ENB316 Design of Machine Elements Gearbox design project variants

Variant 1:

Design a Gearbox for a **Horizontal Belt Conveyor** shown in figure below



Belt length =25m; Capacity (dead load on belt) =1000t/h; Belt weight = 20kg/m; Roller Diameter = 40mm; Bearing diameter = 20mm; Drum diameter = 100mm; Lever arm of reaction force = 7; Travel speed = 2m/sec.

Variant 2:

Design a Gearbox for a Horizontal Belt Conveyor shown in figure below



Belt length =20m; Capacity (dead load on belt) = 2000t/h; Belt weight = 10kg/m; Roller Diameter = 30mm; Bearing diameter = 12mm; Drum diameter = 150mm; Lever arm of reaction force = 7; Travel speed = 1m/sec.

Variant 3:

Design a Gearbox for a **Horizontal Belt Conveyor** shown in figure below



Belt length = 20m; Capacity (dead load on belt)=500t/h; Belt weight = 10kg/m; Roller Diameter=25mm; Bearing diameter = 12mm;Drum diameter = 150mm; Lever arm of reaction force = 6; Travel speed = 2m/sec; Diameter of driven wheel = 300mm; Diameter of drive wheel = 200mm; Efficiency for open transmission = 0.95

Variant 4:

Design a Gearbox for a **Horizontal Belt Conveyor** shown in figure below



Belt length = 25m; Capacity (dead load on belt) = 800t/h; Belt weight = 15kg/m; Roller Diameter = 35mm; Bearing diameter = 12mm; Drum diameter = 200mm; Lever arm of reaction force = 7; Travel speed = 1m/sec; Diameter of driven wheel = 300mm; Diameter of drive wheel = 200mm; Efficiency for open transmission = 0.9

Variant 5:

Design a Gearbox for an **Incline Belt Conveyor** shown in figure below



Belt length = 40m; Capacity (dead load on belt) = 200t/h; Belt weight = 15kg/m; Roller Diameter = 30mm; Bearing diameter = 10mm; Drum diameter = 100mm; Incline angle = 10 degrees; Lever arm of reaction force = 6; Travel speed = 1m/sec.

Variant 6:

Design a Gearbox for an Incline Belt Conveyor shown in figure below



Belt length = 20m;Capacity (dead load on belt) = 300t/h;Belt weight = 15kg/m;Roller Diameter = 30mm;Bearing diameter = 10mm;Drum diameter = 80mm;Incline angle = 14 degrees;Lever arm of reaction force=6;Travel speed = 1m/sec.

Variant 7:

Design a Gearbox for an Incline Belt Conveyor shown in figure below



Belt length = 15m; Capacity (dead load on belt) = 200t/h; Belt weight = 15kg/m; Roller Diameter = 40mm; Bearing diameter = 15mm; Drum diameter = 90mm; Incline angle = 10° ; Lever arm of reaction force = 6; Travel speed = 1m/sec; Diameter of driven wheel = 200mm; Diameter of drive wheel = 300mm; Efficiency for open transmission = 0.98

Variant 8:

Design a Gearbox for an Incline Belt Conveyor shown in figure below



Belt length = 20m; Capacity (dead load on belt) = 300t/h; Belt weight = 15kg/m; Roller Diameter = 30mm; Bearing diameter = 10mm; Drum diameter = 80mm; Incline angle = 14° ; Lever arm of reaction force = 6; Travel speed = 1m/sec; Diameter of driven wheel = 200mm; Diameter of drive wheel = 300mm; Efficiency for open transmission = 0.98

Variant 9:

Design a Gearbox for a Horizontal Chain Conveyor shown in figure below



Chain length = 18m; Capacity (dead load on chain) = 2000t/h; Chain weight = 20kg/m; Pinion Diameter = 60mm; Sliding factor = 0.18; Travel speed = 2m/sec.

Variant 10:

Design a Gearbox for a Horizontal Chain Conveyor shown in figure below



Chain length =15m; Capacity (dead load on chain) = 1200t/h; Chain weight = 15kg/m; Pinion Diameter = 250mm; Sliding factor = 0.2; Travel speed = 1.5m/sec.

