III B.Tech. II Semester Supplementary Examinations May 2018
# CAD/CAM
( Mechanical Engineering)

Max. Marks: 70                                                                                      Time: 3 Hours

Answer any **five** questions
All Questions carry equal marks (**14 Marks** each)
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1.  a)  Explain the four types of production                                                    6M
    b)  What is product cycle? With a neat sketch explain CAD/CAM Product cycle    8M

2.  a)  Describe the various database models which are generally used in Geometrical Database    6M
    b)  Perform a $45^0$ of rotation of a triangle A(0,0), B(1,1), C(5,2) about the origin    8M

3.  a)  Explain how a Bezier curve is defined and Describe the parametric equations of a circular cone and tabulated cylinder    8M
    b)  Investigate the statement "each segment of a B-spline curve is influenced by only k control points or   each control point affects only k curve segments". Use n = 3, k = 2,3,4.    6M

4.  a)  Discuss the basic elements of Numerical Control system with advantages and Limitations    5M
    b)  Write the APT geometry statements and motion statements to perform the machining operation on the component outline surfaces. Do not consider the two holes. They will be used for clamping the    component during machining. {As shown in the Figure-a}
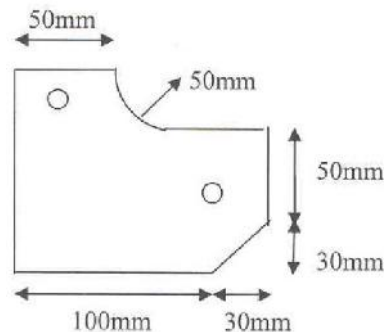


**Figure-a**                                                                                       9M

5.  a)  Define GT. Explain the composite part concept of part families.                      7M
    b)  Spread a light over the role of computers in process planning. Discuss generative CAPP    7M

6.  a)  Write a note on JIT.                                                                      6M
    b)  What do you understand by AGVS? Classify them.                                          8M

7.  a)  What is shop floor control? Discuss the functions of shop floor control.             7M
    b)  What do you mean by MRP II? Discuss the four steps of MRP II.                         7M

8.  a)  Discuss the integration of computer aided quality control with CAD/CAM               6M
    b)  With the help of schematic diagram explain the operation of scanning laser beam system. Explain its application in CAQC systems.

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**Code : 1G565**

**R-11 / R-13**

III B.Tech. II Semester Supplementary Examinations May 2018
## Design of Machine Elements-II
*( Mechanical Engineering )*

**Max. Marks: 70**                                                      **Time: 03 Hours**

Answer *any* **five** questions

All Questions carry equal marks (14 Marks each)

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1.  a) Differentiate between Hydrostatic and Hydrodynamic bearings                3M

    b) The following data refer to a journal bearing Diameter of the journal = 100 mm, Length of the journal = 175 mm, Load = 28 kN, Speed = 250 rpm,  C/D=0.001 Determine the coefficient of friction and heat generated.                11M

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

    Cylinder bore = 100 mm

    Stroke = 125 mm

    Maximum gas pressure = 5 N/mm$^2$

    Indicated mean effective pressure = 0.75 N/mm$^2$

    Mechanical efficiency = 80%

    Fuel consumption = 0.15 kg per brake power per hour

    Higher calorific value of fuel = 42 × 10$^3$ kJ/kg

    Speed = 2000 rpm

    Tensile stress for cast iron = 38 MPa.

    Any other data required for the design may be assumed.

                                                                                   14M

3.  The following data refer to a 4-stroke single cylinder vertical engine

    Piston diameter = 125mm, Stroke=150mm, Speed of the engine=1200r.p.m, Weight of the reciprocating parts = 45N, Design stress for the material used=80N/sq.mm, Design bearing stress=10N/sq.mn, Design stress for bolts=35N/sq.mm

    Design a suitable connecting rod and check for stresses due to inertia.       14M

4.  The crane hook carries a load of 20 kN as shown in figure below. The section at X-X is rectangular whose horizontal side is 100 mm. Find the stresses in the inner and outer fibers at the given section.



