Hall Ticket Number :										

R-11 / R-13

Code: 1G562

III B.Tech. II Semester Supplementary Examinations Nov/Dec 2019

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.		Describe the working of any five of the input devices and any two of the output devices used in CAD systems	14M
2.	a)	Explain at least four types of 2D transformations that can be performed on a graphic element.	7M
	b)	Perform a 45^0 of rotation of a triangle A(0,0), B(1,1), C(5,2) about the origin	7M
3.		Discuss the most commonly used wire frame entities with the help of neat sketches.	14M
4.	a)	Discuss the salient features of machining centers.	7M
	b)	Describe the principles of any two feedback control devices used for linear measurement in NC machines.	7M
5.	a)	Explain the composite part concept in group technology with an example.	7M
	b)	Explain the benefits of a well-designed classification and coding system for group technology.	7M
6.		Flow of material in the plant determines the type of layout, cost of material handling, space needed and length of production time". Discuss.	14M
7.	a)	Explain Material requirement planning	7M
	b)	Discuss capacity planning with a neat sketch	7M
8.		Discuss the integration of computer aided quality control with CAD/CAM	14M

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Hall Ticket Number :										

R-14

Code: 4G565

III B.Tech. II Semester Supplementary Examinations Nov/Dec 2019

Design of Machine Elements-II

(Mechanical Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

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UNIT–I

1. Design a journal bearing for a centrifugal pump from the following data:
   Load on journal = 20 kN, Speed of the journal = 900 rpm, type of oil = SAE10 for which the absolute viscosity at 55°C = 0.017kg/m-s. Ambient temperature of the oil is 15.5°C. Maximum bearing pressure for the pump = 15 N/mm^2. Calculate the mass of the lubricating oil required for artificial cooling, if rise of temperature of oil be limited 10°C. Heat dissipation coefficient = 1232 W/m^2/°C 14M

OR

2. Design a full hydrodynamic journal bearing with the following specification for machine tool application:
   Journal diameter = 75 mm Radial load = 10 kN
   Journal speed = 1440 rpm Minimum oil fil thickness = 22.5 microns
   Inlet temperature = 40°C Bearing material = Babbitt
   Determine the length of the bearing and select a suitable oil for this application. 14M

UNIT–II

3. A bearing for an axial flow compressor is to carry a radial load of 2500 N and thrust of 1500 N. The service imposes light shock and the bearing will be in use for 40hours/week for 5 years. The speed of the shaft is 1000 rpm. Select suitable ball bearing for the purpose and give the required tolerances on the shaft and the housing. Diameter of the shaft is 50 mm. 14M

OR

4. The radial reaction on a bearing is 8000 N. It also carries a thrust of 5000 N. The shaft diameter is 140 mm and it rotates at 1700 rpm. Outer ring is stationery. Load is smooth, 8 hours/day for a life of 17000 hours.
   (a) Select a deep groove ball bearing
   (b) What is the rated 90% life of the selected bearing?
   (c) For b = 1.34, compute the probability of the selected bearing surviving 17000 hours. 14M

UNIT–III

5. a) What are the forces acting on the connecting rod? 2M

   b) A vertical cylinder petrol engine has a bore of 100 mm and stroke 120 mm. The length of the connecting rod between centres is 250 mm. The mass of the piston is 1.1 kg. The speed of the engine is 1500 rpm. In the expansion stroke with a crank at 30° from TDC, the gas pressure is 700 kN/m^2. Determine:
      (i) Net force on the piston
      (ii) Force on the connecting rod
      (iii) Thrust on the cylinder wall
      (iv) Speed above which the gudgen pin force would reverse in direction. 12M

OR

6. a) A cast iron flywheel for a blanking press has a mean diameter of 1.5 m. the normal operating speed of 275 rpm slows down to 250 rpm during the punching operation. The required energy fluctuation is 6500 joules and the density of the cast iron is 7000 kg/m^3. Find the area of flywheel rim if the arms and hub provide 7% of the flywheel effect. 12M

   b) Explain the functions of oil rings and compression rings on piston. 2M

UNIT–IV

7. a) Design a close coiled helical compression spring for a service load ranging from 2250 N to 2750 N. The axial deflection of the spring for the load range is 6 mm. Assume a spring index of 5. The permissible shear stress intensity is 420 MPa and modulus of rigidity, G = 84 kN/mm^2.

   Neglect the effect of stress concentration. Draw a fully dimensioned sketch of the spring, showing details of the finish of the end coils. 12M

   b) What is nipping in a leaf spring? Discuss its role. 2M

OR

8. Two pulleys, one 450 mm diameter and the other 200 mm diameter, on parallel shafts 1.95 m apart are connected by a crossed belt. Find the length of the belt required and the angle of contact between the belt and each pulley.

   What power can be transmitted by the belt when the larger pulley rotates at 200rev/min, if the maximum permissible tension in the belt is 1 kN, and the coefficient of friction between the belt and pulley is 0.25? 14M

UNIT–V

9. A motor shaft rotating at 1500 r.p.m. has to transmit 15 kW to a low speed shaft with a speed reduction of 3:1. The teeth are $14\frac{1}{2}^{\circ}$ involute with 25 teeth on the pinion. Both the pinion and gear are made of steel with a maximum safe stress of 200 MPa. A safe stress of 40 MPa may be taken for the shaft on which the gear is mounted and for the key.

   Design a spur gear drive to suit the above conditions. Also sketch the spur gear drive. Assume starting torque to be 25% higher than the running torque. 14M

OR

10. a) A pair of helical gears consist of a 20 teeth pinion meshing with a 100 teeth gear. The pinion rotates at 720 r.p.m. The normal pressure angle is 20° while the helix angle is 25°. The face width is 40 mm and the normal module is 4 mm. The pinion as well as gear are made of steel having ultimate strength of

    600 MPa and heat treated to a surface hardness of 300 B.H.N. The service factor and factor of safety are 1.5 and 2 respectively. Assume that the velocity factor accounts for the dynamic load and calculate the power transmitting capacity of the gears. 12M

    b) What is a herringbone gear? Where they are used? 2M

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Hall Ticket Number :										

R-11/R-13

Code : 1G561

III B.Tech. II Semester Supplementary Examinations Nov/Dec 2019

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 the working of LVDT by means of neat sketches?
   b) What do you mean by instrumentation? Write the objective of instrumentation?
2. a) Describe the reasons for popularity of the Bourdon tube element for pressure measurement and show how the elements are constructed.
   b) Explain the basic principle of operation of McLeod vacuum gauge with necessary diagram.
3. a) Explain the usage of hot wire anemometer in flow measurement. Enumerate the principle of operation and its limitations.
   b) Distinguish between RTD and thermistors.
4. a) How is hydraulic cell used for force measurement? Explain?
   b) Explain working of different types of torsion meters?
5. a) Explain the construction details and working principle of the Un-Bounded strain gauge. List the advantages and limitation of un-bounded strain gauge.
   b) What is the temperature compensation with respect strain gauge?
6. a) Explain with neat block diagram of closed loop positioned system?
   b) Describe the operation of a driver driving an automobile on the road and identity the components, input and output of the human system?
7. a) Briefly explain the first order & second order control systems with neat sketch?
   b) Write the time domain specifications
8. Obtain the Bode plot for the system with $G(s)=20(0.1s+1)/[s^2(0.2s+1)(0.02s+1)]$

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