Code : 1G562

R11

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES :: RAJAMPET
(AUTONOMOUS)

III B.Tech. II Semester Supplementary Examinations December, 2014

CAD/CAM

(Mechanical Engineering)

Time: 3 hours **Max Marks: 70**

Answer any FIVE of the following
All questions carry equal marks (14 Marks each)

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1. a) Discuss the role of computers in Industrial Manufacturing. 6M

   b) Compare the product life cycle in a conventional and computer based manufacturing environment. 8M

2. a) Define database and discuss about various types of database models 6M

   b) Find the transformed coordinates when a square [(1,1), (2,1), (1,2) & (2,2)] is rotated by 90^0 anticlockwise about a line passing through one of its vertex (1,1) and parallel to x-axis. Solve the problem by homogeneous transformations. 8M

3. a) A cubic Bezier curve is defined by the control points as (20, 20), (60, 80), (120, 100), and (150, 30). Find the equation of the curve and its midpoint. 8M

   b) What is a Bezier surface? Discuss the properties of Bezier surface. 6M

4. a) What is a turning centre? Discuss about the features of a turning centre. 6M

   b) What is meant by Canned Cycle? Illustrate its importance by writing NC part program with and without using canned cycle for the component shown in Fig.1 below.

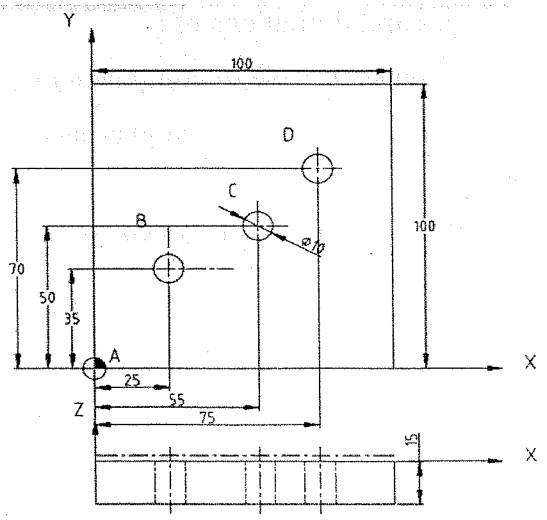

Fig. 1 8M

5 a) What is meant by part family? List about various types of parts classification and coding systems 4M

b) Develop the opitz form code (first 5 digit) with justification for the component shown in Fig.2.

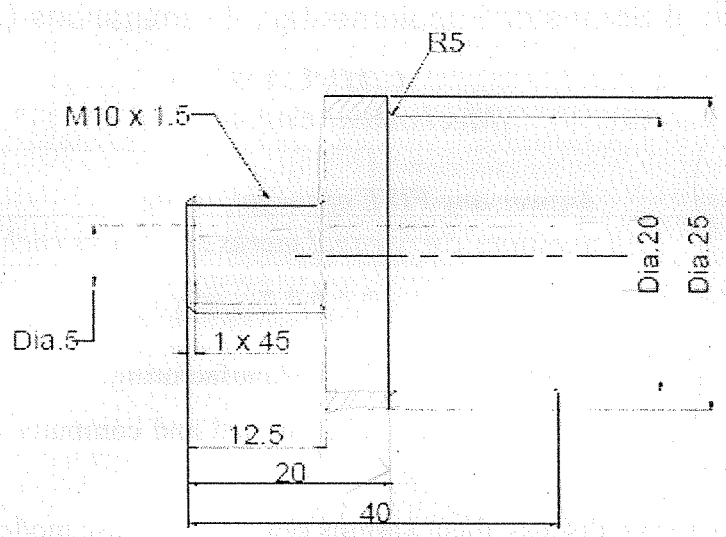

Fig.2 5M

c) What is meant by CAPP? Discuss about the working of a retrieval CAPP system with a neat sketch. 5M

6. a) Define FMS and discuss the classification of various types of FMS systems. Mention the advantages and limitations of FMS system. 7M

b) Explain the various principles of material handling and discuss about any five type of material handling systems 7M

7. a) Discuss about various types of shop floor data collection systems 7M

b) What is meant by MRP I? Discuss about the working of a MRP I system with a neat sketch. Mention the advantages and limitations of it. 7M

8. a) Define the term Quality and discuss the role of computers in quality control 4M

b) Classify various types of contact inspection techniques and discuss about working of a CMM with a neat sketch. 6M

c) Discuss about the working of a machine vision system with a neat sketch. 4M

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Code : 1G565

R11

III B.Tech. II Semester Supplementary Examinations December, 2014

Design of Machine Elements-II

(Mechanical Engineering)

Time: 3 hours **Max Marks: 70**

Answer any FIVE of the following
All questions carry equal marks (14 Marks each)

