Gender

156 responses

- ● Male
- ● Female
- ● Other

96.2%

Name of the college applied for

156 responses

- ● Government Polytechnic Katihar
- ● Government Polytechnic Khagaria
- ● Government Polytechnic Bhagalpur

34%   23.7%

42.3%
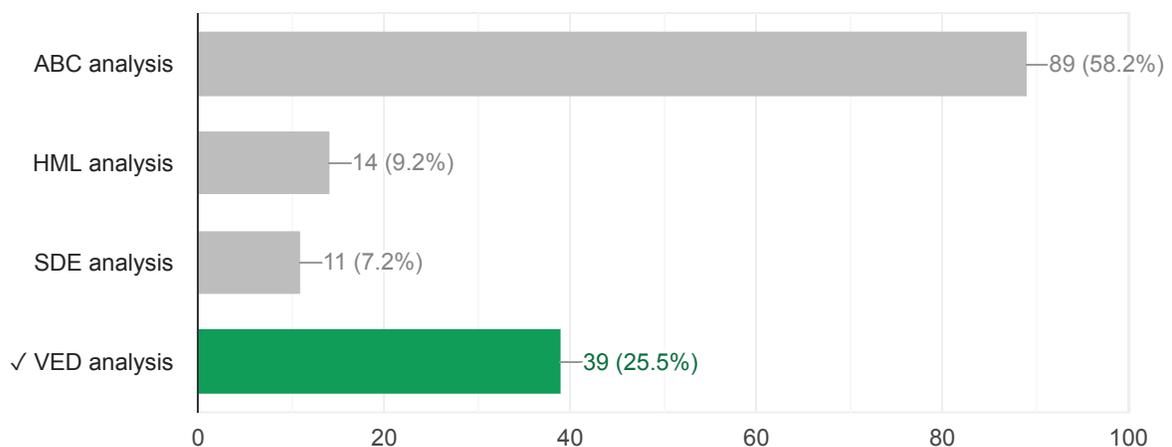
Q1. In which of the following, the criticality of the items is most important than the cost factor of the item?

39 / 153 correct responses

ABC analysis	89 (58.2%)
HML analysis	14 (9.2%)
SDE analysis	11 (7.2%)
✓ VED analysis	39 (25.5%)

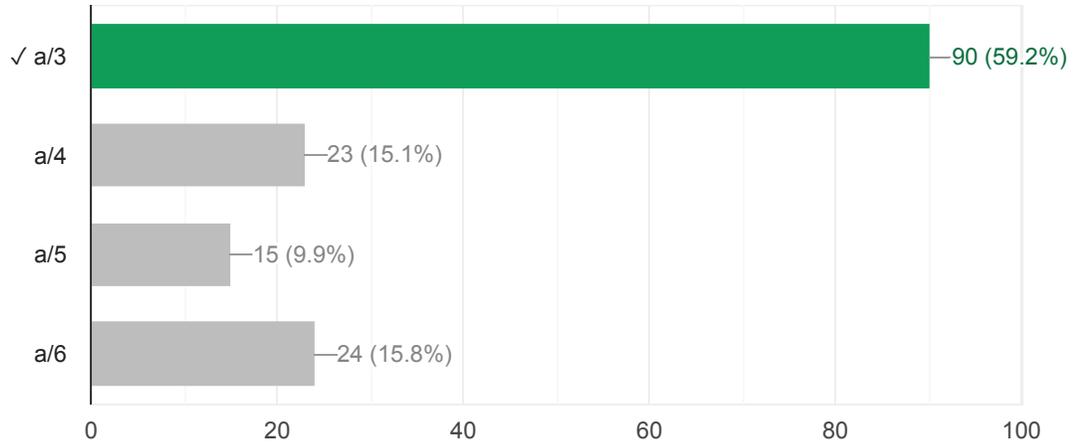**Q2.** Consider sand casting of a cube of edge length a. A cylinder riser is placed at the top of the casting. Assume solidification time, Ts ∝ V/A, where V is the volume and A is total surface area dissipating heat. If the top of the riser is insulated, which of the following radius/radii of the riser is/are acceptable?
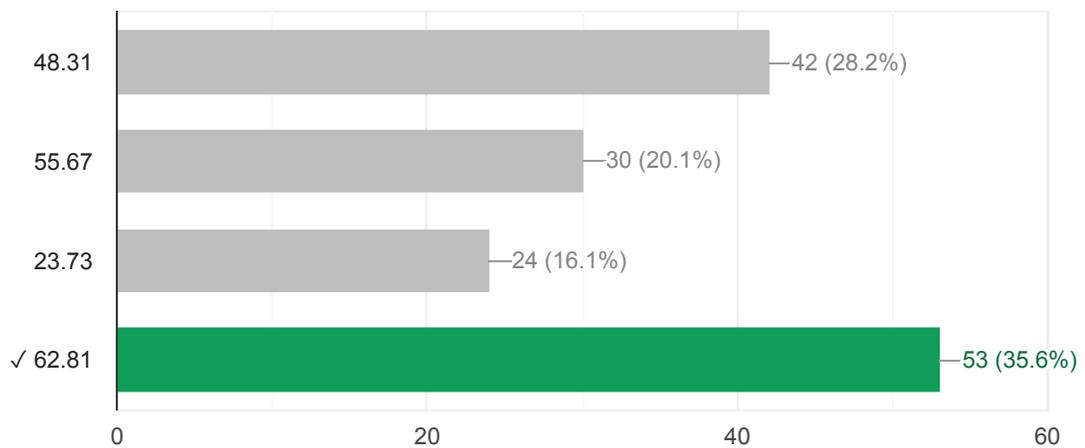
Copy

