**Unit-1 Design of Machine Tool Geraox**

1. What is the maximum percentage loss of economic cutting speed if geometric progression ratio = 1.06 ?
2. 17 b) 11.5 c) 5.7 d)2.9

Ans: d

1. Diameter range is high in geometric progression due to \_\_\_\_\_\_\_\_\_ spindle speed.
2. Low b) High c) Constant d) all of these

Ans: a

1. What is harmonic progression?
2. Difference between reciprocal of two successive spindle speeds is constant
3. Difference between two successive spindle speeds is constant
4. Ratio of two successive spindle speeds is constant.
5. Ratio of two successive spindle speeds is variable.

Ans: a

1. What is arithmetic progression?
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Ans: b

1. What is geometric progression?
2. Difference between reciprocal of two successive spindle speeds is constant
3. Difference between two successive spindle speeds is constant
4. Ratio of two successive spindle speeds is constant.
5. Ratio of two successive spindle speeds is variable.

Ans: c

1. What is the purpose of using a gear box?
2. To increase torque
3. To increase speed
4. Converts single input speed into multiple output speeds
5. All of above

Ans: d

1. Which of the following statements is true for structure/speed diagrams?
2. Structure diagrams gives range ratio of spindle speeds
3. Speed diagrams do not give range ratio of spindle speeds
4. Speed diagrams consider motor speed
5. All of above

Ans: c

1. A machine tool has minimum speed of 100 r.p.m. How many speed steps are required by it to achieve speed of 200 rpm? (Geometric progression ratio = 1.06)
2. 11 b) 12 c) 13 d) 14

Ans: b

1. Maximum and minimum diameter of a shaft to be machined is 100 mm and 80 mm respectively. What is the maximum spindle speed if cutting velocity is 40 m/min?
2. 120 b) 127 c) 160 d) 636

Ans: c

1. Economic cutting speed is minimum if geometric ratio is \_\_\_\_\_\_\_\_\_
2. Minimum b) Maximum c) Equal to economic cutting speed d) All of above

Ans: a

1. What is the geometric progression ratio if maximum and minimum spindle speeds are 500 r.p.m and 300 r.p.m respectively? (Number of speed steps = 7)
2. 2 b) 1.5 c) 1.08 c) None of these

Ans: c

1. Ratio of two spindle speeds is constant in \_\_\_\_\_\_\_\_\_ progression.
2. Arithmetic b) Harmonic c) Geometric d) All of the above

Ans: c

1. Which of the following is the need of the gearbox?  
   a) To vary the speed of the vehicle  
   b) To vary the torque of the vehicle  
   c) To vary the power of the vehicle  
   d) To vary the acceleration of the vehicle

Ans: b

1. What is the maximum percentage loss of economic cutting speed if geometric progression ratio = 1.06 ?
2. 17.0% b) 11.5% c) 5.7 % d) 2.9%

Ans: d

1. Higher the value of geometric progression, \_\_\_\_\_\_\_\_\_\_\_\_ is loss of economic cutting speed.
2. Higher
3. Lower
4. Constant
5. None of the above

Ans: a

1. What is the maximum percentage loss of economic cutting speed if geometric progression ratio = 1.58 ?
2. 17.0% b) 22.5% c) 5.7 % d) 2.9%

Ans: b

1. What is the maximum percentage loss of economic cutting speed if geometric progression ratio = 2 ?
2. 17.0% b) 22.5% c) 5.7 % d) 33.3%

Ans: d

1. If number of spindle speed steps, z = 27, then Number of stages of the gearbox is,
2. 1 b) 2 c) 3 d) 4

Ans: c

1. If number of spindle speed steps, z = 12, then Number of stages of the gearbox is,
2. 1 b) 2 c) 3 d) 4

Ans: c

1. If number of spindle speed steps, z = 8, then Number of stages of the gearbox is,
2. 1 b) 2 c) 3 d) 4

Ans: c

1. For a three stage, twelve speed gearbox the total number of structural formulae that can be written are
2. 3 b) 6 c) 12 d) 36

Ans: d

1. For a two stage, four speed gearbox the total number of structural formulae that can be written are
2. 2 b) 4 c) 12 d) 36

Ans: b

1. Lower is the speed of shaft, higher is the torque that shaft has to transmit and hence \_\_\_\_\_\_\_\_\_\_ is its diameter.
2. Higher b) Lower c) Constant d) None of the above

Ans: a

1. What is the geometric progression ratio if maximum and minimum spindle speeds are 100 r.p.m and 1800 r.p.m respectively? (Number of speed steps = 8)
2. 1.5 b) 2 c) 2.5 d) 3

Ans: a

1. What is the Range ratio if maximum and minimum spindle speeds are 100 r.p.m and 1800 r.p.m respectively?
2. 15 b) 18 c) 20 d) 22

Ans: b

1. Identify the optimum structure diagram from the following structural formulae.
2. 2(3) 3(1) b) 2(1) 3(2) c) 3(1) 2(3) d) 3(2) 2(1)

Ans: b

1. Identify the optimum structure diagram from the following structural formulae.
2. 2(1) 2(2) 3(4) b) 2(1) 2(6) 3(4) c) 2(2) 3(1) 3(4) d) 3(1) 2(4) 2(2)

