

- (viii) Mastication of rubber is the process of
- Cutting the bales in smaller pieces
 - Sheeting out the rubber
 - Reducing the chain length
 - Extruding the rubber through a die
- (ix) In Cold feed extruders, L/D ratio is :
- 2 : 1
 - 6 : 1
 - 15 : 1
 - 5 : 1
- (x) If the fill factor of F -270 Internal mixer is 0.75, then batch weight of compound is:- (if the Sp.Gravity is considered as 1)
- 20.2 kg.
 - 202 kg.
 - 270 kg.
 - 175 kg.
- (xi) In a tyre manufacturing unit the bead wires are coated with compound using –
- Duplex extruder
 - Triplex extruder
 - T-head extruder
 - Roller Head extruder
- (xii) The batch weight capacity of 28" x 84" mixing mill (if sp. Gravity is considered as 1)
- 56 – 70 kgs.
 - 100 – 135 kgs.
 - 65 – 85 kgs.
 - 80 kgs. Maximum
- (xiii) A thick rubber sheeting with profile is produced by using :
- Simple calendar
 - Spreader
 - Any hot feed extruder
 - Extruders with roller head die arrangement.
- (xiv) On incorporation of carbon black into rubber
- Hardness increases
 - Hardness does not change
 - Hardness decreases
 - Becomes brittle
- (xv) Reversion & OCT can be tested by using –
- Mooney viscometer
 - MDR
 - Resiliometer
 - DIN abrader
- (xvi) Rotocure curing presses are recommended for curing _____ articles.
- Tyres
 - Tubes
 - Textile rollers
 - Conveyor belt
- (xvii) ML₁₊₄ @ 125°C is related to the following polymer
- NR
 - Polyethylene
 - IIR
 - EPDM
- (xviii) Cambering of calendar rolls are done to
- Increase the life of the calendar rolls
 - To bring smoothness on the surface of the calendered sheet
 - To maintain uniform gauge of the calendered sheet
 - To reduce thickness of the calendered sheet

- (xix) High temperature & shorter curing time is preferred for
- (a) Thicker moulded articles (c) Thin rubber moulded goods
 (b) Commonly for all NR products (d) None of the above.

- (xx) Mooney viscometer is used to measure the viscosity of
- (a) Cured compound
 (b) Semi cured compound
 (c) Raw polymer, masticated rubber, master batch & final batch Rubber
 (d) Porous compound.

20 x 1 = 20

- 2.(a) Draw a neat sketch of an INTERNAL MIXER and explain the major parts and its function.
 (b) A Banbury is used for mixing 100 parts NR compound with the rotor rpm of 20 with batch weight of 200 kgs. If the specific gravity of compound is 1.10 calculate the volume of the chamber (assume fill factor as 0.75).
 (c) How do ram pressure and rotor speed affect quality of mixing?

(10 + 5 + 5) = 20

- 3.(a) Sketch a typical rubber extruder showing its different parts.
 (b) Discuss the differences between a rubber extruder and a plastic extruder.
 (c) What are the advantages of pin barrel cold feed extruder over conventional cold feed extruder?
 (d) What is die swell? Explain the factors on which die swell depends.

(6+5+4+5) = 20

- 4.(a) What are the advantages and disadvantages of a Moving Die Rheometer (MDR) over an Oscillating Disc Rheometer (ODR)?
 (b) Draw a typical rheo-curve for reversion-type cure and explain the different terms associated with it.
 (c) What is Initial Plasticity Number and Plasticity Retention Index? Explain the significance of both terms in rubber industry.
 (d) Define frictioning, topping and sheeting.

(5+5+5+5)=20

GROUP – B

- 5.(a) What are the advantages & disadvantages in compression and injection moulding process?
 (b) Explain the method used for vulcanizing the following products:
- (i) Tyre curing
 - (ii) Tube curing
 - (iii) Hand gloves
 - (iv) O-ring
 - (v) Rubber band
 - (vi) Ballons
 - (vii) Steel cord conveyor belt

[TURN OVER]

(c) State the probable reasons for the following processing problems :

- (i) Air entrapment
- (ii) Blister
- (iii) Crow feet defect
- (iv) Tearing
- (v) Blooming
- (vi) Flow cracks
- (vii) Sticking to moulds.

(6 +7 +7) = 20

6. (a) Explain the safety factors associated while mixing in a two roll mill with respect to :

- (i) Machine safety
- (ii) Human safety

(b) Define the following terms :

- (i) Work
- (ii) Power
- (iii) Energy
- (iv) Efficiency

(c) Draw a power consumption – time curve for an internal mixer and discuss the reasons for variation of power with time.

(d) Discuss the drive system of a two roll mill.

(6+4+5+5)= 20

7.(a) Show in figures the nip area and the rolling bank of a two roll mixing mill. How it affects the mixing process? Which force is responsible for Front roll to Back roll transfer of the stock? What is up-side down mixing?

(b) Discuss the operations; Incorporation, particle size reduction, distributive mixing and dispersive mixing, during compounding of rubber.

(c) State the functions of different auxiliary chemicals added to the NR latex.

(8 + 8 + 4) = 20

8. Write short notes on any **Four** of the following :

- (i) Curing of hoses
- (ii) Ram and Screw Extruder
- (iii) Roll Bending and Roll Cambering
- (iv) Autoclave
- (v) Mould shrinkage
- (vi) Bag-O-matic press.

4 x 5 = 20