



Sanjay Ghodawat University, Kolhapur

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2018-19

EXM/P/09/01

Year and Program: 2018-19

School of Technology

Department of FY M.Tech

Course Code: MMD 507

Course Title: Advanced Machine Design

Semester – I

Day and Date:

Monday - 24-12-18

End Semester Examination
(ESE)

Time: Max Marks: 100

12 10 to 1 pm

Instructions:

- 1) All questions are compulsory.
- 2) Assume suitable data wherever necessary.
- 3) Figures to the right indicate full marks.

Q.1	Solve the following (any Two)	Marks	Bloom's Level	CO
a)	Explain stress-strength interference theory concerned with probability determination	07	L ₃	CO1
b)	Explain different factors which affect the selection of factor of safety while designing a machine component	07	L ₂	CO1
c)	Explain Johnsons method of optimum design	07	L ₃	CO2
Q.2	Solve the following (any Two)			
a)	Prove that optimization in power transmitted by a spur gear pair occurs when the tangential load (Pt) is equal to dynamic load (Pd) when the criterion failure is scoring. Assume dynamic load to be directly proportional to pinion speed.	07	L ₃	CO2
b)	Explain the stresses in rectangular flat plates	07	L ₃	CO5
b)	Explain briefly torsional spring and derive the expression for its stiffness	07	L ₃	CO3
Q.3	Solve the following (any Two)			
a)	Explain 3-4-5 polynomial cam with SVAJ diagrams and applications	07	L ₃	CO4
b)	Explain the characteristics of cycloidal cam and trapezoidal cam curves	07	L ₂	CO4
c)	State Kirchoff's assumptions of flat plate theory	07	L ₃	CO5
Q.4	Solve any Two of the following			
a)	A Belleville spring is made of silicon steel. The spring is compressed completely flat when it is subjected to an axial force of 4500N. The	10	L ₃	CO3

corresponding maximum stress is $(1375 \times 106) \text{ N/m}^2$.

Assume,

$d_o/d_i = 1.75$ and $h/t = 1.5$

where d_o & d_i are outer and inner diameter of washer in m.

Calculate:

- i) Thickness of washer
 - ii) Free height of washer minus thickness (h)
 - iii) Outer diameter of washer &
 - iv) Inner diameter of washer
- b) Explain the boundary conditions for rectangular flat plate considering various edges 10 L₄ CO5
- c) Obtain briefly the equations of equilibrium for flat plates 10 L₄ CO5

Q.5 Solve any Two of the following

- a) What are the different aids of creative thinking? Explain briefly 10 L₂ CO6
- b) Explain various creative thinking methods 10 L₂ CO6
- c) Discuss innovation, invention and improving system ideality 10 L₂ CO6

Q.6 Solve any Two of the following

- a) Derive Strain-displacement relationship for flat plate 09 L₃ CO5
- b) Explain Quality function deployment approach to define customer needs 09 L₂ CO6
- d) What do you mean by reverse engineering? Explain reverse engineering process 09 L₂ CO6
