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R-11 / R-13

Code: 1G562

III B.Tech. II Semester Supplementary Examinations May 2019

CAD/CAM

(Mechanical Engineering)

Max. Marks: 70

Time: 3 Hours

Answer any **five** questions

All Questions carry equal marks (**14 Marks** each)

1. Write short notes on the following:
 - i) Random scan graphic terminal
 - ii) Digitizers and Image scanners
 - iii) CPU
2. Briefly explain the concept of various coordinate systems required for geometric display systems. Give examples.
3. What is meant by a geometric entity? Explain the common entities used in geometric modeling.
4.
 - a) Distinguish between Numerical Control and Computer Numerical Control.
 - b) Give a brief description of the CNC machining centre.
5.
 - a) Develop the form code in the opitz system for any simple part of your choice.
 - b) Discuss Product flow analysis.
6.
 - a) Discuss various FMS layout configurations.
 - b) What are the functions performed by FMS computer control system.
7.
 - a) Describe CIM benefits
 - b) Compare MRP with MRP I
8.
 - a) Classify different types of contact and non-contact inspection methods
 - b) Explain the method of Post inspection using CMM

Code: 1G565

III B.Tech. II Semester Supplementary Examinations May 2019

Design of Machine Elements-II

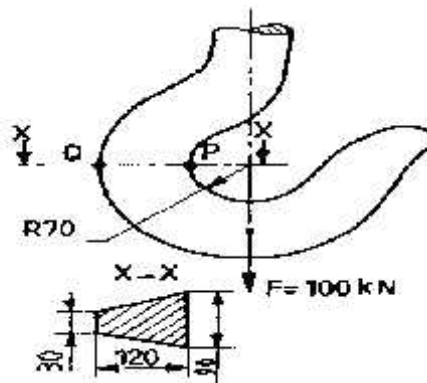
(Mechanical Engineering)

Max. Marks: 70

Time: 3 Hours

Answer any **five** questionsAll Questions carry equal marks (**14 Marks** each)

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 $150\text{W/m}^2/^{\circ}\text{C}$, determine the maximum speed of rotation. 11M
2. The following data is given for the piston of a four stroke diesel engine: Cylinder bore=250 mm Material of piston rings = grey cast iron Allowable tensile stress = 100 MPa Allowable radial pressure on cylinder wall = 0.03 MPa Thickness of piston head = 42 mm Number of piston rings = 4. Design the Piston (Assume the any data needed). 14M
3. Discuss about the design procedure of a Connecting rod with a neat sketch. 14M
4. Figure shows a crane hook with trapezoidal section. Determine the stresses at the points, P and Q.



5. Design a flat belt to transmit 15 kW at 1200 rpm from a 120 mm effective diameter pulley to a 360 mm diameter pulley. The centre distance is 1.5 m. Thickness of the belt is 12 mm and allowable stress is 2.1 MPa. The belt weighs 10 KN / m³. 14M
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° 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/mm², 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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R-11 / R-13

Code: 1G561

III B.Tech. II Semester Supplementary Examinations May 2019

Instrumentation and Control Systems

(Mechanical Engineering)

Max. Marks: 70

Time: 3 Hours

Answer any **five** questions

All Questions carry equal marks (**14 Marks** each)

1. a) Write a short note on different measurement systems.
b) Explain how displacement is measured using inductive transducer.
2. Explain with neat diagram, how thermistors are used for the measurement of temperature. Also mention the temperature ranges it can measure and materials used for its construction.
3. Explain how ultrasonic's are used in measurement of flow and level.
4. a) List various types of accelerometers and discuss any two with neat diagrams.
b) Explain the method of measuring forces using pneumatic and hydraulic load cells.
5. a) Explain the procedure to measure axial strain using strain gauges.
b) Write a note on surface preparation and bonding techniques.
6. With a block diagram, explain how a closed loop control system can be designed to measure speed.
7. a) What are the standard test signals? Give their representation in mathematical and graphically.
b) Write the time domain specifications.
8. Obtain the Bode plot for the system with $G(s)=20(0.1s+1)/[s^2(0.2s+1)(0.02s+1)]$

III B.Tech. II Semester Supplementary Examinations May 2019

Metrology and Surface Engineering*(Mechanical Engineering)***Max. Marks: 70****Time: 03 Hours**

Answer any five questions

All Questions carry equal marks (14 Marks each)

1. a) A shaft must meet a design requirement of being at least 28.0 mm in diameter, but it can be 0.380 mm oversized. Express the shaft's tolerance, as it would appear on an engineering drawing. 7M
- b) Differentiate between Hole basis and Shaft basis system with aid of sketches. 7M
2. a) Explain the principle of comparison of an end gauge with a line standard method.
- b) Four length bars of basic length 100 mm are to be calibrated using a calibrated length bar of 400mm whose actual length is 399.9992 mm. it was also found that lengths of bars B,C and D in comparison to A are +0.0002 mm, +0.0004 mm and -0.0001 mm respectively and the length of all the four bars put together in comparison to standard calibrated bar is +0.0003 mm longer. Determine the actual dimensions of all the four end bars.
3. a) What are the limitations and uses of optical flats? 4M
- b) Describe the working principle of NPL flatness interferometer with a sketch. What are the fringe patterns obtainable incase of tapered surfaces 10M
4. a) In the measurement of roughness the heights of 16 successive peaks and troughs were measured from a datum and are 18, 24, 25, 35, 22, 36, 18, 42, 22, 32, 24, 36, 16, 38, 23, 4 microns. If the measurements were obtained over a length of 30mm, determine the following Values.
 - (i) R_a (ii) R_z (iii) R.M.S 7M
- b) Explain why identical surface-roughness values do not necessarily represent the same type of surface. 7M
5. a) Draw an illustrative line diagram of a pitch measuring machine and describe it's working. 7M
- b) When measuring the effective diameter of an external screw thread gauge of 3.5 mm pitch. A 30.500 mm diameter cylindrical standard and 2.000mm wires were used. The micrometer readings over the standard wires and gauge cylinders were 13.3768 and 12.2428 mm respectively calculate the thread gauge effective diameter. 7M
- 6 Explain various alignment tests on a lathe machine and equipment required. 14M
7. a) Why have coordinate measuring machines become important instruments? 7M
- b) Discuss the merits and demerits of Parkinsons Gear tester with line diagram 7M
8. a) Why is galvanizing important for automotive-body sheet metals? 7M
- b) Explain why some parts may be coated with ceramics. Give some examples. 7M
