

Reg. No. :

Name :

**VII Semester B.Tech. Engineering Degree (Regular including Part Time)
Examination, December 2010**

PT 2K6 / 2K6 ME 701 : METROLOGY AND INSTRUMENTATION

Time: 3 Hours

Max. Marks: 100

PART – A

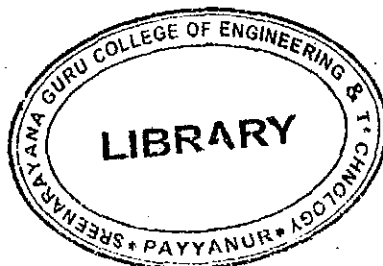
1. a) Explain zeroth, first and second-order system. 5
- b) How does an error differ from uncertainty ? What is a fixed error, random error ? 5
- c) Why is an uncertainty analysis important in the preliminary stages of experiment planning ? 5
- d) Write a note on mechanical comparators. 5
- e) How many temperature compensation be performed on resistance strain gauges ? 5
- f) Name three types of thermocouples with their respective compositions and polarity. Explain also the principle of operation. 5
- g) How sound is measured ? What are the components of sound measurement system ? 5
- h) What are the different types of automatic process control used in industry ? Describe any one of them in brief. 5

PART – B

2. a) Explain the factors influence the time constant in first-order system. 7
- b) In a cooling experiment the system is presumed to behave as a first order system following a relation like

$$Y = Ce^{-at}$$

P.T.O.





The following data points are collected :

Y	t
0.9	0.1
0.8	0.5
0.4	0.9
0.3	1.2
0.2	1.7
0.1	2.3
0.01	4.6

Plot the data on an appropriate graph to obtain a straight line. Then perform a least-square analysis to obtain the best values of C and a. Calculate the correlation coefficient for the least square fit.

8

OR

- c) Write the assumptions to be followed for Gaussian distribution for experimental data. 5
- d) What do you mean by loading effect in measuring instruments ? Explain in details the various types of loading effects. 10
3. a) How can statistical analysis be used to experimental uncertainty ? 5
- b) Two resistors R_1 and R_2 are connected in series and parallel. The values of the resistance are

$$R_1 = 100.0 \pm 0.1 \Omega$$

$$R_2 = 50.0 \pm 0.03 \Omega$$

Calculate the uncertainty in the combined resistance for both the series and the parallel arrangements.

10

OR



- c) Write a note on :
- i) Strain gauges
 - ii) LVDT. 7
- d) A rectangular rosette is placed on a steel plate and indicates the following strains :
- $\epsilon_1 = 563 \mu\text{m/m}$
 - $\epsilon_2 = -155 \mu\text{m/m}$
 - $\epsilon_3 = -480 \mu\text{m/m}$
- Calculate the principal strains and stresses, the maximum shear stress and the orientation angle for the principal axes. 8
4. a) Write a note on optical pyrometer. 7
- b) Describe the principle of operation of the Geiger Muller counter. 8
- OR
- c) How the products of combustion can be analysed ? Explain any one method. 8
- d) Explain how torque can be measured using electric dynamometer. 7
5. a) Write a note on microphone. Discuss various types of microphones with their advantages and disadvantages. 10
- b) Write a note on :
- i) Atmospheric noise
 - ii) Thermal noise. 5
- OR
- c) Write a note on process control and regulators. 7
- d) Explain in detail about method of determining stability of linear control systems. 8
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M 18532

R/g. No. :

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**VII Semester B.Tech. Engineering Degree (Regular Including Part Time)
Examination, December 2010
PT 2K6/2K6ME 702 : INDUSTRIAL MANAGEMENT**

Time : 3 Hours

Max. Marks : 100

GROUP – I

Answer all :

(8×5=40)

1. Mention some of the management functions used in an educational institution.
2. What do you mean by decision making under uncertainty ? Give example.
3. Define PERT network and when it can be implemented in an industry.
4. What do you mean by minimal spanning tree problem ?
5. Mention about single exponential smoothing method.
6. Comment on Scheduling and its significance.
7. Differentiate job enrichment and job enlargement.
8. Differentiate wages and incentives and mention its types.

GROUP – II

Answer all :

(4×15=60)

9. a) Explain about principles of organizing and suggest a suitable organizing method for a batch process industry.

