

Unit 4 - Week 2

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Assignment 2

The due date for submitting this assignment has passed. **Due on 2020-03-11, 23:59 IST.**
 As per our records you have not submitted this assignment.

DATA: (For Questions 1 to 8)

An input 16 teeth helical pinion (20° standard involute) of a medium duty reduction unit is transmitting 12 kW at 1000 input rpm. Considering the Lewis formula for bending strength with wear load factor $C_w=1.25$, velocity factor $C_v = 6/(6+V)$, width factor (ψ) = 16, allowable strength of pinion and gear material $S_u=275$ MPa and the unmodified Lewis form factor is estimated as $y = 0.15 - (0.912/Z)$ for external tooth (where Z is the formative number of teeth). The reduction ratio in 1st stage is close to 2.5. The center distance in mm is to be multiple of 5.

1) The calculated amount of torque (N-m) is

a. 110.5916N-m
 b. 114.5916N-m
 c. 118.5916N-m
 d. 122.5916N-m

a.
 b.
 c.
 d.

No, the answer is incorrect.
 Score: 0
 Accepted Answers:
 b.

2) Calculated module (in mm) that should not be less than 2.5 or if it is less than 2.5 then upgrade it to 2.5 by assuming initial value of V in m/s (not more than 7 m/s)

a. 3 mm
 b. 3.5 mm
 c. 4 mm
 d. 4.5 mm

a.
 b.
 c.
 d.

No, the answer is incorrect.
 Score: 0
 Accepted Answers:
 a.

3) The refine value of C_v is close to

a. 0.18794
 b. 0.28794
 c. 0.38794
 d. 0.48794

a.
 b.
 c.
 d.

No, the answer is incorrect.
 Score: 0
 Accepted Answers:
 d.

4) To maintain the center distance (in mm) multiple of 5 choose refine teeth number of $Z_g=$

a. 32
 b. 36
 c. 40
 d. 44

a.
 b.
 c.
 d.

No, the answer is incorrect.
 Score: 0
 Accepted Answers:
 c.

5) Refine Helix angle β is

a. $8^\circ 47' 51''$
 b. $8^\circ 7' 51''$
 c. $7^\circ 47' 51''$
 d. $7^\circ 7' 51''$

a.
 b.
 c.
 d.

No, the answer is incorrect.
 Score: 0
 Accepted Answers:
 a.

6) Tangential load F_t (in N) acted on tooth is

a. 4318.48 N
 b. 4518.48 N
 c. 4718.48 N
 d. 4918.48 N

a.
 b.
 c.
 d.

No, the answer is incorrect.
 Score: 0
 Accepted Answers:
 c.

7) Radial load F_r (in N) acted on tooth is

a. 1937.83 N
 b. 1737.83 N
 c. 1537.83 N
 d. 1337.83 N

a.
 b.
 c.
 d.

No, the answer is incorrect.
 Score: 0
 Accepted Answers:
 b.

8) Axial load F_a (in N) acted on tooth is

a. 730.2065 N
 b. 740.2065 N
 c. 750.2065 N
 d. 760.2065 N

a.
 b.
 c.
 d.

No, the answer is incorrect.
 Score: 0
 Accepted Answers:
 a.

DATA: (For Questions 9 to 13)

A 90° shaft, straight tooth bevel gear pair, made of same steel, has 17 and 42, 20° full depth 4 module teeth. Consider the following data in calculation: Allowable strength of both gear and pinion material (S_u, C_v) $C_w = 225$ MPa, $b/l = 0.3$, width factor (ψ) = 10, input rpm 1450 and modified Lewis form factor is $Y = (0.471 - 2.79/Z')$, where Z' is the formative number of teeth.

9) The calculated amount of torque (N-m) is

a. 213.2092 N-m
 b. 233.2092 N-m
 c. 253.2092 N-m
 d. 273.2092 N-m

a.
 b.
 c.
 d.

No, the answer is incorrect.
 Score: 0
 Accepted Answers:
 d.

10) The calculated amount of power (kW) can transmit is

a. 39.485W
 b. 41.485W
 c. 43.485W
 d. 45.485W

a.
 b.
 c.
 d.

No, the answer is incorrect.
 Score: 0
 Accepted Answers:
 b.

11) Tangential load F_t (in N) acted on tooth is

a. 8095.564 N
 b. 8065.564 N
 c. 8035.564 N
 d. 8005.564 N

a.
 b.
 c.
 d.

No, the answer is incorrect.
 Score: 0
 Accepted Answers:
 c.

12) Radial load F_r (in N) acted on tooth is

a. 2511.047 N
 b. 2711.047 N
 c. 2911.047 N
 d. 2311.047 N

a.
 b.
 c.
 d.

No, the answer is incorrect.
 Score: 0
 Accepted Answers:
 b.

13) Axial load F_a (in N) acted on tooth is

a. 1097.327 N
 b. 1197.327 N
 c. 1297.327 N
 d. 1397.327 N

a.
 b.
 c.
 d.

No, the answer is incorrect.
 Score: 0
 Accepted Answers:
 a.

DATA: (For Questions 14 to 17)

A 90° crossed shafts helical gear drive having 10 teeth pinion and 31 teeth gear. The specified centre distance is 100 mm., and the input rpm to pinion is 900. Consider the highest possible standard 20° module for selecting the gear pair. Given allowable strength of both gear and pinion material is (S_u, C_v) $C_w = 250$ MPa and factor (ψ) for effective contact width equal to 12. Use the chart for initial value of the helix angle of gear.