Variant 11:

Design a Gearbox for a Horizontal Chain Conveyor shown in figure below



Chain length = 10m; Capacity (dead load on chain) = 1000t/h; Chain weight = 20kg/m; Pinion Diameter = 100mm; Sliding factor=0.2; Travel speed = 1m/sec.; Diameter of driven wheel = 200mm; Diameter of drive wheel = 300mm; Efficiency for open transmission = 0.9

Variant 12:

Design a Gearbox for a Horizontal Chain Conveyor shown in figure below



Chain length = 15m; Capacity (dead load on chain) = 1500t/h; Chain weight = 15kg/m; Pinion Diameter = 250mm; Sliding factor = 0.2; Travel speed = 1m/sec; Diameter of driven wheel = 200mm; Diameter of drive wheel = 300mm; Efficiency for open transmission = 0.9

Variant 13:

Design a Gearbox for an Incline Chain Conveyor shown in figure below



Chain length =25m; Capacity (dead load on chain) = 700t/h; Chain weight = 15kg/m; Pinion Diameter = 100mm; Incline angle = 12 degrees; Sliding factor = 0.3; Travel speed = 2m/sec;

Variant 14:

Design a Gearbox for an Incline Chain Conveyor shown in figure below



Chain length = 25m; Capacity (dead load on chain) = 1000t/h; Chain weight = 15kg/m; Pinion Diameter = 300mm; Incline angle = 10 degrees; Sliding factor = 0.2; Travel speed = 1m/sec.

Variant 15:

Design a Gearbox for an Incline Chain Conveyor shown in figure below



Chain length = 50m; Capacity (dead load on chain) = 1000t/h; Chain weight = 10kg/m; Pinion Diameter = 250mm; Incline angle = 12 degrees; Sliding factor = 0.18; Travel speed = 1m/sec. Diameter of a driven wheel = 200mm; Diameter of drive wheel = 100mm; Efficiency for open transmission = 0.9

Variant 16:

Design a Gearbox for an Incline Chain Conveyor shown in figure below



Chain length =25m; Capacity (dead load on chain) = 1000t/h; Chain weight=15kg/m; Pinion Diameter = 300mm; Incline angle = 10 degrees; Sliding factor = 0.2; Travel speed = 1m/sec. Diameter of driven wheel = 200mm; Diameter of drive wheel = 300mm; Efficiency for open transmission = 0.9

Variant 17:

Design a Gearbox for a Combined Belt Conveyor shown in figure below



Horizontal Belt length = 15m; Incline Belt Length = 10m; Incline angle = 15 degrees; Capacity (dead load on belt) = 200t/h; Belt weight = 9kg/m; Roller Diameter = 25mm; Bearing diameter = 10mm; Drum diameter = 120mm; Lever arm of reaction force = 6; Travel speed = 1m/sec.

Variant 18:

Design a Gearbox for a Combined Belt Conveyor shown in figure below



Horizontal Belt length = 20m; Incline Belt Length = 15m; Incline angle = 10° ; Capacity (dead load on belt) = 250t/h; Belt weight = 9kg/m; Roller Diameter = 25mm; Bearing diameter = 10mm; Drum diameter = 90mm; Lever arm of reaction force = 6; Travel speed = 1m/sec.

Variant 19:

Design a Gearbox for a Combined Belt Conveyor shown in figure below



Horizontal Belt length = 20m; Incline Belt Length = 15m; Incline angle = 10° ; Capacity (dead load on belt) = 250t/h; Belt weight = 9kg/m; Roller Diameter = 25mm; Bearing diameter = 10mm; Drum diameter = 90mm; Lever arm of reaction force = 6; Travel speed = 1m/sec. Diameter of driven wheel = 200mm; Diameter of drive wheel = 300mm; Efficiency for open transmission = 0.9

Variant 20:

Design a Gearbox for a Combined Belt Conveyor shown in figure below



Horizontal Belt length = 20m; Incline Belt Length = 15m; Incline angle = 10 degrees; Capacity (dead load on belt)=2250t/h; Belt weight = 9kg/m; Roller Diameter = 25mm; Bearing diameter = 10mm; Drum diameter = 90mm; Lever arm of reaction force = 6; Travel speed = 1m/sec. Diameter of driven wheel = 300mm; Diameter of drive wheel = 200mm; Efficiency for open transmission = 0.9