OR

- b) Explain different models of decision making.

P.T.O.



10. a) Explain with example different network techniques with examples.

OR

- b) The following project carries a penalty cost of Rs. 200 per day (Rs. 1,400 per week) for any delay in completion beyond 26 weeks. Any task can be accelerated by upto 3 weeks at a cost of Rs. 1,000 per week reduction :

- i) Draw a an arrow network diagram.
- ii) Identify the critical path and duration.
- iii) Determine which task, if any, you will crash, and by how much, to minimize project cost ?

Task	Follows Task	Duration (Week)
A	Start	6
B	A	20
C	B	10
D	D	30
E	START	15

11. a) Explicate the functions of PPC and write about material requirement planning.

OR

- b) Explain the performance measures of scheduling and write about linear forecast.

12. a) Explain the importance of human resource management and mention the effective methods for evaluating newly appointed programmers in a software industry.

OR

- b) Write short notes on :

- i) Elements of costs
 - ii) Depreciation
 - iii) Methods of allocation of overhead costs
 - iv) Cost accounting.
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**VII Semester B.Tech Engineering Degree (Regular Including Part Time)
Examination, December 2010
PT 2K6/2K6 ME 703 : MACHINE DESIGN – I**

Time : 3 Hours

Max. Marks : 100

PART – A

(8×5=40)

1. a) Write down the principles of standardization.
- b) State the importance of modeling and analysis packages in design.
- c) A lever loaded safety valve has a diameter of 100 mm and the blow off pressure is 1.6 N/mm^2 . The fulcrum of the lever is screwed in to the cast iron body of the cover. Find the diameter of the threaded part of the fulcrum if the permissible tensile stress is 50 MPa and the leverage ratio is 8.
- d) List out the various types of keys. Also write down the merits and demerits of woodruff key.
- e) Write the elements of welding symbol. Also draw the symbol with standard location of elements.
- f) What is meant by surge in springs and mention the ways to reduce the phenomenon surge ?
- g) Find the diameter of a solid steel shaft to transmit 20kW at 200 rpm. The ultimate shear stress for the steel shaft may be taken as 360 MPa and the factor of safety as 8. IF the hollow shaft is to be used in place of solid shaft, find the inside and outside diameter when the ratio of inside to outside diameter is 0.5.
- h) List out the requirements of good shaft couplings. Also differentiate between rigid coupling and flexible coupling.

P.T.O.



PART – B

(4×15=60)

2. A) A cylindrical shaft made of steel of yield strength 700 MPa is subjected to static loads consisting of bending moment 10kN – m. Determine the diameter of the shaft using maximum shear stress theory and maximum strain energy theory. Assuming factor of safety of 2. Take 210 GPa and Poisson's ratio 0.25.

OR

- B) Explain the steps involved in design process. Also write the merits of computer aided design over conventional design.

3. A) Find the efficiency of the following riveted joints.

- i) Single riveted lap joint of 6 mm plates with 20 mm diameter rivets having pitch of 50 mm.
- ii) Double riveted lap joint of 6 mm plates with 20 mm diameter rivets having a pitch of 65 mm.

Assume permissible tensile stress in plate = 120 MPa, permissible shearing stress in rivets = 90 MPa and permissible crushing stress in rivets = 180 MPa.

OR

- B) Design and draw a cotter joint to support a load varying from 30 kN in compression to 30 kN tension. The material used is carbon steel for which the following allowable shear stresses may be used. The load is applied statically. Tensile stress = compressive stress = 50 MPa; shear stress = 35 MPa and crushing stress = 90 MPa.

4. A) i) A plate of 100 mm wide and 10 mm thick is to be welded with another plate by means welds at the ends. If the plates are subjected to a load of 70 kN. Find the size of weld for static as well as fatigue load. The permissible tensile stress should not exceed 70 MPa.
- ii) A circular steel bar 50 mm diameter and 200 mm long is welded perpendicularly to a form a cantilever to be loaded with 5 kN at the free end. Determine the size of the weld assuming the allowable stress in the weld as 100 MPa.

