JAYA GROUP OF INSTITUTION-THIRUNINRAVUR

4th SEM – B.E. / B.Tech

INTERNAL ASSESSMENT-3(MODEL EXAM-III)

Sub. Name: Aircraft Structures-I — Date:08/ 04/2015

Sub. Code: AE-6403 — Branch: Aeronautical

Duration: 180 minutes — Max.Marks: 100

Part A **10X2=20**

1. Differentiate between statically determinate and statically indeterminate structures.
2. Differentiate between perfect frame and imperfect frame.
3. Write the assumptions made on frame analysis.
4. Draw stress strain curve.
5. Explain maxwell's reciprocal theorem.
6. write castigliano's theorems.
7. Define strain energy.
8. Define slenderness ratio.
9. Draw southwell plot.
10. Draw fatigue life curve.

PART B (5x16=80)

11. a) Determine forces in all members. Refer fig (1)

(or)

11. b) Derive three moment equation

12. a)(i) Explain strain energy theory. (8)

(ii) Explain distortion theory. (8)

(or)

12. b) A shaft is subjected to a torque of 10 KN-m and maximum bending moment of 7.5 KN-m at a particular section if allowable eqiuvalent stress in the tensile test is 160 MN/m^2. Find the diameter of the shaft using

(i) Maximum stress theory.

(ii) Maximum strain energy theory.

(iii)Shear strain energy theory.

13. a) Determine midpoint deflection. Refer fig (2)

(or)

13. b) Find vertical & horizontal deflection of the joint C. Refer fig(3)

14. a) derive maximum deflection and maximum bending moment. Refer fig (4)

(or)

14. b)Find euler's critical load for a hollow cylindrical column, 200 mm external diameter, 25mm thickness.If it is 6m of length and hinged at both ends. Take young's modulus as 0.8×10^5 N/m^2

(i) Find euler's critical load

(ii) Find rankine's critical load

(iii)For what length of column both critical loads becomes equal.

Take $\alpha = 1/1600$, $f_c = 550$N/mm^2.

15. a) Draw SFD and BMD. Refer fig (5)

(or)

15, b) explain various stages of creep curve.

fig(1)

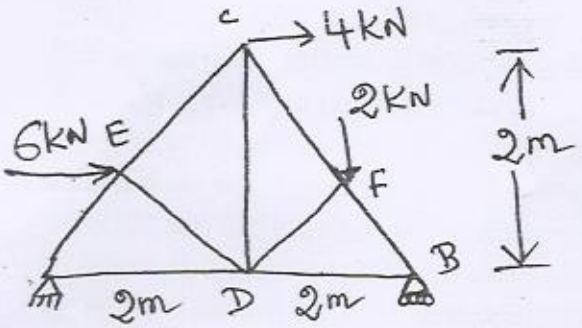


fig (2)

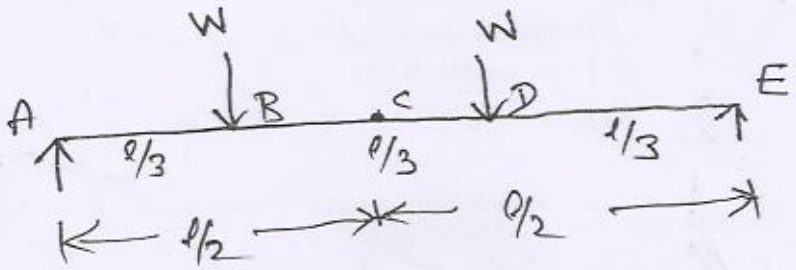


fig (3)

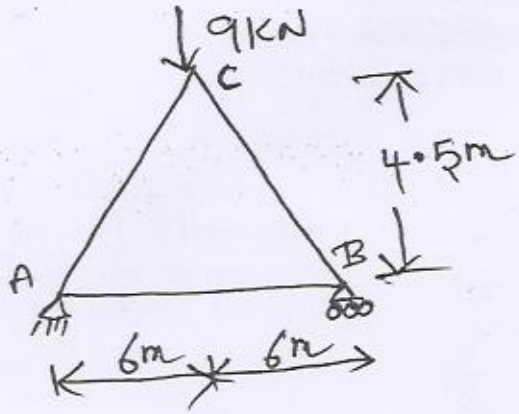
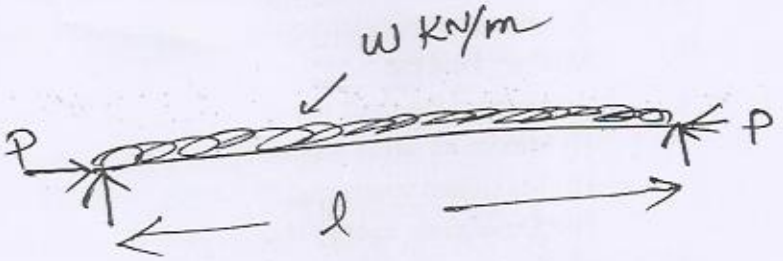


fig (4)



fig(5)