Section at X-X
All dimensions in mm.

                                                                                   14M
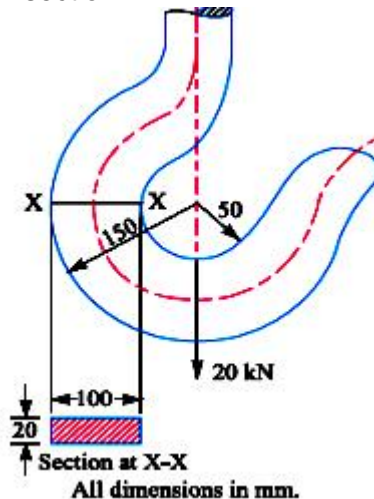
5. a) Briefly explain the design procedure for flat belt. 4M

   b) A flat belt, 8 mm thick and 100 mm wide transmits power between two pulleys, running at 1600 m/min. The mass of the belt is 0.9 kg/m length. The angle of lap in the smaller pulley is $165^0$ and the coefficient of friction between the belt and the pulley is 0.3.If the maximum permissible stress in the belt is 2 $MN/m^2$, find (**i**) Maximum power transmitted, and (**ii**) Initial tension in the belt 10M

6. A reciprocating compressor is to be connected to an electric motor, through spur gearing. The distance between the shafts is 360 mm. The speed of the electric motor is 1000r.p.m.and the speed of the compressor shaft is 200 r.p.m. The torque to be resisted by the motor shaft is 3600 N-m. Determine (i) module and face width of the gears, using 200 stub teeth and (ii) number of teeth and pitch circle diameter of each gear. 14M

7. a) What is the significance of Whal's Factor? 2M

   b) A helical compression spring made of oil tempered carbon steel, is subjected to a load which varies from 400N to 1000N. The spring index is 6 and the design factor of safety is 1.25. If the yield stress in shear is 770 MPa and endurance stress in shear is 350 MPa, find i) Size of the spring wire ii) Diameter of the Spring iii) Free length of the spring 12M

8. The lead screw of a lathe has 50 x 8 threads. The screw must exert and axial pressure of 2500 N in order to drive the tool carriage. The thrust is carried on a collar 110 mm outside diameter and 55 mm inside diameter and the screw rotates at 30 rpm. Determine:

   (a) The power required to drive the screw and

   (b) The efficiency of the lead screw. Assume a coefficient of friction of 0.15 for the screw and 0.12 for the collar. 14M

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III B.Tech. II Semester Supplementary Examinations May 2018
## Instrumentation and Control Systems
*( Mechanical Engineering )*

**Max. Marks: 70**                                                **Time: 03 Hours**

Answer *any* **five** questions

All Questions carry equal marks (14 Marks each)

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1.  a) Explain in detail the 'static' and 'dynamic' characteristics of measuring instruments.    6M
    b) Describe the function of LVDT with a neat sketch. List out its advantages and disadvantages.    8M

2.  a) Discuss in detail the various 'pressure measurement devices'.    8M
    b) Sketch and explain the working principle of 'Bourdon pressure gauge'.    6M

3.  a) Give a broad classification of 'flow measurement techniques'.    8M
    b) Explain about resistance thermometers and thermistors.    6M

4.  a) Explain how a 'pneumatic load cell' is used for 'force measurement'.    6M
    b) Describe the working of 'piezo-electric accelerometer'.    8M

5.  a) Illustrate the various 'strain measurement techniques'.    8M
    b) Discuss the principle of working of 'Resistance strain gauge'.    6M

6.  a) What are 'control systems'? Explain about 'open loop' and 'closed loop' control systems.    7M
    b) Explain the significance of 'transfer function' and 'block diagram' in the process of 'mathematical modeling of mechanical systems'.    7M

7.  a) State and explain the response of 'first order control systems'.    8M
    b) Give a brief note on 'steady state error' and 'error constants'.    6M

8.  a) Explain in brief about Routh-Hurwitz stability criterion.    6M
    b) Write short note on (i) bode plots (ii) gain and phase margin.    8M

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