Variant 21:

Design a Gearbox for a Combined Chain Conveyor shown in figure below



Horizontal Chain length =25m; Inclined Chain Length = 25m; Incline angle = 10 degrees; Capacity (dead load on chain) = 400t/h; Chain weight=15kg/m; Pinion Diameter = 200mm; Sliding factor = 0.2; Travel speed = 1.5m/sec;

Variant 22:

Design a Gearbox for a Combined Chain Conveyor shown in figure below



Horizontal Chain length = 25m; Inclined Chain Length = 25m; Incline angle = 10 degrees; Capacity (dead load on chain) = 1500t/h; Chain weight = 15kg/m; Pinion Diameter = 100mm; Sliding factor = 0.2; Travel speed = 0.5m/sec;

Variant 23:

Design a Gearbox for a Combined Chain Conveyor shown in figure below



Horizontal Chain length = 25m; Inclined Chain Length = 25m; Incline angle = 10 degrees; Capacity (dead load on chain) = 1000t/h; Chain weight = 15kg/m; Pinion Diameter = 200mm; Sliding factor = 0.2; Travel speed = 0.5m/sec; Diameter of driven wheel = 200mm; Diameter of drive wheel = 300mm; Efficiency for open transmission = 0.95

Variant 24:

Design a Gearbox for a Combined Chain Conveyor shown in figure below



Horizontal Chain length = 30m; Inclined Chain Length = 25m; Incline angle = 15 degrees; Capacity (dead load on chain) = 1500t/h; Chain weight = 10kg/m; Pinion Diameter = 150mm; Sliding factor = 0.2; Travel speed = 1m/sec; Diameter of driven wheel = 200mm; Diameter of drive wheel = 100mm; Efficiency for open transmission = 0.95

Variant 25:

Design a Gearbox for **Drum Hoisting** shown in figure below



Drum Diameter = 500mm; Mass to lift = 500kg; Winch efficiency = 0.85; Lifting speed = 10m/sec; Rope Diameter = 19mm; Multi-sheave = no.

Variant 26:

Design a Gearbox for **Drum Hoisting** shown in figure below



Drum Diameter = 500mm; Mass to lift = 1000kg; Winch efficiency = 0.85; Lifting speed = 10m/sec; Rope Diameter = 19mm; Xmax = 1000mm; Multi-sheave = no.

Variant 27:

Design a Gearbox for Drum Hoisting shown in figure below



Drum Diameter =600mm; Mass to lift = 4000kg; Winch efficiency = 0.85; Lifting speed = 5m/sec; Rope Diameter=19mm; Minimum load offset Xmin = 200mm;

Variant 28:

Design a Gearbox for **Drum Hoisting** shown in figure below



Drum Diameter =500mm; Mass to lift = 2000kg; Winch efficiency = 0.85; Lifting speed = 5m/sec; Rope Diameter=19mm; Diameter of Driven wheel = 300mm; Diameter of driver wheel = 200mm; Transmission efficiency = 0.9; Multi-sheave = no.

Variant 29:

Design a Gearbox for Drum Hoisting shown in figure below



Drum Diameter =500mm; Mass to lift = 2000kg; Winch efficiency = 0.85; Lifting speed = 5m/sec; Rope Diameter = 19mm; Diameter of Driven wheel = 300mm; Diameter of driver wheel = 200mm; Transmission efficiency = 0.9; Multi-sheave = no.

Variant 30:

Design a Gearbox for a Rack and pinion/chain sprocket shown in figure below



Pitch diameter pinion gear = 500mm; Mass to lift = 4000kg; Rack and Pinion efficiency = 0.9; Lifting speed = 5m/sec.

Variant 31:

Design a Gearbox for a Rack and pinion/chain sprocket shown in figure below



Pitch diameter pinion gear = 1000mm; Mass to lift = 4000kg; Rack and Pinion efficiency = 0.9; Lifting speed = 15m/sec; Xmax = 1000mm.