90 / 152 correct responses

Option	Count
✓ a/3	90 (59.2%)
a/4	23 (15.1%)
a/5	15 (9.9%)
a/6	24 (15.8%)

Q3. A cubical casting of 65 mm size will undergoes volumetric solidification shrinkage of 3% and volumetric solid contraction of 7%. There is no riser is used and pattern making allowances is not consider. What is the final size of casting.

Copy

53 / 149 correct responses

Option	Count
48.31	42 (28.2%)
55.67	30 (20.1%)
23.73	24 (16.1%)
✓ 62.81	53 (35.6%)

Q4. A triangular plate in the form of an isosceles triangle ABC has a base BC = 10 cm and altitude = 12 cm. From this plate, a portion in the shape of an isosceles triangle OBC is removed. If O is the mid point of altitude of triangle ABC, then distance of CG of the remainder section from the base is
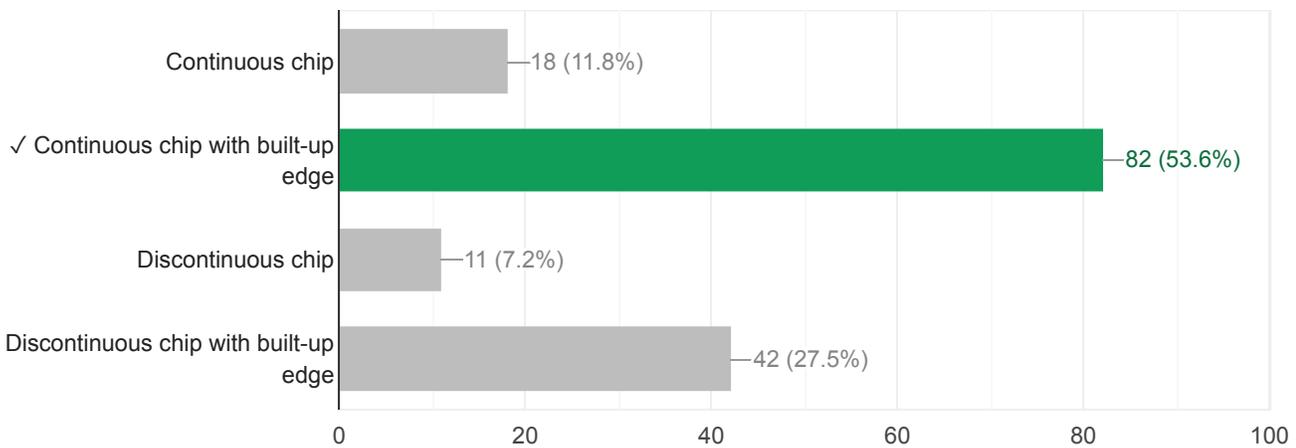
35 / 144 correct responses
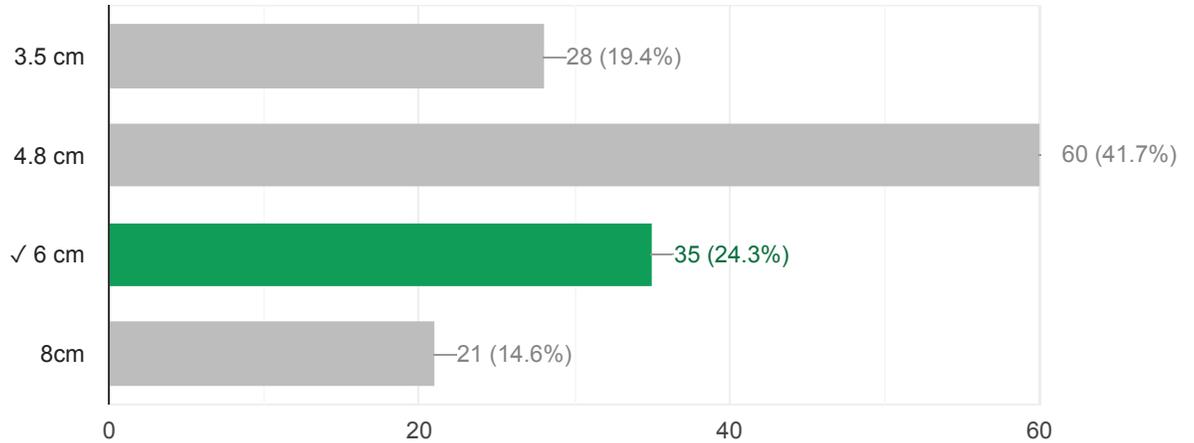
Option	Responses
3.5 cm	28 (19.4%)
4.8 cm	60 (41.7%)
✓ 6 cm	35 (24.3%)
8cm	21 (14.6%)

Q5. Which one of the following is formed due to large friction and stronger adhesion between chips and tool face?

82 / 153 correct responses

Option	Responses
Continuous chip	18 (11.8%)
✓ Continuous chip with built-up edge	82 (53.6%)
Discontinuous chip	11 (7.2%)
Discontinuous chip with built-up edge	42 (27.5%)

