PANDIAN SARASWATHI YADAV ENGINEERING COLLEGE

(Approved by AICTE & Affiliated to Anna University, Chennai)

Madurai - Sivagangai Highway, Arasanoor, Thirumansolai Post, Sivagangai Dt. - 630 561, Tamilnadu
Mobile : 9842102628, 7373002628 Email: info@psyec.edu.in Website : www.psyec.edu.in

City Office : 10, Pandian Saraswathi St, Sivagami Nagar, Narayanapuram, Madurai - 625 014. Telefax- 0452 2682338, Mobile : 98423-02628

Department of Mechanical Engineering,

Academic Year 2022-23

Internal Assessment Test I

Sub Code: **ME8593** Sub Name: **Design of Machine Elements**

Year /SEM: **III / V** Date: 27.09. 22

Max. Marks: 50 Marks Duration: 11.20 am- 01.00 pm (90 Minutes)

Part-A (7×2=14)

Answer all the questions

Q. No	Question	M	CO	BTL
1	Write down the factors influencing machine Design	2	1	1
2	Describe the material properties of Hardness, Stiffness and Resilience	2	1	1
3	Define Stress Concentration factor	2	1	2
4	Draw the Goodman and Soderberg diagrams and locate the safe design regions	2	1	3
5	What is the main use of woodruff key?	2	2	3
6	Define Equivalent bending moment	2	2	3
7	A shaft of 70 mm long is subjected to shear stress of 40MPa and has an angle of twist equal to 0.017 radian. determine the diameter of the shaft?	2	2	4

Part-B (3×12=36)

Answer all the questions

Q. No	Question	M	CO	BTL
8.	A Cantilever rod of length of 120mm with circular cross section is subjected to a cyclic transverse load varying from -50N to 150N at its free end. Determine the diameter of the rod, by (i) Goodman and (ii) Soderberg method using the following data, FOS=2, theoretical stress Concentration factor=1.4, Notch sensitive factor=0.9, Ultimate strength =550MPa, Yield strength is 320 MPa, Endurance limit is 275 MPa, Size correction factor=0.85 and Surface Correctionfactor=0.9	**12**	**1**	**4**

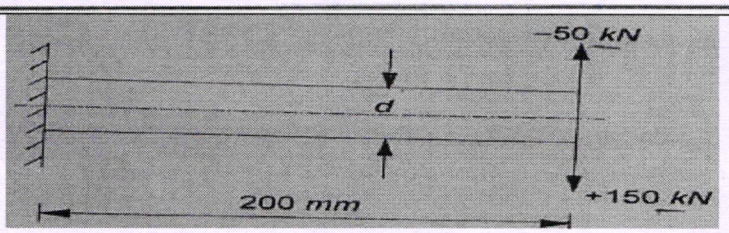
R RAJA Digitally signed by R RAJA Date: 2024.06.25 20:55:07 +05'30'

PANDIAN SARASWATHI YADAV ENGINEERING COLLEGE

(Approved by AICTE & Affiliated to Anna University, Chennai)

Madurai - Sivagangai Highway, Arasanoor, Thirumansolai Post, Sivagangai Dt. - 630 561, Tamilnadu
Mobile : 9842102628, 7373002628 Email: info@psyec.edu.in Website : www.psyec.edu.in

City Office : 10, Pandian Saraswathi St, Sivagami Nagar, Narayanapuram, Madurai - 625 014. Telefax- 0452 2682338, Mobile : 98423-02628

				
9.	A bolt is subjected to tensile load of 25 kN and a shear load of 10kN. The yield strength of the bolt material is 300 MPa. Considering a FOS 2.5. Determine the diameter of the bolt using (i) Maximum normal stress theory (ii) Maximum shear Stress theory (iii) Maximum principal strain theory. Take poisson ratio as 0.25.	**12**	**1**	**3**
10	Design rigid flange couplings to transmit a torque of 250 N-m between two coaxial shafts. The shaft is made of alloy steel, flanges are of cast iron and bolts are of steel. Four bolts are used to couple the flanges. The shafts are keyed to the flange hub. The permissible stresses are given below (a) Shear stress on shaft = 100 MPa (b) Bearing or crushing stress on shaft = 250MPa (c) Shear stress on keys = 100 MPa (d) Bearing stress on keys =250MPa (e) Shearing stress on cast iron =200MPa (f) Shear stress on bolts =100MPa After designing the various elements, make a neat sketch of the assembly indicating the important dimensions. Check stresses developed in the various members, if thumb rules are used for fixing the dimensions.	**12**	**3**	**4**