Variant 32:

Design a Gearbox for a Rack and pinion/chain sprocket, shown in figure below



Pitch diameter pinion gear =500mm; Mass to lift = 4000kg; Rack and Pinion efficiency = 0.9; Lifting speed = 5m/sec; Minimum load offset Xmin = 300mm; Bearing support distance L = 1000mm.

Variant 33:

Design a Gearbox for a Rack and pinion/chain sprocket shown in figure below



Pitch diameter pinion gear =1000mm; Mass to lift = 4000kg; Rack and Pinion efficiency = 0.9; Lifting speed = 2m/sec; Diameter of Driven wheel = 200mm; Diameter of driver wheel = 100mm; Transmission efficiency = 0.9.

Variant 34:

Design a Gearbox for **Rack and pinion/chain sprocket** shown in figure below



Pitch diameter pinion gear =1000mm; Mass to lift = 4000kg; Rack and Pinion efficiency = 0.9; Lifting speed = 2m/sec; Diameter of Driven wheel = 200mm; Diameter of driver wheel = 100mm; Transmission efficiency = 0.9.

Variant 35:

Design a Gearbox for **Rack and pinion/chain sprocket** shown in figure below



Pitch diameter pinion gear = 1000mm; Mass to lift = 4000kg; Rack and Pinion efficiency = 0.9; Lifting speed = 2m/sec.

Variant 36:

Design a Gearbox for a Rack and pinion/chain sprocket shown in figure below



Pitch diameter pinion gear =700mm; Mass to lift = 2000kg; Rack and Pinion efficiency = 0.9; Lifting speed = 1.5m/s; Diameter of Driven wheel = 150mm; Diameter of driver wheel = 80mm; Transmission efficiency = 0.9.

Variant 37:

Design a Gearbox for Rack and pinion/chain sprocket shown in figure below



Pitch diameter pinion gear = 800mm; Mass to lift = 1500kg; Rack and Pinion efficiency = 0.9; Lifting speed = 1.6m/s; Diameter of Driven wheel = 170mm; Diameter of driver wheel = 90mm; Transmission efficiency = 0.9.

Variant 38:

Design a Gearbox for Rack and pinion/chain sprocket shown in figure below



Pitch diameter pinion gear = 9000mm; Mass to lift = 2500kg; Rack and Pinion efficiency = 0.9; Lifting speed = 1.8m/sec.

Variant 39:

Design a Gearbox for a Horizontal Belt Conveyor shown in figure below



Belt length =15m; Capacity (dead load on belt)=300t/h; Belt weight = 18kg/m; Roller Diameter = 40mm; Bearing diameter = 18mm; Drum diameter = 80mm; Lever arm of reaction force = 7; Travel speed = 1m/sec.

Variant 40:

Design a Gearbox for a Horizontal Belt Conveyor shown in figure below



Belt length =10m; Capacity (dead load on belt) = 250t/h; Belt weight = 10kg/m; Roller Diameter = 25mm; Bearing diameter = 14mm; Drum diameter = 140mm; Lever arm of reaction force = 7; Travel speed = 0.8m/sec.

Variant 41:

Design a Gearbox for a Rack and pinion/chain sprocket shown in figure below



Pitch diameter pinion gear = 280mm; Mass to lift = 800kg; Rack and Pinion efficiency = 0.9; Lifting speed = 2m/sec; Xmax = 350mm.

Variant 42:

Design a Gearbox for a Rack and pinion/chain sprocket, shown in figure below



Pitch diameter pinion gear =560mm; Mass to lift = 1000kg; Rack and Pinion efficiency = 0.9; Lifting speed = 1.5m/sec; Minimum load offset Xmin = 250mm; Bearing support distance L = 800mm.

Variant 43:

Design a Gearbox for a Horizontal Belt Conveyor shown in figure below



Belt length =15m; Capacity (dead load on belt) =300t/h; Belt weight = 17kg/m; Roller Diameter = 30mm; Bearing diameter = 22mm; Drum diameter = 80mm; Lever arm of reaction force = 7; Travel speed = 1.7m/sec.

