respectively. Also the shear stress acting is 25N/mm². Find the maximum normal stress. (CO1)

Q.28 Calculate the diameter of pin from shear consideration with maximum shear stress allowed is 40NN/mm² and an axial tensile force of 50kN is acting on the rod. (CO2)

Q.29 Calculate the bending stress induced in the strip of helical spring. The spring is subjected to a moment of 1250N-mm with breadth the thickens of the strip being 11 mm and 1.5 mm respectively. (CO4)

Q.30 A plate clutch consists of 1 pair of contacting surfaces. The inner and outer diameter of the friction disk is 120mm and 180mm respectively. The coefficient of friction is 0.2 and permissible intensity of pressure is 1.8N/mm². Assuming uniform wear theory, calculate the operating force in the clutch. (CO4)

Q.31 Explain knuckle coupling with neat diagram? (CO4)

Q.32 What are the types of gears?

Q.33 Explain universal and slip joint of propeller shaft? (CO2)

Q.34 What are the advantages of sliding mesh gear box over constant mesh gear box? (CO4)

Q.35 Write the assumption while designing clutch? (CO2)

SECTION-D

Note: Long answer type questions. Attempt any two questions out of three questions. (2x10=20)

Q.36 Explain stress-strain diagram for ductile material?(CO5)

Q.37 A muff coupling is connecting two shafts. The torque involved is 750N-m. The shaft diameter is 50 mm with length and breadth of the key being 16mm and 70mm respectively. Find the shear stress induced in the key. (CO5)

Q.38 The piston rod of a hydraulic cylinder exerts an operating force of 20kN. The allowable stress in the cylinder is 55N/mm². Calculate the thickness of the cylinder. Diameter of the cylinder is 50mm and pressure in cylinder is 15MPa.

Roll No. .....

6th Sem / Auto
Subject:- Design of Automotive Components

Time : 3Hrs. M.M. : 100

SECTION-A

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

Q.1 Impact load results from which type of effects of loads applied?

a) Static b) Dynamic
c) Static and dynamic
d) Neither static nor dynamic

Q.2 What is the stress-strain curve?

a) It is the percentage of stress and stain
b) It is the relationship between stress and strain
c) It is the difference between stress and strain
d) None of the mentioned

Q.3 Which point on the stress strain curve occurs after the ultimate point?

a) Last point b) Breaking point
c) Elastic limit d) Material limit

Q.4 Where is the necking region?

a) The area between lower yield point and upper yield point
b) The area between the plastic limit and elastic limit
c) The area between the ultimate point and initial point
d) The area between the ultimate point rupture

Q.5 Which of the following reduces the stress concentration?
a) Use of multiple notches
b) Drilling additional holes
c) Removal of undesired material
d) Each of the mentioned

Q.6 When the shaft is subjected to pure torsional moment, the torsional stress is given by?
a) None of the listed b) $32M/pd^3$
c) $16M/pd^3$ d) $8M/pd^3$

Q.7 If there are 7 clutch plates in a multi-plate clutch, what is the number of pair of contact surfaces?
a) 5 b) 4
c) 6 d) 8

Q.8 Where is the clutch located?
a) Between transmission and engine
b) between transmission and rear axle
c) Between transmission and propeller shaft
d) Between transmission and differential

Q.9 For retaining compression in the cylinder, a flat piece of_____ is placed between the cylinder head and cylinder block.
a) gasket b) rims
c) cylinder liner d) invar strut

Q.10 The main advantage of using aluminium alloy for cylinder head is _____
a) Lightness in weight
b) high thermal conductivity
c) less corrosion rate
d) cost

SECTION-B

Note: Objective type questions. All questions are compulsory. (10x1=10)

Q.11 All engineering materials are plastics.(True/False)

Q.12 A knuckle joint is unsuitable for two rotating shafts, which transmit torque.(True/False)

Q.13 A knuckle joint is also called socket pin joint. (True/False)

Q.14 Petrol engine are more economical than diesel engine. (True/False)

Q.15 The normal stress is perpendicular to the area under considerations, while the shear stress acts over the area.(True/False)

Q.16 Maximum Principal stress Theory is not good for brittle materials. (True/False)

Q.17 Forged components can be held between close limits. (True/False)

Q.18 The temperature at which new stress free grains are formed in the metal is called the_____ temperature.

Q.19 The normal stress is perpendicular to the area under considerations, while the shear stress acts over the area. (True/False)

Q.20 Maximum Principal Stress Theory is not good for brittle materials.(True/False)

SECTION-C

Note: Short answer type questions. Attempt any twelve questions out of fifteen questions. (12x5=60)

Q.21 What are the ergonomics aspects while designing the engine components? (CO1)

Q.22 Explain various types of fits with diagram? (CO1)

Q.23 Explain construction and working of single plate clutch? (CO4)

Q.24 What are the various types of couplings? (CO2)

Q.25 Explain the construction and working of constant mesh gear box? (CO4)

Q.26 If a body is subjected to stresses in xy plane with stresses of $70N/mm^2$ and $90N/mm^2$ acting along x and y axes respectively. Also the shear stress acting is $30N/mm^2$. Find the maximum amount of shear stress to which the body is subjected. (CO1)

Q.27 If a body is subjected to stresses in xy plane with stresses of $50N/mm^2$ and $70N/mm^2$ acting along x and y axes