Prepared by **HOD** **Principal**

R RAJA Digitally signed by R RAJA Date: 2024.06.25 20:55:21 +05'30'

PANDIAN SARASWATHI YADAV ENGINEERING COLLEGE
(Approved by AICTE & Affiliated to Anna University, Chennai)
Madurai - Sivagangai Highway, Arasanoor, Thirumansolai Post, Sivagangai Dt. - 630 561, Tamilnadu
Mobile : 9842102628, 7373002628 Email: info@psyec.edu.in Website : www.psyec.edu.in
City Office : 10, Pandian Saraswathi St, Sivagami Nagar, Narayanapuram, Madurai - 625 014. Telefax- 0452 2682338, Mobile : 98423-02628

Department of Mechanical Engineering,

Academic Year 2022-23

Internal Assessment Test I

Sub Code: **ME 8692** Sub Name: **Finite Element Analysis**

Year /SEM: **III / VI** Date:04.03.2023

Max. Marks: 50 Marks Duration: 90 Minutes

Part-A (7×2=14)

Answer all the questions

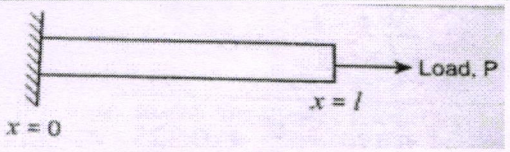
Q. No	Question	M	CO	BTL
1	Distinguish Finite Element Analysis	2	1	1
2	Write down the methods are generally associated with Finite Element Analysis	2	1	1
3	Why polynomial type of interpolation functions is mostly used in FEM?	2	1	2
4	Explain Post Processing?	2	1	3
5	Define Rayleigh- Ritz Method	2	1	4
6	Define Shape Function	2	2	4
7	Define Dynamic analysis?	2	2	2

Part-B (3×12=36)

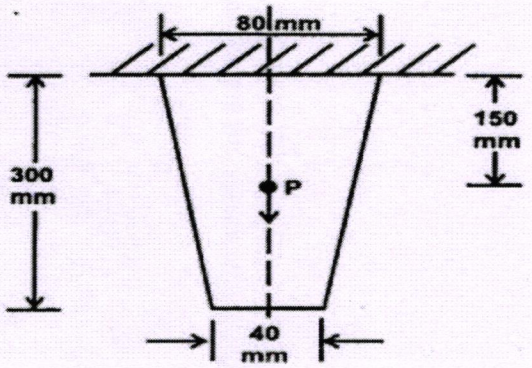
Answer all the questions

Q. No	Question	M	CO	BTL
8.	The following differential equation is available for a physical phenomenon $d^2y/dx^2 + 50 = 0$ $0 \leq x \leq 10$, Trial function is $y = a_1x(10-x)$, Boundary condition are, $y(o) = 0$, $Y(10) = 0$ Find the value of the parameter a1 by the following methods, **(i)** Point collocation **(ii)** sub domain Collocation **(iii)** Least squares **(iv)** Galerkins Method	**12**	**1**	**4**
9.	A bar of uniform cross section is clamped at one end and left free at the other end it is subjected to a uniform axial load P as shown in fig. Calculate displacement and stress in a bar by using two terms polynomial and three terms polynomial. Compare with exact Solutions	**12**	**1**	**3**

R RAJA Digitally signed by R RAJA Date: 2024.06.25 20:55:36 +05'30'



10	For a tapered bar of uniform thickness t=10mm as shown in figure. Predict the displacements at the nodes by forming into two element model. The bar has a mass density $\rho = 7800$ Kg/M ^{3}, the young's modulus E = 2x10 ^{5} N/mm ^{2} . In addition to self-weight, the bar is subjected to a point load P= 1 KN at its centre. Also determine the reaction forces at the support.	**12**	**3**	**4**



Faculty Incharge **HOD** **Principal**

R RAJA
Digitally signed by R RAJA
Date: 2024.06.25 20:55:49 +05'30'