SECTION-D

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

Q.26 A cam, with a minimum radius of 40mm, rotating clockwise at a uniform speed is required to give a knife edge follower, the motion as described below:

i) To move outward through 50mm during 100º rotation of the cam.

ii) To dwell for the next 80º,

iii) To return to its starting position during next 90º,

iv) To dwell for the rest period of a revolution i.e. 90º.

Draw the profile of the cam. The displacement of the followers is to take place with uniform acceleration and deceleration.

Q.27 Design and draw a screw jack, which is used to lift a load of 110 KN, through a height of 450mm. The elastic strength of material of screw in tension and compression is 210N/mm^2 and in shear is 120N/mm^2. The elastic strength of material of nut is 110N/m^2 in tension, 100N/mm^2 in compression and 90N/mm^2 in shear. The bearing pressure between nut and screw does not exceed 18N/mm^2.

Roll No. .....

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

Subject : Machine Design & Drawing

Time : 3 Hrs. M.M. : 100

SECTION-A

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

Q.1 The property of a material to resist any elastic deformation is termed as _____.

a) Stiffness b) Hardness

c) Malleability d) Strength

Q.2 If compressive yield stress and tensile yield stress are equivalent, then region of safety from maximum principal stress theory is of which shape?

a) Rectangle b) Square

c) Circle d) Ellipse

Q.3 Yield strength is defined as the maximum stress at which a marked increase in elongation occurs without increase in

a) Load b) Strength

c) Toughness d) Hardness

Q.4 Which of the following expression is not correct for designing a shaft according to rigidity?

a) T = GqJ//L b) J = TL/Gq

c) B = TL/GJ d) L = GqT/J

Q.5 Which of the following act on shafts?

a) Torsional moment
b) Bending Moment
c) Both torsional and bending
d) None of the mentioned

Q.6 When the shaft is subjected to pure bending moment, the bending stress is given by?

a) None of the listed b) $32M/\pi d^3$
c) $16M/\pi d^3$ d) $8M/\pi d^3$

Q.7 A sunk key fits in the keyway of the _____only.

a) Hub
b) Sleeve
c) Both hub and sleeve
d) Neither hub nor sleeve

Q.8 Which is the smallest circle that can be drawn on a cam profile?

a) Prime circle b) Base circle
c) Addendum circle d) Dedendum circle

Q.9 Diameteral pitch is 5, then calculate module of the gear.

a) 10 b) 0.4
c) 5 d) 0.2

Q.10 Greater the velocity ratio, smaller the gearbox

a) True
b) Greater the gearbox
c) Size of gearbox remains unaffected
d) None of the listed

SECTION-B

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

Q.11 Define factor of safety.
Q.12 Define endurance limit.
Q.13 What is the maximum distortion energy?
Q.14 Define strain energy.
Q.15 Write bending equation for a shaft.
Q.16 Name any two materials used for high strength shafts?
Q.17 Define flank of a thread.
Q.18 Write the disadvantage of screw threads.
Q.19 Define prime circle.
Q.20 Describe uniform motion cams.
Q.21 State law of Gearing .
Q.22 Define module.

SECTION-C

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

Q.23 Explain the terms Stress and Stress Concentration. Explain the various methods to reduce Stress Concentration in detail.

Q.24 Draw the profile of involute teeth for a gear having 22 teeth and diametral pitch 0.1 tooth/mm. Assume pressure angle 20^o. Use any method. Explain its method of construction also.

Q.25 A rectangular sunk key is 16mm wide, 12mm thick and 80mm long is required to transmit a torque 25kNm from a 100mm diameter shaft. Find the shear and crushing stress induced in key.