SECTION-D

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

Q.26 A cam with a minimum radius of 25 mm , rotating clockwise at a uniform speed is to be designed to give a roller follower at end of a valve rod, motion describes below

1) To raise the valve through 50 mm during 120° rotation of cam.
2) To keep the valve fully raised through next 30°
3) Lower for next 60°.
4) To keep the valve closed during rest of revolution.

Take diameter of roller is 20 mm and the diameter of cam shaft is 25 mm.

Draw the profile of cam when the displacement of valve during raised and lowered is to be take place with simple harmonic motion.

Q.27 Design and draw a screw jack which is used to lift a load of 100 KN through a height of 500 mm. The elastic strength of material of screw in tension and compression is 200 N/mm^2 and in shear is 120 N/mm^2. The elastic strength of material of nut is taken as 100 N/mm^2 in tension, 90N/mm^2 in compression and 80 N/mm^2 in shear. The bearing pressure between the nut and screw does not exceed 20 N/mm^2.

Roll No. .....

4th Sem / Mechanical Engineering (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 material is more elastic

a) Rubber b) Glass
c) Steel d) Wood

Q.2 Hook's law holds good upto

a) Elastic limit
b) Plastic limit
c) Limit of proportionality
d) None of above

Q.3 The shear stress on principal plane is.

a) Zero b) Maximum
c) Minimum d) None of these

Q.4 Shafts used in factories and workshops is known as

a) Flexible shaft b) Machine shaft
c) Prime shaft d) Line shaft

Q.5 Strength of two shafts will be equal if ?

a) Angle of twist in both shafts is same

b) Diameter of both shafts is same

c) Material is same

d) Twisting moment is same

Q.6 The standard taper of the taper key is

a) 1:10 b) 1:100

c) 1:1000 d) All of the above

Q.7 Slope of thread is

a) Half of pitch b) Double of pitch

c) Thrice of pitch d) One fourth of pitch

Q.8 In square threads, the flanks make an angle of _____ with axis.

a) 45^{o} b) 60^{o}

c) 90^{o} d) 29^{o}

Q.9 Size of gear is usually specified by

a) Circular pitch b) Diametral pitch

c) Pitch circle diameter d) Pressure angle

Q.10 A cam in which follower reciprocates and oscillates in a plane parallel to the axis of cam is known as

a) Cylindrical cam b) Circular cam

c) Reciprocating cam d) Tangent cam

SECTION-B

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

Q.11 Define machine design

Q.12 What is a code

Q.13 Define principal planes

Q.14 State maximum shear stress theory

Q.15 What is the angle between the principal planes?

Q.16 Define equivalent bending moment?

Q.17 Draw the pictorial view of gib head key

Q.18 Write the function of power screws

Q.19 Name different failures of key

Q.20 Define module of gear

Q.21 Define Radial or disc cam

Q.22 Give the formula by which angle of twist of a solid shaft is calculated.

SECTION-C

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

Q.23 Define term theories of failure & explain in detail any two theories of failures

Q.24 A shaft transmit a power of 100 KW at 200 rpm. If the allowable shear stress in material of shaft is 60 N/mm^2, find the suitable diameter for the shaft. The shaft is not to twist more than 1^{o} in a length of 3m. Take $G=80x10^3 N/mm^2$.

Q.25 Draw the profile of involute teeth for a gear having 25 teeth and module 10 mm. Take pressure angle as 20^{o}. use base circle method.