

## PhD (Mechanical Engineering)

### PART- A

01. A mild steel rod has length of 80mm and a tapered portion length 50mm. The large diameter of taper is 90mm and small diameter is 80mm. For tapering such length the tail stock set over will be  
(A) 12mm (B) 8mm (C) 10mm (D) 4mm
02. It is required to cut a screw having 7mm pitch on a lathe having lead screw of 4 threads per inch. The set of gears required for threading operation are  
(A) 70, 40, 127, 20 (B) 50, 40, 127, 20 (C) 80,20,60,40 (D) 80,60,30,50
03. The relation for cutting tool life is given as  $VT^n=C$  Where  $V$  is cutting speed,  $T$  is corresponding life,  $n$  and  $C$  are constants depending on cutting conditions. The numerical value of  $n$  for roughing cut as compared to that for light cuts in mild steel would be  
(A) More (B) Less (C) same (D) Does not depend on type of cut
04. Spindle speed in a lathe for turning a 40cm dia. Rod at a cutting speed of 30 m/min would be  
(A) 10 rpm (B) 20.6 rpm (C) 23.8 rpm (D) 33.6 rpm
05. If a cutting tool is designated as  $0^0-10^0-6^0-6^0-8^0-75^0-1\text{mm}$ , what is the side cutting edge angle of the tool?  
(A)  $0^0$  (B)  $10^0$  (C)  $6^0$  (D)  $75^0$
06. The coefficient of friction between chip and tool is the variable. It can be reduced by  
(A) Reducing the width of tool (B) Reducing the depth of cut  
(C) Reducing the effective rake angle (D) None of above
07. A special form of piercing in which the entire contour is not cut, is known as  
(A) Lancing (B) Slitting (C) Trimming (D) Slotting
08. Calculate the time to shape a plate 500x900mm size when the cutting speed is 10 m/min and return to cutting time ratio is 1:4. Take feed as 3mm and clearance at each end 70mm.  
(A) 48 min (B) 24min (C) 12min (D) 25min
09. The shear angle  $\phi$  is  
(A)  $\tan^{-1}\left(\frac{r \cos \alpha}{1 - r \sin \alpha}\right)$  (B)  $\tan^{-1}\left(\frac{r \sin \alpha}{1 - r \cos \alpha}\right)$  (C)  $\sin^{-1}\left(\frac{r \sin \alpha}{1 - r \cos \alpha}\right)$  (D)  $\sin^{-1}\left(\frac{r \cos \alpha}{1 - r \sin \alpha}\right)$