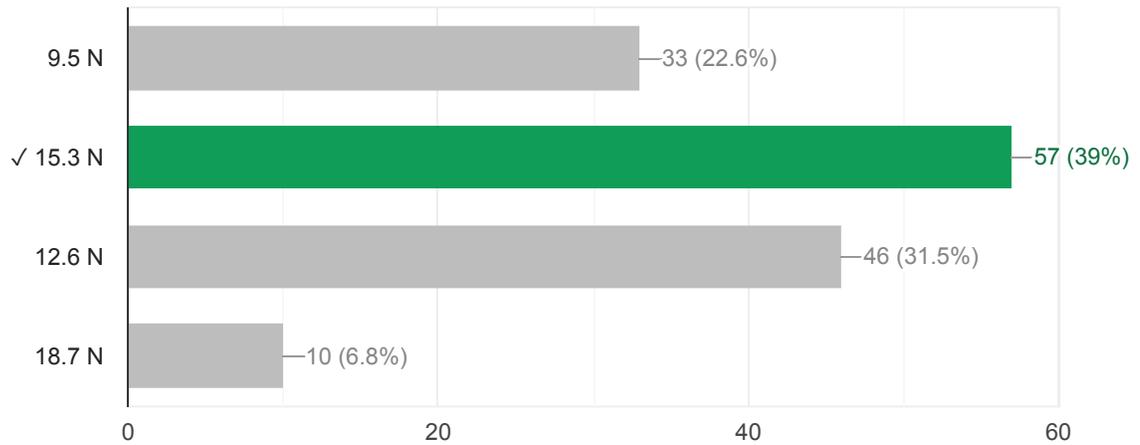## Q6. A 44 N block is thrust up a 30 degree inclined plane with an initial speed of 5 m/s. It travels a distance of 1.5 m before it come to rest. The frictional force acting upon it be
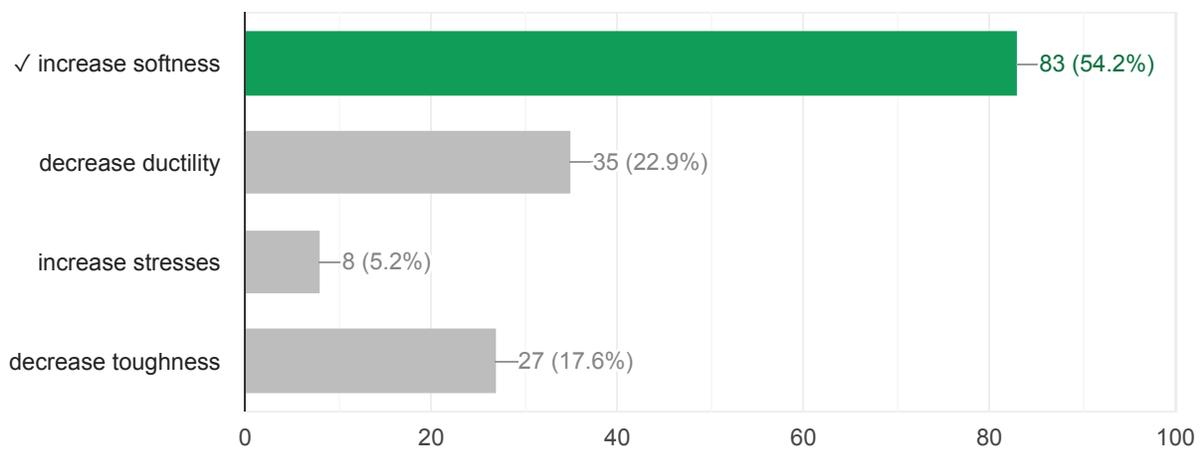
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57 / 146 correct responses

