Adda247

WELCOME TO Adda247

"There is nothing impossible to they who will try."

ISRO | BHEL | DRDO & OTHER PSUs

PRODUCTION

CASTING

MOST EXPECTED QUESTIONS

PART-2

Live@ 11:30Am

Gaurav sir

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GATE 2023 RESULT

GATE

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FROM ADDA 247 FAMILY

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AIR 07 ME RUSHI PRADIPKUMAR KARIYA

AIR 11 CE VINEET JAIN

AIR 30 CE RITIK BANSAL

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AIR 91 EE RISHABH GUPTA

AIR 111 ES ANIL GUPTA

AIR 130 EE SAURAV PATEL

AIR 136 CE RUPESH SACHDEVA

AIR 200 ECE WASIUZZAMA

AIR 212 IN WASIUZZAMA

AIR 217 ME VISHAL KUMAR

AIR 219 ME RITISH KUMAR

AIR 258 EE MANAV

AIR 348 EE AMAN NAMDEV

AIR 392 EE GAURAV MAHAJAN

AIR 403 EC MOHAN KUMAR SINGH

AIR 567 EE SHANKAR JHA

AIR 571 ME VIJENDER MEENA

YouTube Classes Schedule

ENGINEERS

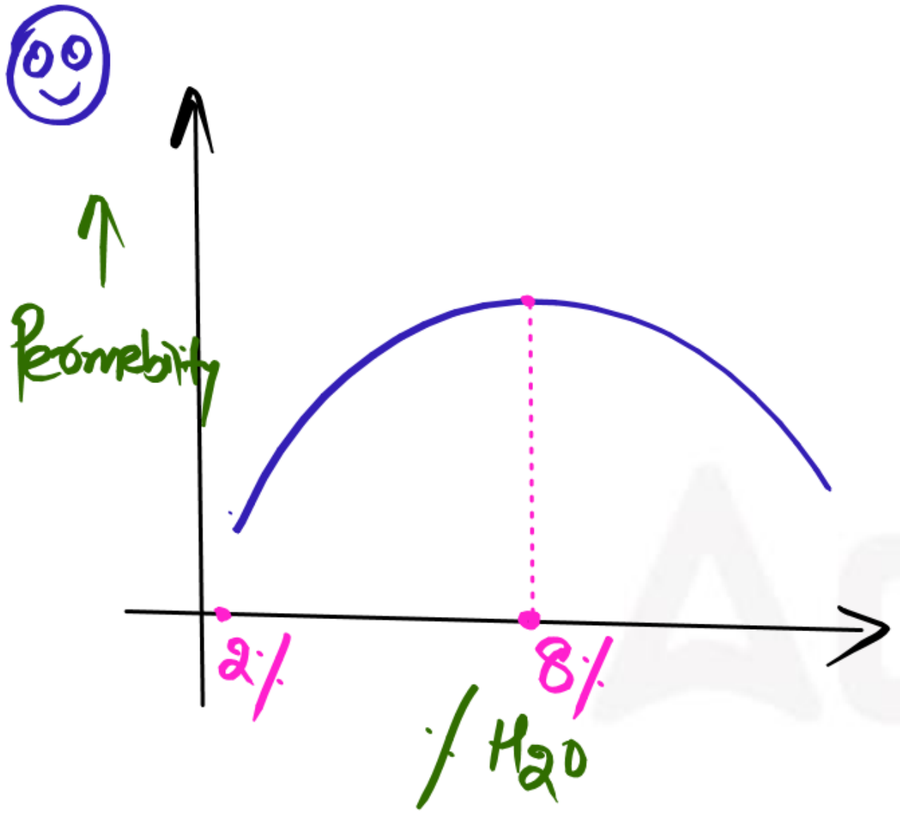
MECHANICAL ENGINEERING

EXAM TARGET	SUBJECT	TIME	FACULTY
ALL PSUs	ENGINEERING MATHS	10:00 AM	ANANT SIR
ALL PSUs	PRODUCTION	11:30 AM	GAURAV SIR
ALL PSUs	THERMODYNAMICS	3:00 PM	KANISTH SIR
GATE 2024-25	HMT	4:30 PM	YOGESH SIR
GATE 2024-25	SOM	9:00 PM	MUKESH SIR