14) The calculated helix angles for pinion and gear are

a. For pinion $60^\circ 33' 53''$ and for gear $29^\circ 26' 7''$
 b. For pinion $62^\circ 33' 53''$ and for gear $27^\circ 26' 7''$
 c. For pinion $64^\circ 33' 53''$ and for gear $25^\circ 26' 7''$
 d. For pinion $66^\circ 33' 53''$ and for gear $23^\circ 26' 7''$

a.
 b.
 c.
 d.

No, the answer is incorrect.
 Score: 0
 Accepted Answers:
 b.

15) The calculated Pitch circle diameters (in mm) for pinion and gear are

a. For pinion 72.9644 mm and for gear 116.249 mm
 b. For pinion 73.9644 mm and for gear 118.249 mm
 c. For pinion 74.9644 mm and for gear 120.249 mm
 d. For pinion 75.9644 mm and for gear 122.249 mm

a.
 b.
 c.
 d.

No, the answer is incorrect.
 Score: 0
 Accepted Answers:
 d.

16) The calculated amount of torque (N-m) is

a. 943.410 N-m
 b. 933.410 N-m
 c. 923.410 N-m
 d. 913.410 N-m

a.
 b.
 c.
 d.

No, the answer is incorrect.
 Score: 0
 Accepted Answers:
 d.

17) The calculated amount of power (kW) is

a. 23.769W
 b. 25.769W
 c. 27.769W
 d. 29.769W

a.
 b.
 c.
 d.

No, the answer is incorrect.
 Score: 0
 Accepted Answers:
 c.

18) A worm gear drive has a centre distance of 220 mm and a normal circular pitch of 20.42 mm. The worm is quadruple and the wheel has 48 teeth (25° Involute). Use the chart for initial value of the helix angle of gear. The calculated lead angle of worm is close to

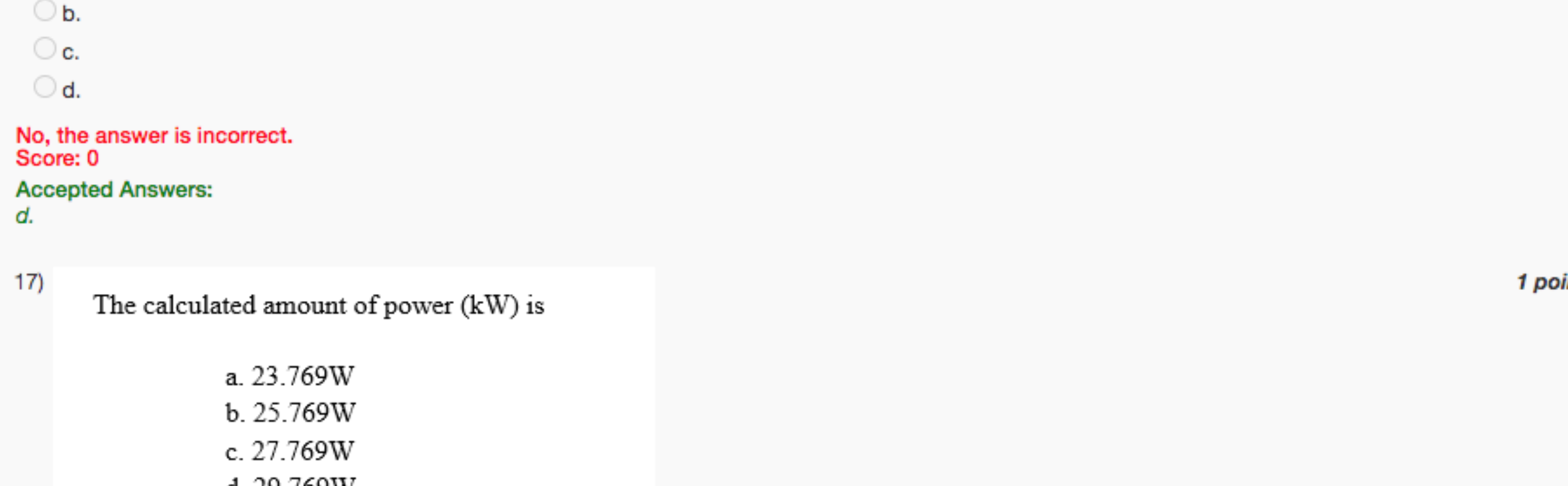
a. $10^\circ 27' 47''$
 b. $12^\circ 27' 47''$
 c. $14^\circ 27' 47''$
 d. $16^\circ 27' 47''$

a.
 b.
 c.
 d.

No, the answer is incorrect.
 Score: 0
 Accepted Answers:
 b.

DATA: (For Questions 19 to 20)

A worm gear drive having same centre distance of 220 mm, now the worm is of single start with the worm wheel of 48 teeth (25° Involute). Use the chart for the helix angle of gear.



19) Is it possible to keep normal circular pitch as 20.42 mm

a. YES
 b. NO

a.
 b.

No, the answer is incorrect.
 Score: 0
 Accepted Answers:
 b.

20) The pitch angle in between

a. 10.1° to 15°
 b. 16.1° to 20°
 c. 21.1° to 25°
 d. 26.1° to 30°

a.
 b.
 c.
 d.

No, the answer is incorrect.
 Score: 0
 Accepted Answers:
 a.