Option	Count
9.5 N	33 (22.6%)
✓ 15.3 N	57 (39%)
12.6 N	46 (31.5%)
18.7 N	10 (6.8%)

Q7. In general, annealing is carried out to

Copy

83 / 153 correct responses

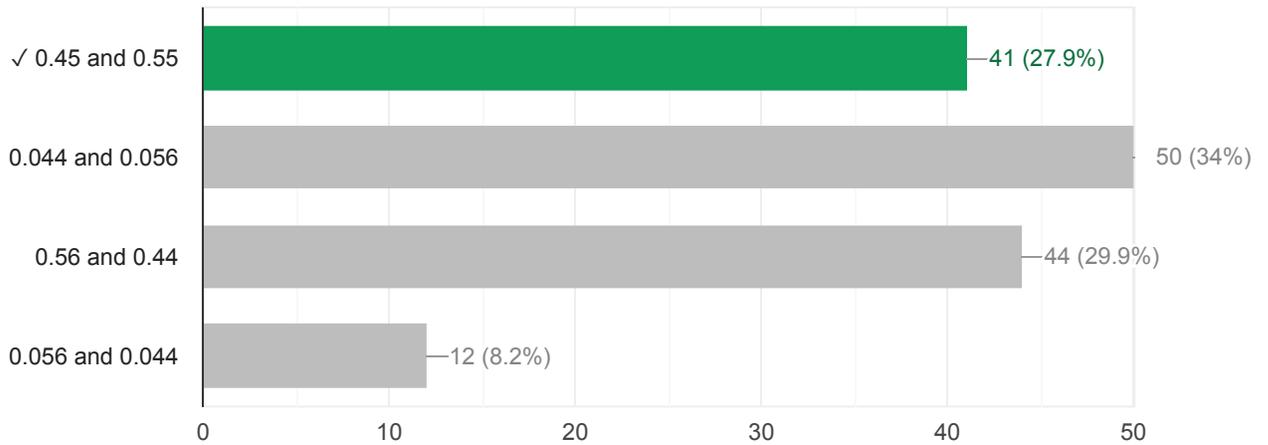| Option	Count
✓ increase softness	83 (54.2%)
decrease ductility	35 (22.9%)
increase stresses	8 (5.2%)
decrease toughness	27 (17.6%)