Variant 44:

Design a Gearbox for a Horizontal Belt Conveyor shown in figure below



Belt length =12m; Capacity (dead load on belt) = 140t/h; Belt weight = 8kg/m; Roller Diameter = 27mm; Bearing diameter = 12mm; Drum diameter = 130mm; Lever arm of reaction force = 7; Travel speed = 1m/sec.

Variant 45:

Design a Gearbox for a Horizontal Belt Conveyor shown in figure below



Belt length = 25m; Capacity (dead load on belt)=420t/h; Belt weight = 11kg/m; Roller Diameter=23mm; Bearing diameter = 14mm;Drum diameter = 145mm; Lever arm of reaction force = 6; Travel speed = 1.6m/sec; Diameter of driven wheel = 280mm; Diameter of drive wheel = 180mm; Efficiency for open transmission = 0.93

Variant 46:

Design a Gearbox for a Horizontal Belt Conveyor shown in figure below



Belt length = 21m; Capacity (dead load on belt) = 180t/h; Belt weight = 13kg/m; Roller Diameter = 37mm; Bearing diameter = 13mm; Drum diameter = 175mm; Lever arm of reaction force = 6.5; Travel speed = 1.2m/sec; Diameter of driven wheel = 320mm; Diameter of drive wheel = 190mm; Efficiency for open transmission = 0.91

Variant 47:

Design a Gearbox for an Incline Belt Conveyor shown in figure below



Belt length = 17m; Capacity (dead load on belt) = 80t/h; Belt weight = 13.5kg/m; Roller Diameter = 32mm; Bearing diameter = 12mm; Drum diameter = 85mm; Incline angle = 9 degrees; Lever arm of reaction force = 6; Travel speed = 0.9m/sec.

Variant 48:

Design a Gearbox for an Incline Belt Conveyor shown in figure below



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Belt length = 21m; Cap Roller Diameter = 35mm; Incline angle = 11 degrees;

Capacity (dead load on belt) = 120t/h; n; Bearing diameter = 14mm; es; Lever arm of reaction force=7; Belt weight = 15kg/m; Drum diameter = 95mm; Travel speed = 0.7m/sec.

Variant 49:

Design a Gearbox for a Horizontal Chain Conveyor shown in figure below



Chain length = 14m; Capacity (dead load on chain) = 120t/h; Chain weight = 17kg/m; Pinion Diameter = 55mm; Sliding factor = 0.17; Travel speed = 1.2m/sec.

Variant 50:

Design a Gearbox for a Horizontal Chain Conveyor shown in figure below



Chain length =18m; Capacity (dead load on chain) = 150t/h; Chain weight = 15 kg/m; Pinion Diameter = 90mm; Sliding factor = 0.2; Travel speed = 1.5 m/sec.

Variant 51:

Design a Gearbox for a Horizontal Chain Conveyor shown in figure below



Chain length = 12m; Capacity (dead load on chain) = 75t/h; Chain weight = 12kg/m; Pinion Diameter = 110mm; Sliding factor=0.21; Travel speed = 1.1m/sec.; Diameter driven of wheel = 220mm; Diameter of drive wheel = 330mm; Efficiency for open transmission = 0.92

Variant 52:

Design a Gearbox for a Combined Chain Conveyor shown in figure below



Horizontal Chain length =15m; Inclined Chain Length = 13m; Capacity (dead load on chain) = 200t/h; Chain weight=14kg/m; Sliding factor = 0.18; Travel speed = 1.2m/sec;

Variant 53:

Design a Gearbox for a Combined Chain Conveyor shown in figure below



Horizontal Chain length = 12m; Inclined Chain Length = 10m; Incline angle = 7 degrees; Capacity (dead load on chain) = 150t/h; Chain weight = 12kg/m; Pinion Diameter = 100mm; Sliding factor = 0.21; Travel speed = 0.6m/sec;

Variant 54:

Design a Gearbox for a Combined Chain Conveyor shown in figure below



Horizontal Chain length = 8m; Inclined Chain Length = 10m; Incline angle = 6 degrees; Capacity (dead load on chain) = 250t/h; Chain weight = 11kg/m; Pinion Diameter = 160mm; Sliding factor = 0.17; Travel speed = 0.4m/sec; Diameter of driven wheel = 180mm; Diameter of drive wheel = 320mm; Efficiency for open transmission = 0.92.

