MECH 320, Tutorial Quiz (2)

Choose the best answer of the following MCQ:

1. In a reciprocating steam engine, which of the following forms a kinematic link ?
   (a) cylinder and piston (b) piston rod and connecting rod
   (c) crank shaft and flywheel (d) flywheel and engine frame
2. The motion of a piston in the cylinder of a steam engine is an example of
   (a) completely constrained motion (b) incompletely constrained motion
   (c) successfully constrained motion (d) none of these
3. The motion transmitted between the teeth of gears in mesh is
   (a) sliding (b) rolling
   (c) may be rolling or sliding depending upon the shape of teeth
   (d) partly sliding and partly rolling
4. The cam and follower without a spring forms a
   (a) lower pair (b) higher pair
   (c) self closed pair (d) force closed pair
5. A ball and a socket joint forms a
   (a) turning pair (b) rolling pair (c) sliding pair (d) spherical pair
6. The lead screw of a lathe with nut forms a
   (a) sliding pair (b) rolling pair (c) screw pair (d) turning pair
7. When the elements of the pair are kept in contact by the action of external forces, the pair is said to be a
   (a) lower pair (b) higher pair
   (c) self closed pair (d) force closed pair
8. Which of the following is a turning pair ?
   (a) Piston and cylinder of a reciprocating steam engine
   (b) Shaft with collars at both ends fitted in a circular hole
   (c) Lead screw of a lathe with nut
   (d) Ball and socket joint
9. A combination of kinematic pairs, joined in such a way that the relative motion between the links is completely constrained, is called a
   (a) structure (b) mechanism
   (c) kinematic chain (d) inversion
10. The relation between the number of pairs (p) forming a kinematic chain and the number of links (l) is
    (a) $l = 2p - 2$ (b) $l = 2p - 3$ (c) $l = 2p - 4$ (d) $l = 2p - 5$
11. The relation between the number of links (l) and the number of binary joints (j) for a kinematic chain having constrained motion is given by $j = \frac{3}{2} l - 2$. If the left hand side of this equation is greater than right hand side, then the chain is
    (a) locked chain (b) completely constrained chain
    (c) successfully constrained chain (d) incompletely constrained chain

12. In a kinematic chain, a quaternary joint is equivalent to
(a) one binary joint (b) two binary joints (c) three binary joints (d) four binary joints

13. If n links are connected at the same joint, the joint is equivalent to
(a) $(n-1)$ binary joints (b) $(n-2)$ binary joints (c) $(2n-1)$ binary joints (d) none of these

14. In a 4 – bar linkage, if the lengths of shortest, longest and the other two links are denoted by s, l, p and q, then it would result in Grashof's linkage provided that
(a) $l+p<s+q$ (b) $l+s<p+q$ (c) $l+p=s+q$ (d) none of these

15. A kinematic chain is known as a mechanism when
(a) none of the links is fixed (b) one of the links is fixed
(c) two of the links are fixed (d) all of the links are fixed

16. The Grubler's criterion for determining the degrees of freedom (n) of a mechanism having plane motion is
(a) $n=(l-1)-j$ (b) $n=2(l-1)-2j$ (c) $n=3(l-1)-2j$ (d) $n=4(l-1)-3j$
where l = Number of links, and j = Number of binary joints.

17. The mechanism forms a structure, when the number of degrees of freedom (n) is equal to
(a) 0 (b) 1 (c) 2 (d) – 1

18. In a four bar chain or quadric cycle chain
(a) each of the four pairs is a turning pair (b) one is a turning pair and three are sliding pairs
(c) three are turning pairs and one is sliding pair (d) each of the four pairs is a sliding pair.

19. Which of the following is an inversion of single slider crank chain ?
(a) Beam engine (b) Watt's indicator mechanism
(c) Elliptical trammels (d) Whitworth quick return motion mechanism

20. Which of the following is an inversion of double slider crank chain ?
(a) Coupling rod of a locomotive (b) Pendulum pump
(c) Elliptical trammels (d) Oscillating cylinder engine

Answer Sheet:

Q #	The Choice	Q #	The Choice	Q #	The Choice
1		8		15	
2		9		16	
3		10		17	
4		11		18	
5		12		19	
6		13		20	
7		14			