Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII • EXAMINATION – SUMMER • 2014

Subject Code: 172302 **Date: 03-06-2014**

Subject Name: Plastic Mould and Die Design - I

Time: 02.30 pm - 05.00 pm **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1 **(a)** For the product shown in the fig.[a], workout the feed system dimensions . **07**

(b) Draw a suitable hand injection mould for the product shown in fig.[a]. **07**

Q.2 **(a)** Define : Mould; Runner ; ejection system; sprue puller; gate ; guide pin ; push back pin . **07**

(b) The shot capacity of an Injection moulding machine is 250 gms. It is desired to mould the product shown in fig.[a] on this machine. Work out the no.of impressions that can be moulded on this machine. **07**

Bulk factor of PS = 1.4
Bulk factor of PP = 1.9
Specific gravity of PS= 1.04
Specific gravity of PP = 0.9

OR

(b) Discuss the advantages and disadvantages of Insert bolster and Integer moulds in detail. Write applications for each of these. **07**

Q.3 **(a)** For the product shown in fig[b], write down step by step machining . Mention the machine that is to be used in the toolroom for various operations **07**

(b) Fill in the blanks: **07**

a. Material of ejector rod is _____
b. For hollow products , _____gate is used.
c. Rectangular edge gate cannot be used for _____materials.
d. _____is the disadvantage of a pin gate.
e. Fan gate is used for _____products.
f. Material of construction of a bolster is _____
g. Minimum diameter of a runner is _____

OR

Q.3 **(a)** Calculate the efficiency of full round, half round, trapezoidal and hexagonal runners. **07**

(b) A rectangular box molded in PP has dimensions of 175x105x30mm. Top open, this box has wall thickness of 2mm throughout. If a 2 impression mould is desired , do the feed system calculations . **07**

Q.4 **(a)** A product in HDPE weighing 5 gms is to be molded on an injection moulding machine having shot capacity of 250 gms. Work out how many impressions can be moulded on this machine .Assume bulk factor of HDPE = 1.8 ; Specific gravity of HDPE = 0.96. Bulk factor of PS= 1,4; sp.gr.of PS=1.04 **07**

(b) Discuss Stripper plate Ejection in detail. **07**

OR

Q.4 **(a)** Discuss pin ejection in detail **07**

Q.4 **(b)** Discuss advantages, disadvantages and applications of Pin Gate; Submarine Gate ; Overlap gate ; rectangular edge gate; tab gate ; ring gate and diaphragm gate. **07**

Q.5 **(a)** Calculate the shot capacity of the injection moulding machine if a product of weight 10 gms is to be moulded in ABS and a 20 impression mould is desired. Assume: **07**

Bulk factor of PS = 1.9
Bulk factor of ABS = 1.8
Specific gravity of PS = 1.04
Specific gravity of ABS= 1.0

(b) Tick the correct one: **07**

1. Material of Insert is (a) MS (b) EN-24 (c) EN-8 (d) EN 48B (e) none of these
2. Function of ejector pin is [a] To eject the product. [b] to protect the core/cavity while mould opening.[c] to protect the core/cavity while mould closing [d] none of these.
3. Shaping operation removes metal in (a) Millimeters (b) Cms Microns (d) None of these
4. For removal of metal burrs from the holes , the operation done is [a] grinding [b] honing [c] reaming [d] polishing
5. Gate has a minimum crosssectional area due to : (a) To increase pressure drop (b) to offer resistance so that impression fills completely.(c) to decrease pressure drop (d) none of these.
6. Stripper plate ejection is preferred for (a) short hollow products (b) tall hollow products (c) solid tall products (d) multiple cavity products.
7. Function of Ejector retainer plate is (a) to hold the ejector element (b) to hold the ejector plate (c) to protect the ejector plate (d) none of these.

Q.5 **(a)** Discuss the requirements of Runner and Gate **07**

(b) Write the function of : Lathe ; Shaping machine ; Drilling machine ; Grinding machine ; wire EDM ; milling machine ; honing machine. **07**

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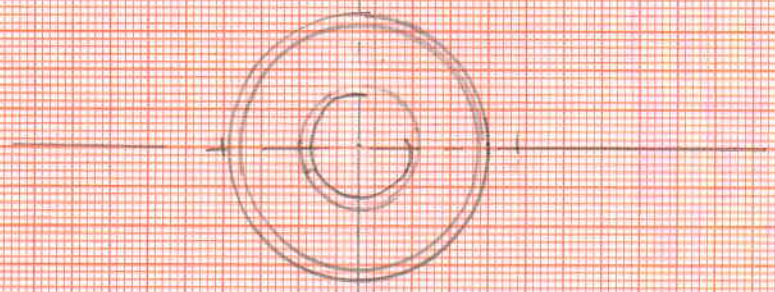

