SUBJECT CODE NO:- E-8011
FACULTY OF ENGINEERING AND TECHNOLOGY
M.E. (Mechanical) Examination Nov/Dec 2017
Advanced Machine Design
(Revised)

[Time: Three Hours]   [Max.Marks:80]

Please check whether you have got the right question paper.

N.B
(i) Question no.1 from section A and Question no.6 from section B are compulsory.
(ii) Solve any two questions from the remaining in each section.
(iii) Figure to right indicate full marks.
(iv)Assume suitable data if required and state it clearly.

Section A

Q.1   Attempt any two from the following.   16

a) Explain Mohr's circle for tri-axial state of stresses

b) Explain flat disc spring theory

c) What are the features, merits, demerits and applications for Belleville spring?

Q.2   How principal stresses are computed from principal strains?   12

Q.3   Explain principal strains due to perpendicular stresses and shear stresses.   12

Q.4   A steel Belleville spring has the ratio h/t = 1.5 and the ratio of maximum diameter to   12
minimum diameter is 2. The thickness of the disc is 6.25 mm. The stress induced in spring
material is 1185 Mpa when it is compressed flat. Find the load P and minimum and
maximum radii. Find the possible stress the spring can sustain and corresponding load P.

Q.5   What are the advantages and disadvantages of square section helical compression spring, ring   12
spring Belleville spring and Torsion bar spring over Round bar spring?

Section – B

Q.6   Attempt any two from the following.   16

a) Explain fracture mechanism approach to design.
b) Explain the philosophy of computer aided machine design.
c) Explain design of spring through interactive programming.

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Q.7 If the equation for polynomial cam is $y = C_a + C_1 + C_2x^2 + C_3x^3 + C_4x^4 + C_5x^5$. 12

Find the values of constants for the boundary conditions.

When x = 0, y=h, y'=0

When x=1, y = y'=y''=y'''=0

Compute and plot values of y/h, y'/h, y''/h, y'''/h at intervals of x=0.3.

Q.8 A cam rotates at 600 rpm and has total list of 100 mm with D-R-D type motion. Find the 12
displacement, velocity and acceleration after 30° of cam rotation, if the motion of follower is
SHM.

Q.9 Explain the term Polynomial Cam. Derive an equation for 3-4-5 polynomial (D-R-D) cam and 12
show that it gives the best result

Q.10 Write a short note on – 12

   a) Undercutting of Cam
   b) Causes and interpretation of failure

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