Code : 1G562

R-11/R-13

III B.Tech. II Semester Supplementary Examinations Nov/Dec 2018

CAD/CAM

(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. With the help of a block diagram, explain the computer aided design process

2. Describe the various database models which are generally used

3. Explain how a Bezier curve is defined. What are the advantages of Bezier curves over cubic spline

4. a) List out the basic elements of Numerical Control system

    b) How direct numerical control system(DNC) will improves the rate of production, Explain it.

5. a) What are part families? What are the methods used for grouping of parts?

    b) Explain the part design and manufacturing attributes giving examples.

6. Explain JIT production system with respect to the following
    i.   Batch size
    ii. Setup time
    iii. Product schedule.

7. What is meant by MRP II? Explain the scope, application, advantages and limitation of MRP II implementation to a manufacturing firm.

8. Explain the application and advantages of integration of CAQC with CAD/CAM systems.

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III B.Tech. II Semester Supplementary Examinations Nov/Dec 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) What is meant by hydrodynamic lubrication? — 3M

   b) A journal bearing 0.075m long on a 0.0025m shaft supports a load of 2700N.The bearing has a clearance of 0.05mm and the viscosity of the oil used is 0.027Kg/ms at the operating temperature. If the bearing capable of dissipating $150W/m^2/^{o}C$, determine the maximum speed of rotation. — 11M

2. A four stroke internal combustion engine has the following specifications: Brake power=7.5 kW; Speed = 1000 r.p.m; Indicated mean effective pressure=0.35 N/mm^2 ; Maximum gas pressure = 3.5 N/mm2 ; Mechanical efficiency=80%. Determine:

   i. The dimensions of the cylinder, if the length of stroke is 1.4 times the bore of the cylinder

   ii. Wall thickness of the cylinder, if the hoop stress is 35 MPa

   iii. Thickness of the cylinder head and the size of studs when the permissible stresses for the cylinder head and stud materials are 45 MPa and 65 MPa respectively. — 14M

3. Design a Connecting rod for a petrol engine from the following data : Diameter of piston 110 mm, Mass of reciprocating parts 2 kg, Length of connecting rod 325 mm, Stroke 150 mm, Speed 1500 rpm, with possible over speed upto 2500 rpm, Compression ratio 4:1, Maximum explosion pressure ,Pe = 2.5 MPa. — 14M

4. Write down the detail procedure for the design of crane hook of triangular section. — 14M

5. a) What are the advantages and disadvantages of chain drive over belt drive. — 4M

   b) Design a chain drive to run a blower at 600 rpm. The power to the blower is available from a 8 KW motor at 1500 rpm. The center distance is to be kept at 800 mm. — 10M

6. Design a pair of helical gears to transmit power of 15 kW at 3200 rpm with speed reduction 4:1, pinion is made of cast steel 0.4% C–untreated. Gear made of high grade C.I. Helix angle is limited to 26^{0} and not less than 20 teeth are to be used on either gear. — 14M

7. a) Derive an expression for energy stored in springs — 6M

   b) A helical spring made from a wire of 6 mm diameter and has outside diameter of 75mm. if the permissible shear stress is 350MPa and modulus of rigidity 84 kN/mm^2, find the axial load which the spring can carry and deflection per active turn i) Neglecting the effect of curvature ii) Considering curvature effect. — 8M

8. 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. — 14M

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Code: 1G563

III B.Tech. II Semester Supplementary Examinations Nov/Dec 2018
Metrology and Surface Engineering
(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) How holes, shafts and fits are designated? Explain with suitable example. **6M**
   b) Interpret the meaning of the following fits.
      (i) $H_7 f_6$ (ii) $H_7 r_6$ (iii) $H_7 v_5$ (iv) $H_7 s_6$ **8M**

2. a) Why the slip gauges are termed as "End Standard"? Explain with suitable example. **6M**
   b) State and explain the "Taylor's Principle of Gauge Design". **8M**

3. a) Sketch and Explain the optical projector. How do you change the magnification of image? **8M**
   b) Define flatness. Describe any one method of testing flatness of a surface. **6M**

4. a) Describe the principle and operation of Taylor-Hobson Talysurf surface roughness instrument. **8M**
   b) The measurement of surface roughness height of 10 successive peaks and valleys over datum line over a specified sampling length were found to be:
      Peaks: 45   42   40   35   35μm
      Valleys: 30   25   25   24   18 μm
      Determine R_z value of the surface. **6M**

5.   Explain with a neat sketch the three wire method of measuring the effective diameter of a screw thread. How does it differ from two wire method? **14M**

6. a) What is meant by alignment tests on machine tools? Why they are necessary? Explain. **6M**
   b) Give Procedure for preparing acceptance chart of any one alignment test **8M**

7. a) Describe briefly constant chord method for tooth thickness measurement. **8M**
   b) Give applications of CMM. **6M**

8. a) What is surface coating? Why it is provided on various products? **6M**
   b) Explain any one diffusion coating process in detail. **8M**

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