Q8. For a 99.65 wt% Fe, 0.45 wt% C alloy at a temperature just below eutectoid fractions of the pro eutectoid ferrite and pearlite are respectively
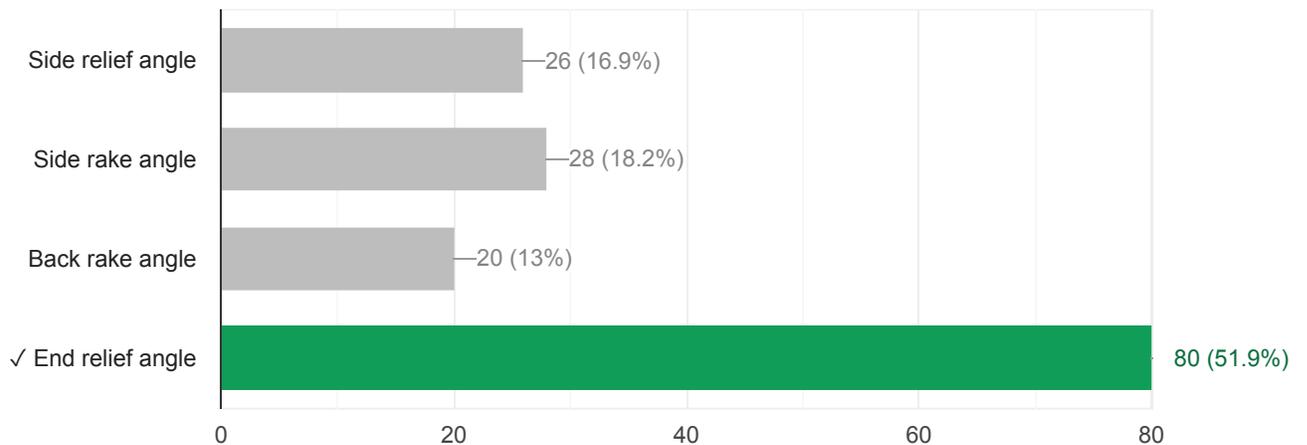
41 / 147 correct responses

Option	Count
✓ 0.45 and 0.55	41 (27.9%)
0.044 and 0.056	50 (34%)
0.56 and 0.44	44 (29.9%)
0.056 and 0.044	12 (8.2%)

Q9. Which one of the following is the angle between the planes of end flank immediately below the end cutting edge and line perpendicular to the base and right angle to the axis?
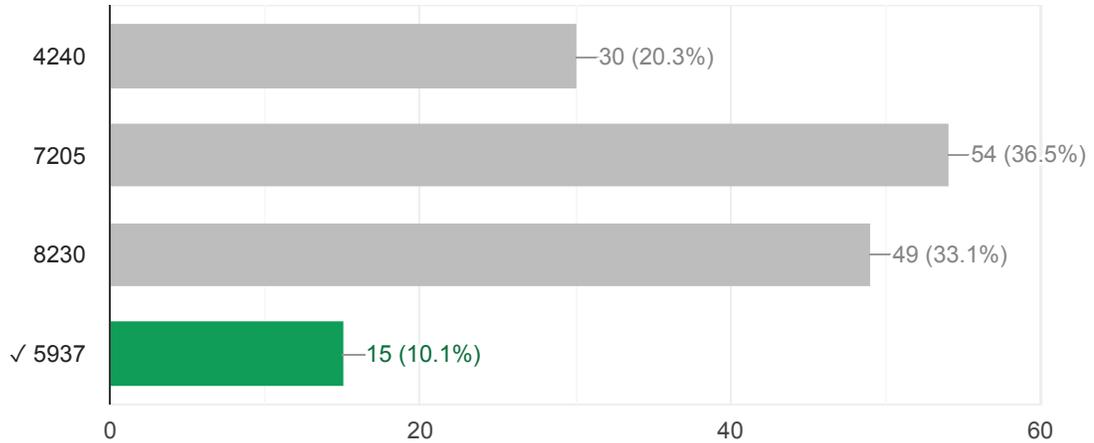
80 / 154 correct responses

