ$  to  $150^\circ$ . 10
- 2 Design graphically a 4 bar mechanism for input angle  $60^\circ$  and output angle  $80^\circ$ . Input angle starts from  $30^\circ$  and output from  $60^\circ$ . 5
- 3 Derive an expression for velocities of linkages of 4 bar mechanism. 5