Ans:a

1. In node method of optimization, for optimum structure diagram the sum of diameter of all shafts be,
2. Minimum b) Maximum c) Constant d) None of the above

Ans: a

1. Loss of economic cutting speed is
2. Difference between actual cutting speed and optimum cutting speed
3. Ratio of actual cutting speed to optimum cutting speed
4. Difference between reciprocal of actual cutting speed and optimum cutting speed
5. None of the above

Ans: a

1. Deviation of actual spindle speeds from calculated spindle speeds must not exceed
2. 10(Φ-1)% b) 15(Φ-1)% c) 20(Φ-1)% d) 10(Φ-10)%

Ans: a

1. Spacing between two adjacent gears on the shaft must be greater than\_\_\_\_\_\_\_\_\_\_ the facewidth.
2. Thrice b) Twice c) half d) None of these

Ans: b

1. Percentage speed deviation is given by,
2. nact-nth/nth\*100 b) nact-nth/nact\*100 c) nth-nact/nact\*100 d) None of the above

Ans: a

1. What is the geometric progression ratio if gearbox based on R5 series is designed?
2. 4 b) 2 c) 1.58 d) 2.5

Ans: c

1. What is the geometric progression ratio if maximum and minimum spindle speeds are 150 r.p.m and 1000 r.p.m respectively? (Number of speed steps = 6)
2. 4 b) 2 c) 2.5 d) 1.46

Ans: d

1. What is the geometric progression ratio if gearbox based on R10 series is designed?
2. 4 b) 2 c) 1.26 d) 2.5

Ans: c

1. What is the geometric progression ratio if gearbox based on R40 series is designed?
2. 4 b) 2 c) 1.06 d) 2.5

Ans: c

1. Advantage of the arithmetic Progression is
2. It is good in High spindle speed range
3. It is poor in low spindle speed range
4. All of the above
5. None of the above

Ans: a

1. Disadvantage of the arithmetic progression is
2. It is good in High spindle speed range
3. It is poor in low spindle speed range
4. All of the above
5. None of the above

Ans: b

1. Advantage of the harmonic Progression is
2. It is good in low spindle speed range
3. It is poor in high spindle speed range
4. All of the above
5. None of the above

Ans: a

1. Disadvantage of the arithmetic progression is
2. It is good in low spindle speed range
3. It is poor in high spindle speed range
4. All of the above
5. None of the above

Ans: b

1. Advantage of the Geometric Progression is
2. It gives constant loss of economic cutting speed in total speed range
3. Gives better gearbox design features
4. All of the above
5. None of the above

Ans: c

1. Disadvantage of the geometric progression is
2. It is good in high spindle speed range
3. It is poor in low spindle speed range
4. All of the above
5. None of the above

Ans: b

1. For a six speed gear box following can be one of the a structural formula,
2. 3(1) 2(3) b) 3(1) 3(3) c) 2(1) 2(2) d) None of the above

Ans: a

1. For a nine speed gear box following can be one of the a structural formula,
2. 3(1) 2(3) b) 3(1) 3(3) c) 2(1) 2(2) d) None of the above

Ans: b

1. For a four speed gear box following can be one of the a structural formula,
2. 3(1) 2(3) b) 3(1) 3(3) c) 2(1) 2(2) d) None of the above

Ans: c

1. For a eight speed gear box following can be one of the a structural formula,
2. 2(1) 2(2) 2(4) b) 3(1) 3(3) 2(9) c) 2(1) 2(2) 3(4) d) None of the above

Ans: a

1. For a eight speed gear box following can be one of the a structural formula,
2. 2(1) 2(2) 2(4) b) 3(1) 3(3) 2(9) c) 2(1) 2(2) 3(4) d) None of the above

Ans: a

1. For a twelve speed gear box following can be one of the a structural formula,
2. 2(1) 2(2) 3(4) b) 3(1) 3(3) 2(9) c) 2(1) 3(2) 3(4) d) None of the above

Ans: a

1. For a eighteen speed gear box following can be one of the a structural formula,
2. 2(1) 3(2) 3(6) b) 3(1) 2(3) 2(9) c) 2(1) 2(2) 3(4) d) None of the above

Ans: a

1. For a twenty seven speed gear box following can be one of the a structural formula,
2. 2(1) 2(2) 3(4) b) 3(1) 3(3) 3(9) c) 2(1) 3(2) 3(4) d) None of the above

Ans: b

1. Following is a purpose of gearbox:
2. To increase the torque
3. To increase the speed
4. To convert the single input speed to multiple output speeds
5. All of the above

Ans: d

1. The minimum number of teeth on the pinion can be taken as  
   a) 14 b) 20 c) 10 d) all of the above

Ans: b

1. What is Range ratio if, nmax=2880rpm, nmin= 60rpm,
2. 48 b) 60 c)85 d)100

Ans: a

1. Vertical lines in the structure diagram represent
2. Shafts b) Gears c) Speed steps d) None of the above

Ans: a

1. Number of vertical lines in structure diagram is equal to
2. N b) N+1 c) N+2 d) N-1