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1. a) Explain the mechanism of Hydrodynamic Lubrication. 4M

   b) Select a suitable ball bearing for an axial flow compressor to carry radial load of 2600 N and thrust load of 1500 N. The service imposes light shock and the bearing will be in use 6 hours per day for 5 years. The speed of the shaft is 100 rpm, and the diameter of the shaft is 60 mm. 10M

2. Design a cast iron piston for a single acting four stroke engine for the following data:

Cylinder bore	= 100 mm
Stroke	= 120 mm
Maximum gas pressure	= 5 MPa
Break mean effective pressure	= 0.5 MPa
Fuel consumption	= 0.15 kg / KW / h
Speed	= 2200 rpm

   Assume other data suitably. 14M

3. a) Derive an equation for the Whipping stress in the connecting rod. 6M

   b) Explain the design procedure and analysis of center crankshaft, when the crank is at angle of Maximum Twisting Moment. 8M

4. a) Differentiate between straight and curved beams, when subjected to bending 4M

   b) Plot the distribution of stresses across section A-A of the crane hook shown in Figure-1. The cross section is trapezium, with 18 mm and 36 mm sides and height of 100 mm, and the load is 30 KN.

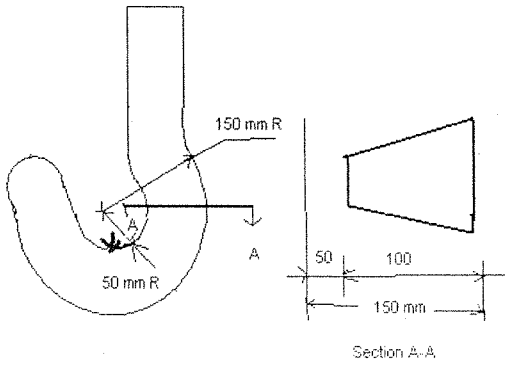

Figure-1 10M

5. a) What are the advantages and disadvantages of V-belt drive over flat belt drive. 4M

b) A V-belt is driven on a flat pulley and a V-pulley. The drive transmits 20 kW power from a 250 mm diameter V-pulley operating at 1800 rpm to a 900 mm diameter flat pulley. The center distance is 1 m. The angle of groove is 40^0. The coefficient of friction for both pulleys is 0.2. The cross sectional area of the belt is 230 mm^2. For the belt material, the density of is 1100 kg/m^3 and the allowable stress is 2.1 MPa. Find the number of belts required. 10M

6. A cast steel spur pinion running at 450 rpm, transmits 20 Kw power to a cast iron gear running at 112 rpm. The load is steady and continious. Design the drive and check for dynamic and wear loads. The static strength for cast steel is 200 Mpa and for cast iron is 80 Mpa. Number of teeth on pinion is 24. Tooth profile is 20^0 full depth involute. Take the module as 6 mm 14M

7. a) Sketch and explain the construction of leaf springs used in automobiles. 4M

b) At the bottom of an elevator shaft a group of 8 identical helical springs are set in parallel to absorb the shock of the elevator in case of a failure. The elevator weighs 28 kN. Assuming that the elevator has a free fall of 1.2 m from rest, determine the maximum stress induced in each spring if each spring is made from 30 mm diameter rod. For each spring the spring index is 6 and the number of active turns is 15. Neglect any effects of counterweights in the system and take G = 84 GN/m^2 10M

8. a) Discuss various types of power threads and give atleast two practical applications for each type. 4M

b) In a differential jack, the outside diameter is 50 mm and the threads are of square form single start. The coefficient of thread friction is 0.15. The pitch for the upper portion of the screw is 16 mm and for the lower portion is 12 mm. Determine (i) the efficiency of the differential jack and (ii) Load that can be lifted, if the shear stress in the body of the screw is limited to 28 MPa. 10M

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Code : 1G566

R11

III B.Tech. II Semester Supplementary Examinations December, 2014

Industrial Management

(Mechanical Engineering)

Time: 3 hours **Max Marks: 70**

Answer any FIVE of the following
All questions carry equal marks (14 Marks each)

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1. a) Discuss on Fayol's Principles of Management 7M
   b) Discuss on Mayo's Hawthorne Experiments 7M
2. a) Distinguish Line and staff organization 7M
   b) Discuss about boundary less organization 7M
3. a) Discuss the factors affecting the plant location. 7M
   b) Discuss about types of production 7M
4. a) Describe the Work Sampling steps involved, and standard time calculations in it. 7M
   b) Discuss various allowances to be provided while arriving standard time 7M
5. a) Describe the various types of inventories 7M
   b) Describe ABC, VED analysis 7M
6. With the help of following data, draw the network?
   (a) Draw the network.
   (b) Find the project duration for following project.
   (c) Identity critical path.

