

Enrolment No:



UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, December 2020

Course: Manufacturing Technology
Program: B. Tech ASE
Course Code: MEPD 3010

Semester: V
Time :03 hrs.
Max. Marks : 100

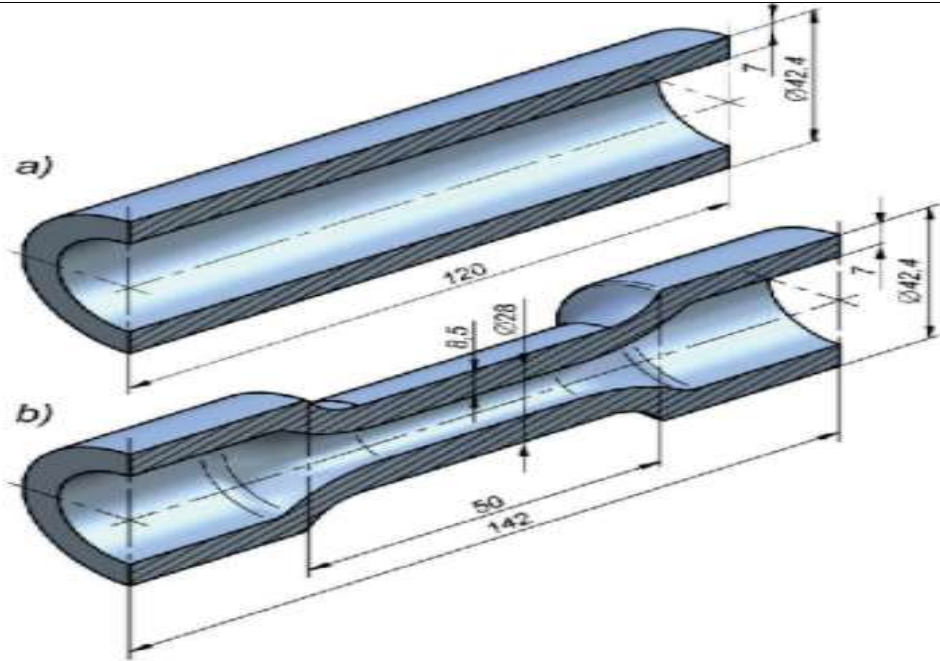
SECTION A

- Each Question will carry 5 Marks
- Instruction: Write short and to the point as per question

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Q 1	<p>I. The process of making hollow castings of non-circular shape and desired thickness by permanent mould without the use of cores is known as</p> <p>(a) Die casting (b) Slush casting (c) Pressed casting (d) Centrifugal casting [02 Marks]</p> <p>II. Which one of the following is the correct statement? In a centrifugal casting method</p> <p>(a) No core is used (b) Core may be made of any metal (c) Core is made of sand (d) Core is made of ferrous metal [02 Marks]</p> <p>III. Turbine blade can be made through centrifugal casting [True/ False] [01 Marks]</p>	C03
Q 2	<p>I. For cutting of brass with single-point cutting tool on a lathe, tool should have</p> <p>(a) Negative rake angle (b) Positive rake angle (c) Zero rake angle (d) Zero side relief angle [02 Marks]</p> <p>II. Cutting power consumption in turning can be significantly reduced by</p> <p>(a) Increasing rake angle of the tool (b) Increasing the cutting angles of the tool (c) Widening the nose radius of the tool (d) Increasing the clearance angle [02 Marks]</p> <p>III. Carbide cutting tool material made with throw away tip of the tool [True/False] [01 Marks]</p>	C01

Q 3	Explain at least five property possess by cutting tool material.	C01
Q 4	<p>I. Assertion (A): Carbide tips are generally given negative rake angle. Reason (R): Carbide tips are made from very hard materials.</p> <p>(a) Both A and R are individually true and R is the correct explanation of A (b) Both A and R are individually true but R is not the correct explanation of A (c) A is true but R is false (d) A is false but R is true</p> <p style="text-align: right;">[02 Marks]</p> <p>II. During orthogonal cutting, an increase in cutting speed causes</p> <p>(a) An increase in longitudinal cutting force (b) An increase in radial cutting force (c) An increase in tangential cutting force (d) Cutting forces to remain unaffected</p> <p style="text-align: right;">[03 Marks]</p>	C02
Q5	<p>I. Interference fit joints are provided for:</p> <p>(a) Assembling bush bearing in housing (b) Mounting heavy duty gears on shafts (c) Mounting pulley on shafts (d) Assembly of flywheels on shafts</p> <p style="text-align: right;">[02 Marks]</p> <p>II. A hole is specified as $40^{+0.050}_{-0.000}$ mm. The mating shaft has a clearance fit with minimum clearance of 0.01 mm. The tolerance on the shaft is 0.04 mm. The maximum clearance in mm between the hole and the shaft is</p> <p>(a) 0.04 (b) 0.05 (c) 0.10 (d) 0.11</p> <p style="text-align: right;">[03 Marks]</p>	C02
Q6	Calculate the shear angle in the metal cutting process with the following data. Back rake angle = 20 degree Chip thickness ratio = 0.8	C03
SECTION B		
Each Question will carry 10 Marks		
Q 1	Differentiate between pressurized and unpressurised gating systems with references in to the applications.	C02
Q2	Explain the following welding process with neat sketch. A) Tungsten inert gas welding (TIG) with application B) Resistance Welding	C01
Q3	Discuss the effect of following tool geometry on machining process. a) Positive Back rake angle b) Negative Back rake angle c) Side rake angle d) Cutting edge angle	C02

	e) Nose radius	
Q4	Derive the equation of shear angle used in metal cutting operation and establish relationship through velocity triangle.	C04
Q5	Calculate the dimensions of hole and shaft from the standard designation 40 H ₅ h ₇ . Following data are given for references. <ul style="list-style-type: none"> • Geometric mean dimensions = 35 mm • IT₅= 7 times of i • IT₇= 16 times of i 	CO3
SECTION C		
1. Each Question will carry 20 Marks 2. Instruction: Assume necessary data if needed		
Q 1	A XYZ company want to launch a new car in which some of following parts (shown in the figure) wants to manufacture inhouse. <ol style="list-style-type: none"> Hollw and step shaft Falt surface used at floor dimensions (80 x 60 x 5 Cm) Analyze the above two component in terms of right selction of manufacturing method as well as tool selection. Following data you can refer for analysis purpose. <ul style="list-style-type: none"> • Total number of componemt production – 1000 • Machining Speed variation lies between (N) – 50 to 2000 RPM • Labour cost per hour – 100 rupees • For hollow shaft raw material dimension – outside and inside dia 50 and 20 mm respectively . • Steel plate raw material dimension= (82 c 62 x 6 cm) • Material used – high carbon steel • Machining cost per hours- 2000 rupees Prepare the complete chart for manufactring selection, total time required for production and total manufactring cost exclude fixed cost of machine.	CO4



OR

Analyze the forces and stress generated in the machining operation through merchant circle method and established the relationship between resolve and actual forces.