OR



- B) Design a helical compression spring for a maximum load of 1000 N for a deflection of 25 mm using the value of spring index as 5. The maximum permissible shear stress for spring wire is 420 MPa and modulus of rigidity is 84 kN/mm². Take Wahl's factor, $K = (4C - 1/4C - 4) + (0.615/C)$. Where C = Spring index.
5. A) A solid shaft subjected to a torque of 45 kNm. If the angle of twist is 0.5° per meter length of the shaft and the shear stress is not to exceed 90 MN/m², find the suitable diameter for the shaft, maximum shear stress and maximum shear strain in the shaft. Take C = 80 GN/m².

OR

- B) Design a cast iron flange coupling for a mild steel shaft transmitting 90 kW at 250 rpm. The allowable shear stress in the shaft is 40 MPa and the angle of twist is not to exceed 1° in a length of 20 diameters. The allowable shear stress in the coupling bolts is 30 MPa.
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**VII Semester B.Tech. Engineering Degree (Regular Including Part Time)
Examination, December 2010**

PT2K6/2K6ME704 : POWER PLANT ENGINEERING

Time: 3 Hours

Max. Marks: 100

PART – A

1. a) List out the safety devices used in boiler. Also write its purpose. (8×5=40)
- b) Write down the merits of high pressure boilers.
- c) Differentiate between impulse and reaction turbines.
- d) Mention the merits of steam turbines over steam engines.
- e) Make a neat sketch and explain the working of multi retort stoker.
- f) Describe the working principle of solar thermal power generation.
- g) What is meant by load curve ? What its significance in power generation?
- h) Discuss the various pollutants from steam power plant.

PART – B

2. A) With block diagram explain the following power cycles. (4×15=60)
 - i) Binary vapour cycle
 - ii) Reheat-Regenerative cycle.

OR

B) With neat sketch explain the working principle of babcock and Wilcox boiler.

3. A) List out the methods employed in governing of steam turbines. Also explain any two methods of steam turbine governing with neat sketch.

OR

P.T.O.



- 3) Steam at a pressure of 15 kg/cm^2 and temperature of 250°C is expanded through a turbine to a pressure of 5 kg/cm^2 . It is then reheated at constant pressure to a temperature of 200°C after which it complete its expansion through the turbine to an exhaust pressure 0.1 kg/cm^2 . Calculate theoretical efficiency.
- Taking reheating in to account.
 - If the steam was expanded direct to exhaust pressure without reheating.
4. A) Name the different types of hydroelectric power plants. Describe the pumped storage power plant and high head hydro electro power plant.

OR

- B) What is wind energy ? State the characteristics of wind energy. Also explain the working principle of horizontal axis and vertical axis wind mill.
5. A) A central power station has annual factors as follows :
- Load factor = 60%
- Capacity factor = 45%
- Use factor = 45%
- Power station has a maximum demand of 15,000 kW. Determine Annual energy production, Reserve capacity over and above peak load, Hours per year not in service.

OR

- B) Describe the methods used to control the following from steam power plant.
- SO_2
 - NO_x .
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M 18535

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PT 2K6/2K6 ME 705 (A) : MARKETING MANAGEMENT

Time: 3 Hours

Max. Marks: 100

PART – A

1. Bring out the differences between selling and marketing. 5
2. What are the changes in the environment that makes marketing more challenging today ? 5
3. Explain BCG matrix. How is it used to appraise the business portfolio ? 5
4. What are the various bases used for segmenting the market ? Explain briefly. 6
5. What is marketing research ? Give the scope and list the benefits of the research. 5
6. Sketch the typical product life cycle and describe the various stages of the life cycle. 5
7. Briefly account the various promotion tools. 5
8. What are the various elements of marketing mix ? Explain briefly. 5

PART – B

9. a) What are the various concepts of marketing ? Show how marketing concepts evolved citing their fit. 15
- OR
- b) What are kinds of environment that are prevalent for marketing an offering ? Explain. 15

P.T.O.



10. a) Give the process of marketing planning and explain each step in detail. 15
- OR
- b) What is positioning ? Write a note on how a company uses different bases for positioning. 15
11. a) Mention the various strategies that companies practice in order to break through the mature product syndrome. Give examples. 15
- OR
- b) Explain the five-stage model of the consumer buying process in detail. 15
12. a) Give a detailed note on how an advertising message is designed. 15
- OR
- b) Critically analyze a favourite advertisement of yours. 15

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