

SECTION-D

Note : Long answer type questions. Attempt question out of two questions. (1x30=30)

- Q.26 A C clamp is shown in fig 9.11, it has acme threads of 14mm nominal diameter and 4mm pitch. The coefficient of friction for the screw threads is 0.1 and for the collar is 0.2. The mean radius of collar is 8mm. If the force exerted at the end of the handle is 90 N. Determine the following:

 - Length of handle
 - Maximum shear stress in the body of screw and its location
 - Bearing pressure on the threads.

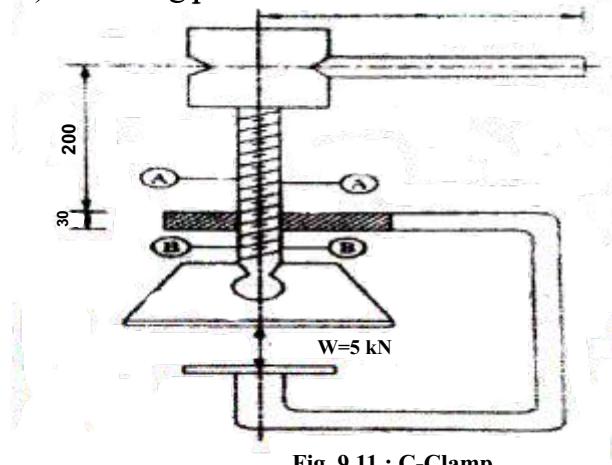


Fig. 9.11 : C-Clamp

- Q.27** Draw a cam profile to raise a valve with simple harmonic motion through 50mm in $1/3$ revolution, keep it fully raised through $1/12$ revolution & to lower it with harmonic motion in $1/6$ of revolution. The valve remain closed during the rest of revolution. The minimum radius of cam is to be 25mm. The diameter of cam shaft is taken as 25 mm.

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4th. Sem / Mech. Engg. (MSIL)

Subject:- Machine Design & Drawing

Time : 3Hrs.

M.M. : 100

SECTION-A

Note: Multiple choice questions. All questions are compulsory (10x1=10)

- Q.1 Which of the following is not the cause of stress concentration

 - Abrupt change in cross section
 - Discontinuity in the component
 - Machining scratches
 - Point load applied on the component

Q.2 Which of the following is a brittle material?

 - Aluminum
 - Nickel
 - Platinum
 - Cast iron

Q.3 Maximum principal stress theory is also known as

 - Rankin's theory
 - Guest's theory
 - Saint Venant's theory
 - Haig's theory

Q.4 Which of the following key transmits power through frictional resistance only?

 - Saddle key
 - Kennedy key
 - Woodruff key
 - Sunk key

Q.5 A railway carriage coupling has

 - Square thread
 - Knuckle thread
 - Acme thread
 - Buttress thread

- Q.6 While designing shafts, type of loading on shafts may be
a) Twisting b) Bending
c) Both a and b d) All of the above

Q.7 Which thread is used in lead screw of lathe?
a) B.S.W. b) Square
c) B.A d) Acme

Q.8 Which of the following is not true about gears
a) Positive drive
b) Constant velocity ratio
c) Transmit large power
d) Bulky construction

Q.9 Bevel gears impose _____ loads on the shafts.
a) Radial and thrust
b) Radial
c) Thrust
d) Neither radial nor thrust

Q.10 The throw of cam is the maximum distance of follower from
a) Base circle b) Pitch circle
c) Prime circle d) Pitch curve

SECTION-B

Note: Very short answer type questions. Attempt any ten questions out of twelve questions. (10x2=20)

- Q.11 $1\text{ MPa} = \underline{\hspace{2cm}} \text{ N/mm}^2$.

Q.12 Define principal stresses.

Q.13 Shafts are generally manufactured by

- Q.14 Crank shaft is an example of _____ shaft.

Q.15 The ratio of strength of shaft with key-way to the strength of same shaft without any keyway is called _____.

Q.16 What is feather key?

Q.17 The angle of buttress threads is 29° . (True/False)

Q.18 Write any two application of power screws.

Q.19 Write any one difference between key & splines.

Q.20 Explain the effect of key way on strength of shaft.

Q.21 Define fatigue & endurance limit.

Q.22 Write two functions of keys.

SECTION-C

Note: Short answer type questions. Attempt any two questions out of three questions. (2x20=40)

- Q.23 Define term stress concentration & explain in detail with neat sketches different method to reduce stress concentration.

Q.24 Define term gear and explain different types of gears in details with neat diagrams.

Q.25 A solid circular shaft is subjected to combined torsion and bending moment of 15000 N-m and 5000 N-m respectively. The shaft is made up of steel and having ultimate tensile stress of 1000 Mpa and a ultimate shear stress of 750 Mpa. If the factor of safety (FOS) is 6, find the diameter of shaft.