Option	Count
Side relief angle	26 (16.9%)
Side rake angle	28 (18.2%)
Back rake angle	20 (13%)
✓ End relief angle	80 (51.9%)

Q10. A steel rod of 3 cm diameter and 5 m long is fitted between two grips and is maintained at 90°C temperature. When the temperature falls to 30°C and the ends allowed to yield by 0.15 cm, the pull (in kgf) exerted on the rod will be.....Take: E = 2×10^6 kgf/cm^2 and coefficient of linear thermal expansion = 12×10^-6/°C.

15 / 148 correct responses

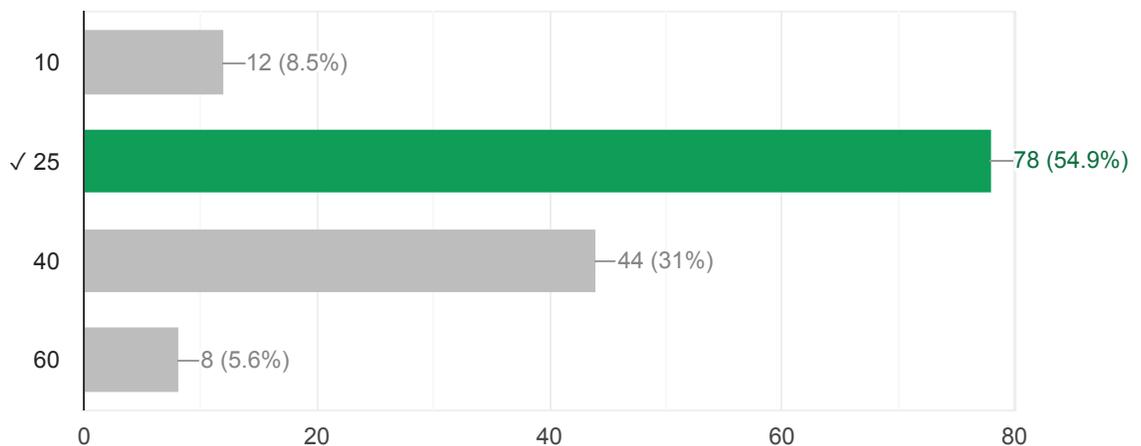|	
4240	—30 (20.3%)
7205	—54 (36.5%)
8230	—49 (33.1%)
✓ 5937	—15 (10.1%)

Q11. A symmetrical beam of depth 20 cm and made of a material of modulus of elasticity 20 × 10^6 N/cm^2 has been bent. If maximum stress is not be exceed 8000 N/cm^2, what would be radius of curvature in meter
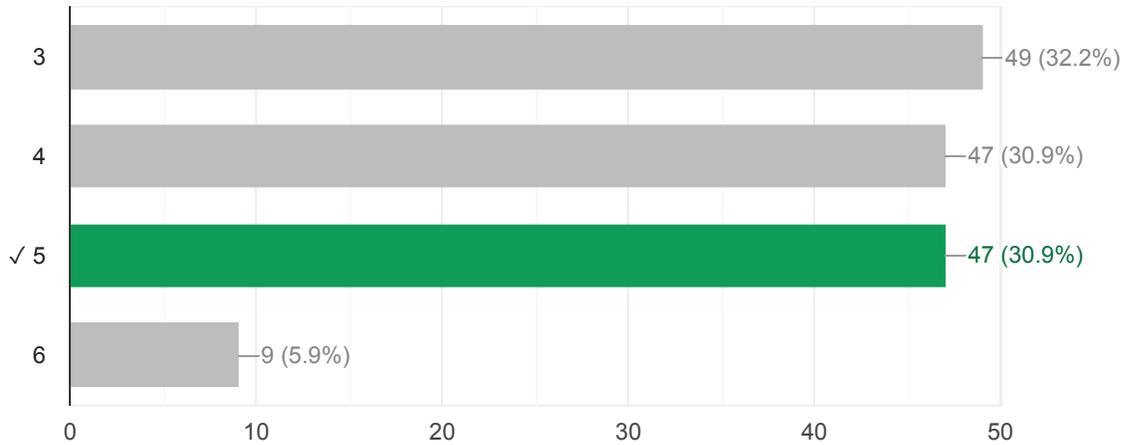
78 / 142 correct responses

