

- Q.29 Describe the phenomenon of slip and creep in pulleys.  
 Q.30 Explain different types of kinematic chains.  
 Q.31 Explain addendum, dedendum, module and pitch of the gears.  
 Q.32 Explain how will you calculate natural frequency of transverse vibrations.  
 Q.33 Differentiate between free & forced vibrations.  
 Q.34 Explain different types of gear with their diagrams.  
 Q.35 What are harmful effects of vibrations on machines?

#### SECTION-D

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

- Q.36 A car moving on a level at a speed of 13.89m/sec. If the co-efficient of friction between the tyres and the road is 0.6 find:  
 a) Retardation of the car  
 b) Distance travelled by the car before coming to rest. Assume brakes are applied to all the four wheels.
- Q.37 Four masses  $m_1$ ,  $m_2$ ,  $m_3$  and  $m_4$  are 200, 300, 240 and 280Kg respectively. The corresponding radii of rotations are 0.2, 0.15, 0.25 and 0.3m respectively and the angles between successive masses are  $45^\circ$ ,  $75^\circ$  and  $135^\circ$ . Find the position and magnitude of the balance mass required, if its radius of rotation is 0.2m.
- Q.38 Discuss, in detail, any two inversions of a single slider crank chain mechanism with the help of neat sketches.

No. of Printed Pages : 4  
 Roll No. ....

120345

**4th Sem / Branch : Auto.**

**Subject:- Mechanics of Vehicles**

Time : 3Hrs.

M.M. : 100

#### SECTION-A

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

- Q.1 Concurrent forces have their lines of action meet in  
 a) one point                      b) two point  
 c) plane                          d) perpendicular planes
- Q.2 Mass X velocity = \_\_\_\_\_  
 a) work                              b) moment  
 c) Impulse                          d) momentum
- Q.3 The ratio of maximum fluctuation of energy to the work done per cycle is called  
 a) fluctuation of energy  
 b) maximum fluctuation of energy  
 c) coefficient of fluctuation of speed  
 d) none of the mentioned
- Q.4 Which of the following is a vector quantity  
 a) energy                          b) mass  
 c) momentum                      d) angle
- Q.5 A mechanism is an assemblage of  
 a) Two links  
 b) Three links  
 c) Four links or more than four links  
 d) All of the above

- Q.6 A cam with a roller follower would constitute following type of pair \_\_\_\_\_  
 a) lower pair                      b) higher pair  
 c) open pair                      d) close pair
- Q.7 When the body vibrates under the influence of external force, then the body is said to be under \_\_\_\_\_  
 a) free vibrations              b) natural vibrations  
 c) forced vibrations      d) damped vibrations
- Q.8 In balancing of single-cylinder engine, the reciprocating unbalance is \_\_\_\_\_  
 a) completely made zero and so also the rotating unbalance  
 b) completely made zero and the reciprocating unbalance is partially reduced  
 c) partially reduced and the reciprocating unbalance is completely made zero  
 d) partially reduced and so also the reciprocating unbalance
- Q.9 The distance between the corresponding points on adjacent teeth measured on the pitch circle is called \_\_\_\_\_  
 a) helical pitch              b) normal pitch  
 c) gear pitch              d) circular pitch
- Q.10 Crowning on pulleys helps \_\_\_\_\_  
 a) in increasing velocity ratio  
 b) in decreasing the slip of the belt  
 c) for automatic adjustment of belt position so that belt runs centrally  
 d) increase belt and pulley life

### SECTION-B

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

- Q.11 Define horse power.  
 Q.12 What is turning moment diagram?  
 Q.13 The driving gear and smaller of a pair of mated gears of called \_\_\_\_\_  
 Q.14 A ball and a socket forms a \_\_\_\_\_ type of pair.  
 Q.15 Give an example of turning pair?  
 Q.16 Creep, in belt drive, is due to .....  
 Q.17 Kinematic link is also known as \_\_\_\_\_.  
 Q.18 Define balancing ?  
 Q.19 Define stopping distance.  
 Q.20 Give function of hookes joint.

### SECTION-C

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

- Q.21 Explain working principle of Ackermann steering.  
 Q.22 Write the method of calculation of braking force in case of front wheel drive .  
 Q.23 Explain four bar chain mechanism.  
 Q.24 Give the calculation of angular velocity & acceleration of connecting rod at TDC and BDC.  
 Q.25 Write the working of porter governor.  
 Q.26 Derive the condition for maximum horse power transmitted by the belts.  
 Q.27 Explain compound gear box.  
 Q.28 Differentiate between static & dynamic balancing.