Activity	1–2	1–3	1–4	2–4	2–5	3–4	3–7	4–6	4–7	5–6	5–7
Time (months)	4	6	12	7	11	7	8	8	13	4	7

14M

7. a) Describe any two variable control charts 7M
   b) Discuss OC curve of acceptance sampling 7M
8. a) Describe any two wage incentives schemes. 7M
   b) Discuss on functions of HRM 7M

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Code : 1G563

R11

III B.Tech. II Semester Supplementary Examinations December, 2014

Metrology and Surface Engineering

(*Mechanical Engineering*)

Time: 3 hours **Max Marks: 70**

Answer any FIVE of the following
All questions carry equal marks (14 Marks each)

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1. a) Explain the terms:

(i)Basic size (ii)Zero line

(iii)Lower and upper deviations

Draw a conventional diagram to represent these terms for a shaft and hole pair of interference fit. 6M

b) Differentiate between interchangeability and selective assembly? 8M

2. a) What are wavelength standards and what are their advantages? 6M

b) With the help of neat sketches, explain how a Sine bar is used to determine the taper angle of an inclined surface? 8M

3. a) What are the necessary conditions for interference of light waves? 7M

b) What are the measuring techniques employed in optical projector? 7M

4. a) Explain terms: Roughness height; Roughness width; Lay; flaw 6M

b) Explicate the working principle of

(i) Mechanical comparator (ii) Electrical comparator 8M

5. The following elements of screw threads are to be measured:

(i) Outer Diameter. (ii)Effective Diameter.

(iii)Pitch Diameter

Explain the methods with sketches wherever possible. 14M

6. With the aid of sketches describe how the following tests may be carried out on a centre lathe.

(i) Straightness of a bed.

(ii)Parallelism of the spindle axis with the guide ways.

(iii)Parallelism of the axis of 'centres' with the bed in the vertical plane. 14M

7. a) Describe briefly the method of measurement of tooth thickness by constant chord method? 7M

b) Discuss about applications of Coordinate Measuring Machine (CMM)? 7M

8. Explain the terms Dip coating and Spray coating? Distinguish between these two Processes and also compare their merits and demerits. 14M

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Code : 1G564

R11

III B.Tech. II Semester Supplementary Examinations December, 2014

Thermal Engineering-III

(Mechanical Engineering)

Time: 3 hours **Max Marks: 70**

Answer any FIVE of the following
All questions carry equal marks (14 Marks each)

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1. a) Explain the effect of isentropic efficiency of turbine and compressor on the work output of gas turbine cycle. 6M
   b) With the help of a neat diagram explain the working of Closed Cycle Gas Turbine 8M
2. A turbo jet engine flying at a speed of 1000 km/hr consumes air at the rate of 55 kg/sec. Calculate
   a) Exit velocity of jet if the enthalpy change for the nozzle is 220 kj/kg and velocity coefficient is 0.98
   b) Fuel flow rate in kg/sec
   c) Thrust specific fuel consumption
   d) Thermal efficiency of the plant when the combustion efficiency is 95 % and heating value of the fuel is 45000 kj/kg
   e) Propulsive power
   f) Propulsive efficiency
   g) Overall efficiency 14M
3. a) Name five means of producing refrigeration 4M
   b) An air refrigerator of 15 TR operates on a Bell-Coleman cycle. The temperature of air entering the compressor is 120^0C and that of entering the expander is 300^0C. The quantity of air circulated is 60 kg/min. The compression and expansion follow the law $PV^{1.25}$=constant. Find COP of the system and the power required to run the system. 10M
4. a) Why in practice a throttle valve is used in V.C.R system rather than an expansion cylinder to reduce the pressure between condenser and evaporator? 7M
   b) Differentiate between dry compression and wet compression. What are the advantages of one over the other? 7M
5. a) Enumerate the advantages and disadvantages of three fluid over two fluid vapour absorption refrigeration systems. 6M
   b) Explain the working of Analyzer & Rectifier. How these two systems increases the COP of Vapour Absorption Refrigeration. 8M
6. a) Prove that the enthalpy of the humid air remains constant along a Wet Bulb Temperature line on the Psychrometric chart. 6M
   b) A room of dimensions 6m x 3m x 3m contains air & water vapour mixture at 1 bar & 30^0C with 70%.Calculate
   (i) mass of air (ii) mass of water vapour (iii) degree of saturation 8M
7. a) List out the impurities in the air and explain the working centrifugal dust collector 7M
   b) Explain how desalination of sea water is carried out by the heat pump with a suitable sketch. 7M
8. a) Define the term "Effective Temperature" and explain its significance in the design of an Air-Conditioning system. 6M
   b) Describe an Air-Conditioning system that you would suggest for an office in a city like Chennai where hot and humidified climate prevails. 8M

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