Variant 55:

Design a Gearbox for a Combined Chain Conveyor shown in figure below



Horizontal Chain length = 23m; Inclined Chain Length = 20m; Incline angle = 9 degrees; Capacity (dead load on chain) = 150t/h; Chain weight = 12kg/m; Pinion Diameter = 180mm; Sliding factor = 0.19; Travel speed = 0.8m/sec; Diameter of driven wheel = 250mm; Diameter of drive wheel = 110mm; Efficiency for open transmission = 0.94.

Variant 56:

Design a Gearbox for Drum Hoisting shown in figure below



Drum Diameter = 400mm; Mass to lift = 450kg; Winch efficiency = 0.86; Lifting speed = 7m/sec; Rope Diameter = 12mm; Multi-sheave = no.

Variant 57:

Design a Gearbox for Drum Hoisting shown in figure below



Drum Diameter = 450mm; Mass to lift = 800kg; Winch efficiency = 0.87; Lifting speed = 6m/sec; Rope Diameter = 10mm; Xmax = 800mm; Multi-sheave = no.

Variant 58:

Design a Gearbox for **Drum Hoisting** shown in figure below



Drum Diameter =500mm; Mass to lift = 2000kg; Winch efficiency = 0.84; Lifting speed = 4m/sec; Rope Diameter=16mm; Minimum load offset Xmin = 250mm; Bearing support distance L = 800mm; Multi-sheave = no.

Variant 59:

Design a Gearbox for a Horizontal Belt Conveyor shown in figure below



Belt length =20m; Capacity (dead load on belt) =800t/h; Belt weight = 18kg/m; Roller Diameter = 30mm; Bearing diameter = 20mm; Drum diameter = 80mm; Lever arm of reaction force = 7; Travel speed = 1.8m/sec.

Variant 60:

Design a Gearbox for a Horizontal Belt Conveyor shown in figure below



Belt length =22m; Capacity (dead load on belt) = 1600t/h; Belt weight = 14kg/m; Roller Diameter = 30mm; Bearing diameter = 12mm; Drum diameter = 150mm; Lever arm of reaction force = 7; Travel speed = 1.2m/sec.

Variant 61:

Design a Gearbox for an Incline Belt Conveyor shown in figure below



Belt length = 35m; Capacity (dead load on belt) = 180t/h; Belt weight = 17kg/m; Roller Diameter = 30mm; Bearing diameter = 10mm; Drum diameter = 130mm; Incline angle = 8 degrees; Lever arm of reaction force = 6; Travel speed = 1m/sec.

Variant 62

Design a Gearbox for an Incline Belt Conveyor shown in figure below



Belt length = 30m; Capacity (dead load on belt) = 150t/h; Belt weight = 15kg/m; Roller Diameter = 50mm; Bearing diameter = 20mm; Drum diameter = 200mm; Incline angle = 10 degrees; Lever arm of reaction force = 6; Travel speed = 1.2m/sec.

Variant 63:

Design a Gearbox for an Incline Chain Conveyor shown in figure below



Chain length =22m; Capacity (dead load on chain) = 500t/h; Chain weight = 13kg/m; Pinion Diameter = 120mm; Incline angle = 10 degrees; Sliding factor = 0.3; Travel speed = 2m/sec;

Variant 64:

Design a Gearbox for an Incline Chain Conveyor shown in figure below



Chain length = 25m; Capacity (dead load on chain) = 700t/h; Chain weight = 15kg/m; Pinion Diameter = 250mm; Incline angle = 8 degrees; Sliding factor = 0.2; Travel speed = 1.3m/sec.

Variant 65:

Design a Gearbox for an Incline Chain Conveyor shown in figure below



Chain length = 32m; Capacity (dead load on chain) = 600t/h; Chain weight = 17kg/m; Pinion Diameter = 220mm; Incline angle = 12 degrees; Sliding factor = 0.18; Travel speed = 1m/sec. Diameter of a driven wheel = 200mm; Diameter of drive wheel = 100mm; Efficiency for open transmission = 0.9

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