FREE APP
CLASS SCHEDULE

MECHANICAL ENGINEERING

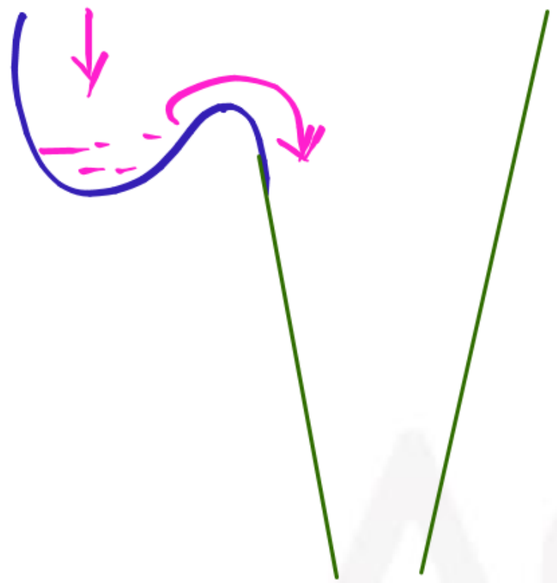
HMT	MONDAY Live @11AM	YOGESH SIR
PRODUCTION	TUESDAY Live @11AM	GAURAV SIR
SOM	WEDNESDAY Live @8PM	MUKESH SIR
THERMODYNAMICS	THURSDAY Live @11AM	KANISTH SIR
ENGINEERING MATHEMATICS	FRIDAY Live @11AM	ANANT SIR



Increase in water content in moulding sand causes

(a) Flowability to go through a maximum
(b) permeability to go through a maxima
(c) Compressive strength to go through a maxima
(d) strength to go through a maxima

$H_2O \rightarrow 2$ to 8%



Converging passage is used for feeding the liquid molten metal into the mold to

(a) Increase the rate of feeding
(b) quickly break off the protruding portion of the casting
(c) Decrease wastage of cast metal
(d) avoid aspiration of air

Sprue → converging passage

centrifugal casting

⇓

Pure metal at periphery

⇓

Impurity collected at centre

In centrifugal casting, the lighter impurities are

(a) uniformly distributed

(b) forced towards the outer surface

(c) trapped near the mean radius of the casting

(d) collected at the center of the casting

Given data :→

* $t_{s_1} = 20\text{sec} \Rightarrow t = 3\text{mm}$

* $t_{s_2} = 50\text{sec} \Rightarrow t = 4.5\text{mm}$

* $t_s = 100\text{sec} \Rightarrow t = ?$

Molten aluminum was poured in a sand mould and the thickness of solid skin formed after 20 seconds and 50 seconds were fond to be 3mm and 4.5mm respectively. What would be the thickness of the solid skin at the end of 100 seconds after pouring?

(a) 5.5 mm
(b) 6.19 mm ✓
(c) 7.1 mm
(d) None of these

Solution :→

$* \; t = c_1\sqrt{t_s} + c_2$

$* \; 3 = c_1\sqrt{20} + c_2$ — ①

$* \; 4.5 = c_1\sqrt{80} + c_2$ — ②

$* \; c_1 = 0.58$

$* \; c_2 = 0.406$

$* \; t = 0.58\sqrt{t_s} + 0.406$

$* \; t = 0.58\sqrt{100} + 0.46$

$* \; t = 0.58 \times 10 + 0.46 = 5.8 + 0.46$

$* \; t = 6.26 \text{ mm}$

Green sand mould indicates that

(a) Polymeric mould has been cured
(b) mould has been totally dried
(c) mould is green in colour
(d) mould contains moisture

Green Sand
↓ Heat
Dry Sand
↓ Heat
Hot Sand

Hot chamber Die Casting

Lead, Tin, Zinc

Al ✗

Which of the following engineering materials is the most suitable candidate for hot chamber die casting

(a) Low carbon steel
(b) titanium
(c) Copper
(d) tin ✓

Negative allowance is provided on the pattern to take care of

(a) The distortion allowance
(b) The draft allowance → Angular Allowances
(c) The machining allowance → +ve Allowances
(d) The shake allowance → −ve Allowances

Two castings of the same metal have the same surface area one casting is in the form of a sphere and the other is a cube. What is the ratio of the solidification time for the sphere to that of cube.

core
⇓
To create cavity

Chaplets
⇓
To support the core

Chaplets are placed between mold in order to

(a) promote directional solidification
(b) help alloying the metal
(c) facilitate easy removal of core from casting
(d) prevent core movement due to buoyancy

Moulding Sand
⇓
Solid Particle
⇓
Flowability

Which one of the following is NOT a property of a sand mould?

