Paper Code: ME-503	Roll No.									

B.Tech.
(Sem V) ODD SEMESTER EXAMINATION 2015-16
MANUFACTURING SCIENCE-II

[TIME: 3HRS.] **[MAX MARKS 100]**

NOTE: Attempt all questions. They carry equal marks.

Q.1: Attempt any two parts: **[10x2=20]**

(a) Write a brief note bringing out the difference between orthogonal and oblique cutting. Explain the logic, that if during turning operation, the value of the expression $\tan\alpha_b \cos\psi - \tan\alpha_s \sin\psi$ is zero, the cutting is assumed to be orthogonal. Angles α_b and α_s refer to the back and side rakes of the turning tool in ASA system and ψ is the side cutting edge angle in same system.

(b) Mild steel is being machined at a cutting speed of 200 m/min with a tool having a rake angle of 10^0. The width of cut and uncut thickness are 2 mm and 0.2 mm respectively. If value of μ between chip and tool face is taken as 0.5 and the shear stress of work material (τ_s) is 400 N/mm^2, determine (i) shear angle and (ii) the cutting and thrust components of the machining force.

(c) Explain what is meant by tool-life? How does tool life affect economics of machining?
TAYLOR's tool life equation for machining C-40 steel with a H.S.S. tool at a feed of 0.2 mm/min and a depth of cut of 2 mm is given by $VT^n=C$. In an experiment following values of V and T were noted.
(i) V (m/min) = 25 , T(min) = 90
(ii) V (m/min) = 35 , T(min) =20
Calculate the cutting speed for a desired tool life of one hour.

Q.2: Attempt any two parts: **[10x2=20]**

(a) Describe the construction of a grinding wheel and explain, what is meant by STRUCTURE, BOND, GRIT and GRADE of the wheel.

(b) Describe briefly the HONING and LAPPING processes. What is the object of honing process?

(c) Describe the process of centreless grinding with different kinds of work feeding arrangements.

Q.3: Attempt any four parts: **[5x4=20]**

(a) Differentiate between up milling and down milling. Which is technically superior and why?

(b) What is the difference between peripheral and face milling processes? Which is technically better and why?

(c) Mention at least four time- saving devices provided in a Capstan lathe.

(d) Is machining a horizontal plain surface on a shaper an example of orthogonal machining? If no, how can it be made so. What is the function of a clapper box?

(e) How many type of fits do you know? Give examples of each one. What is meant by allowance?

(f) Name the different kinds of drilling machines, you expect to see in a modern machine-shop. What are the features of a job which require a RADIAL DRILLING MACHINE for drilling holes on it?

Q.4: Attempt any two parts: **[10x2=20]**

(a) Compare and contrast welding, brazing and soldering processes.

(b) Present the essential features of SMAW, TIG, MIG, and SAW welding processes in a tabular form?

(c) (i) What do you understand by Carbon equivalent and how does it affect weldability of steel?
(ii) How can distortion be reduced in weldments? What is meant by HAZ?

Q 5: Attempt any two parts: **[10x2=20]**

(a) Describe EDM process of machining in detail. How can tool wear be minimized?

(b) Describe the essential features of ECM process. Compare and contrast it with EDM process in respect of tool wear and precision of machined job.

(c) Describe the use of LASER for welding and machining. What advantages are claimed for laser welding over Electron Beam Welding process?