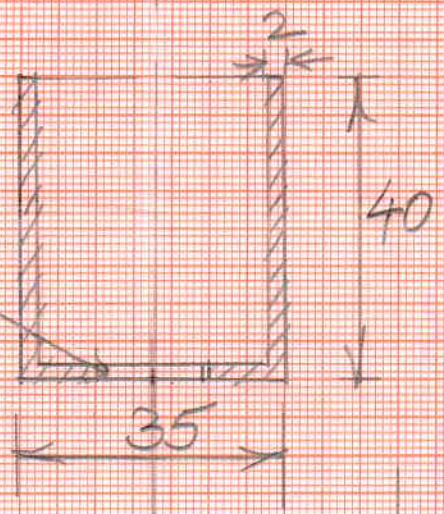

Fig (a)
Mat'l: HDPE
$\rho = 0.96\ g/cc$

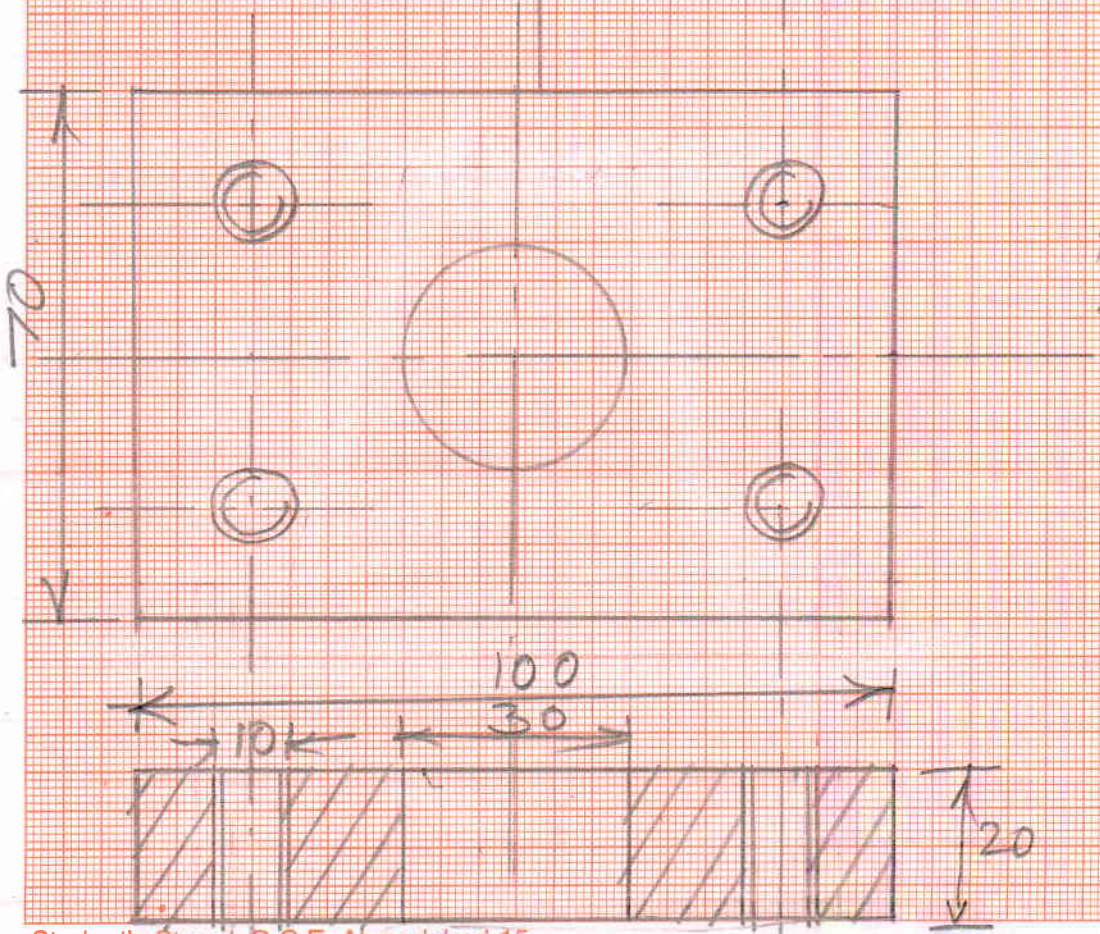

Fig (b)