(a) permeability
(b) Collapsibility
(c) Strength
(d) Fluidity

* Fluidity → Ability to flow fluid
* Flowability → Ability to flow Solid

An expandable pattern is used in

(a) slush casting
(b) squeeze casting
(c) centrifugal casting
(d) Investment casting

"Wax" as Pattern

* Expandable Mould (Temporary)
  - Sand casting
  - Shell casting
  - Investment casting
  - Full Moulding
  - CO_2 Moulding

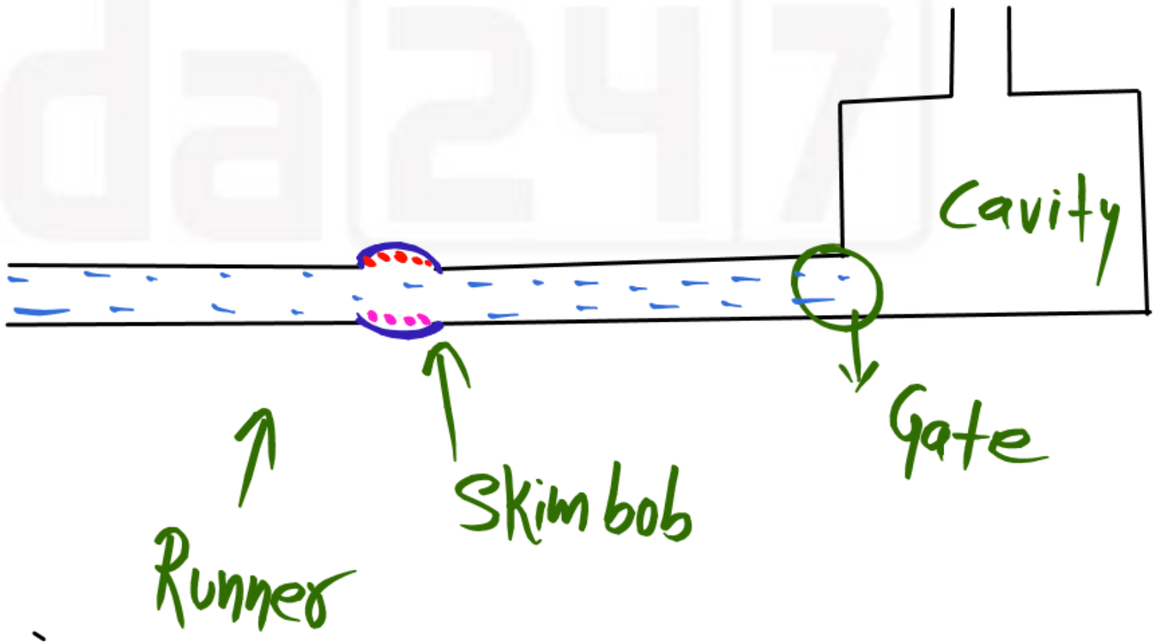
X Permanent Mould
  - centrifugal casting
  - Slush casting
  - Die casting
  - Squeeze casting

A cylindrical job with diameter of 200 mm and height of 100 mm is to be cast using modulus of riser design. Assume that the bottom surface of cylindrical riser does not contribute as cooling surface. If the diameter of the riser is equal to its height, then the height of the riser (in mm) is

(a) 150
(b) 200
(c) 100
(d) 125

Light impurities in the molten metal are prevented from reaching the mold cavity by providing

(a) Strainer
(b) Button well
(c) Skim bob
(d) All of these



Which of the following materials requires the largest shrinkage allowance, while making a pattern for casting

(a) Aluminum (b) Brass

(c) Cast iron (d) Plain carbon steel

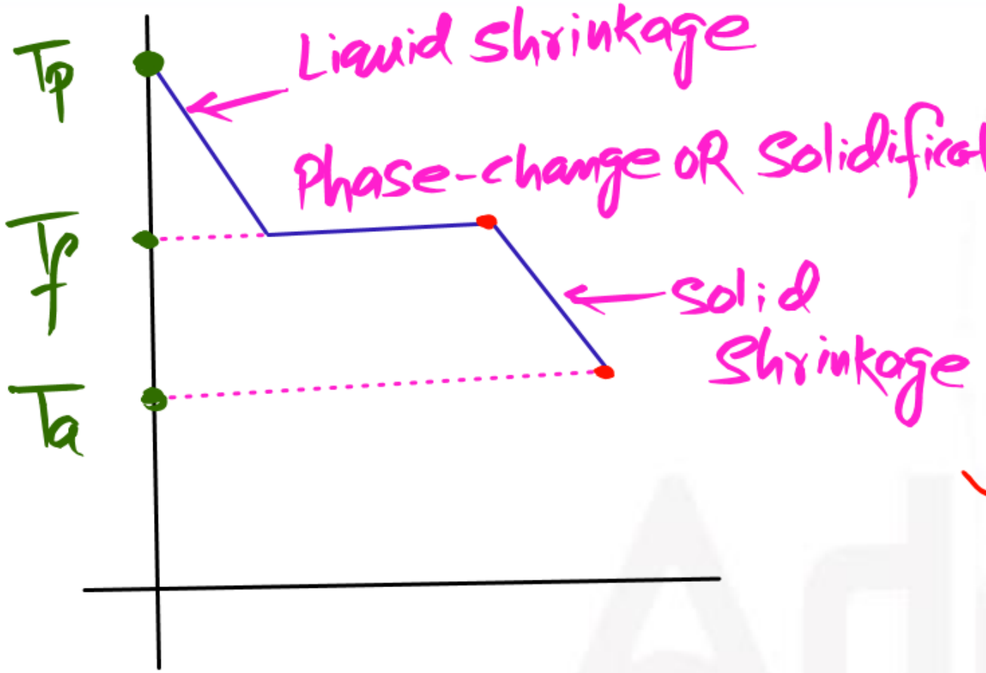
Material	Shrinkage Allowances (Solid)
* Brass	23 mm/m
* Steel	20 mm/m
* Cast Iron	10 mm/m

