Examination Nov/Dec 2019

H-419

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-419
FACULTY OF SCIENCE AND TECHNOLOGY
T.E. (MECH/PROD) (Sem-I)
Design of Machine Elements-I
[OLD]

[Time: Three Hours]

[Max. Marks:80]

Please check whether you have got the right question paper.
N.B.:i) Solve any three questions from each section.
ii) Figures to right indicate full marks.
iii) Assume suitable data, if necessary.

Section– A

Q.1	a)	Explain in detail the basic procedure for design of machine element.	06
	b)	State the meaning of following designation	06
		i) 26 crMo2 ii) 55C4 iii) WM400	

Q.2   Design a cotter joint used to connect two co axial rods subjected to a load of 35KN.The components are made of 3008 (Syt=400 MPa). Design the joint and specify the major dimensions.   12

Q.3   Derive the expressions for the torque requirement for lifting and lowering load by power screw.   12

Q.4   Design a muff coupling two connect two steel shaft transmitting 25KW power at 360 rpm. The shafts and key are made of plain carbon steel 3008 (Syt=sy$_c$=400N/mm^2). The sleeve is made of grey cast iron FG200 (Sut=200N/mm^2). The factor of safety for shaft and key is 4. For sleeve the factor of safety is 6 based on ultimate strength.   12

Q.5   Write Short Notes on (Any Four)   16
     a) Ergonomic consideration in design
     b) Selection and use of theories of Failure
     c) Preferredseries
     d) Flexible coupling
     e) Design classification

Section – B

Q.6	a)	Explain stress concentration in detail.	04
	b)	A bar of circular cross section is subjected to alternating tensile force varying from a minimum of 200KN to maximum of 500 KN. It is to be manufactured of material with ultimate tensile strength of 900 MPa and an endurance limit of 700 MPa. Determine the diameter of bar using Factor of safety 3.5 related to ultimate tensile strength and 4 related to endurance limit and stress concentration Factor of 1.65 for fatigue load. Use Goodman straight line as basis of design.	08

Q.7   A welded connection of steel plate as shown in Figure 1.It is subjected to an eccentric load of 50 KN. Determine the size of weld if permissible shear stress in weld is not to exceed 80N/mm^2.   12

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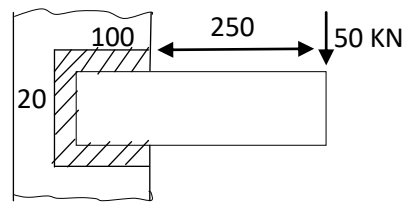
Figure. 1

Q.8   Design a close coiled helical compression spring for a service load ranging from 2250N to 2750N.The axial deflection of the spring for the load range is 6mm.Assume a spring index of 5. The permissible shear stress intensity is 420 MPaand modulus of rigidity G=84 KN/mm^2. Neglect effect of stress concentration. Draw the neat sketch showing major dimension of spring.   12

Q.9   A semi elliptic leaf spring consist of 2 extra full length leaves and 6 graduated length leaves, including the master leaf. Each leaf is 7.5mm thick and 50 mm wide. The centre to centre distance between two eyesis 1m.The leaves are prestressed in such a way that when load is maximum, stress induced in all the leaves are equal to 350 N/mm^2. Determine the maximum force that spring can withstand.   12

Q.10   Write Short Note (Any Four)   16
    i)   Eccentrically loaded riveted joint
    ii)   Nipping of Spring
    iii)   Notch sensitivity and Endurance limit
    iv)   Modified Goodman Diagram
    v)   Surging and Buckling of Spring