* Max Shrinkage (Solid) Shrinkage → Brass

* Max total Shrinkage → Steel

Disposable patterns are made of

(a) wood
(b) rubber
(c) metal
(d) Polystyrene



$\times$ $T_p = T_m + \Delta t$

Shrinkage allowance on pattern is provided to compensate for shrinkage when

(a) the temp of liquid metal drops from pouring to freezing temp

(b) the metal changes from liquid to solid state at freezing temp

(c) the temp of solid phase drops from freezing to room temp

(d) the temp of metal drops from pouring to room temp

Shrinkage $\Rightarrow$ Solid Shrinkage

The primary purpose of sprue in casting mold is to

(a) feed the casting at rate consistent with tne rate of solidification
(b) Act as a reservoir for molten metal
(c) Fed molten metal from the pouring basin to the gate.
(d) Help feed the casting until all solidification takes place

The primary function of a riser is to

(a) feed molten metal to casting as it solidifies

(b) prevent atmospheric air from contaminating the metal in the mold

(c) allow gases to easily escape from mold cavity

(d) allow molten metal to rise above the mold cavity

While cooling, a cubical casting of side 40mm undergoes 3%, 4% and 5% volume shrinkage during the liquid state, phase transition and solid state respectively. The volume of metal compensated from the riser is

(a) 2% (b) 7% (c) 8% (d) 9%

Liquid state → 3%

Phase change state → 4%

→ compensated by Riser

Solid state → 5% → By providing Linear Solid Shrinkage Allowance.

Riser → 3+4 = 7%

Gating Ratio

$A_s : A_r : A_g$

1 : 2 : 4 ← Non Pressurised Gating System

$(A_s \text{ Area})_{Min}$ → Sprue

In a gating system, the ratio 1:2:4 represents

(a) Sprue base area: Runner area: in- gate area

(b) Pouring basin area : in-gate area: Runner area

(c) Sprue base area: in-gate area: casting area:

(d) Runner area: in-gate area :Casting area.

Given Data :→

Cyl Riser ⇒ D = H = 6 cm

Casting ⇒ 7 X 10 X 2 cm

$(t_s)_{(Total)_{casting}} = 1.36$ min

$(t_s)_{(Total)_{Riser}} = ?$

A cylindrical riser of 6 cm diameter and 6 cm height has to be designed for a sand casting mould for producing a steel rectangular plate casting of 7 cm × 10 cm × 2 cm dimensions having the total solidification time of 1.36 minute. The total solidification time (in minute) of the riser is 2 minute

Solution :→

$$* (t_s)_c = K_c \left(\frac{V}{SA}\right)_c^2 \quad -①$$

$$* (t_s)_R = K_R \left(\frac{V}{SA}\right)_R^2 \quad -②$$

$$* \frac{(t_s)_R}{(t_s)_c} = \frac{\left(\frac{V}{SA}\right)_R^2}{\left(\frac{V}{SA}\right)_c^2} = \frac{1}{\left(\frac{140}{208}\right)^2}$$

$$* (t_s)_R = 1.36 \left(\frac{208}{140}\right)^2 = 3 \text{ minute}$$

$$* \left(\frac{V}{SA}\right)_R \Big|_{h=d} = \frac{\frac{\pi}{4} d^2 \times h}{2 \times \frac{\pi}{4} d^2 + \pi d h} = \frac{d}{6}$$

$$* \left(\frac{V}{SA}\right)_R = \frac{d}{6} = \frac{6}{6} = 1$$

$$* \left(\frac{V}{SA}\right)_c = \frac{7 \times 10 \times 2}{2(7 \times 10 + 10 \times 2 + 7 \times 2)}$$

$$* \left(\frac{V}{SA}\right)_c = \frac{140}{208}$$

For a given volume of a riser, if the solidification time of the molten metal in riser needs to be quadrupled, the surface area of the riser should be made

(a) one-fourth
(b) half
(c) double
(d) four times

Two streams of liquid metal which are not hot enough to fuse properly result into a casting defect known as.

(a) cold shut
(b) Swell
(c) blow hole
(d) Scar

For the same material, powder metallurgy process is superior to casting for

(a) making large products
(b) better control over the density of product
(c) better strength of the finished product
(d) making parts with wide variations of thickness at different sections

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