10	—12 (8.5%)
✓ 25	—78 (54.9%)
40	—44 (31%)
60	—8 (5.6%)

Q12. A fixed gear having 100 teeth is in mesh with another gear having 50 teeth. The two gears are connected by an arm. The number of turn made by the smaller gear for one revolution of arm about the center of bigger gear is
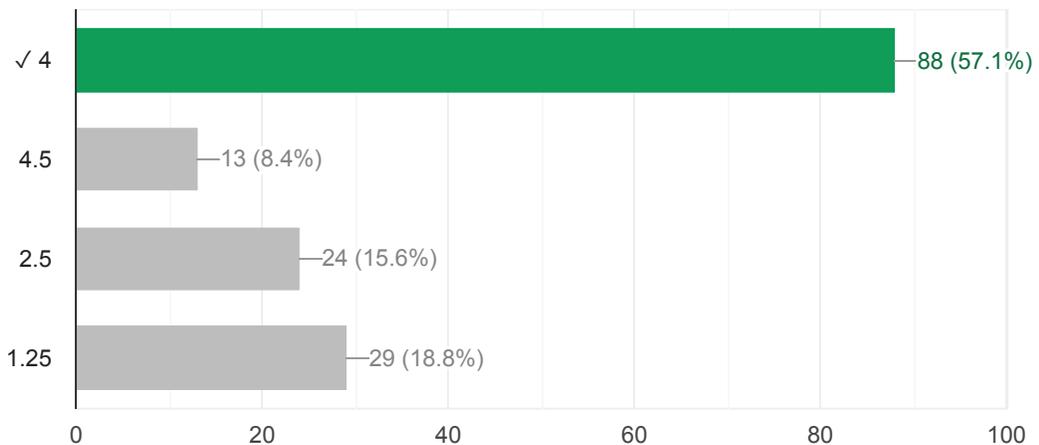
47 / 152 correct responses

Option	Responses
3	49 (32.2%)
4	47 (30.9%)
✓ 5	47 (30.9%)
6	9 (5.9%)

Q13. An object weighing 100 N in air was found to weigh 75 N when fully submerged in water, the relative density of the object is

88 / 154 correct responses
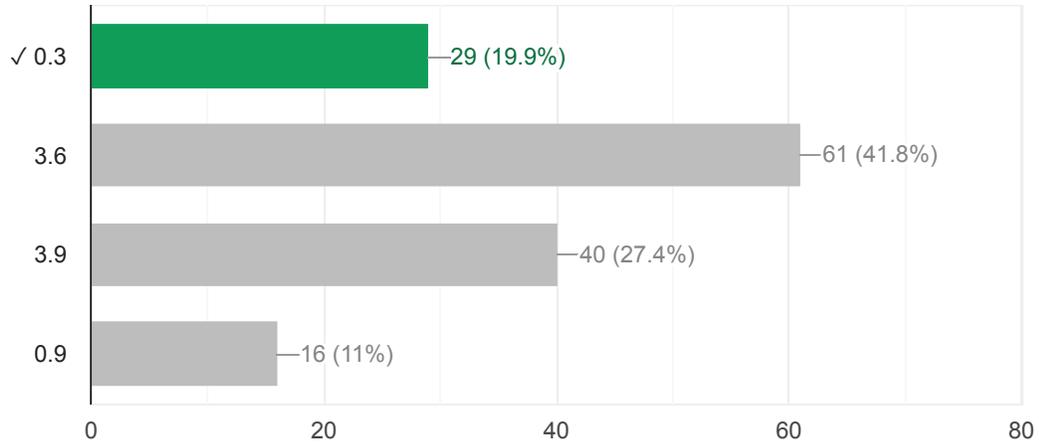
Option	Responses
✓ 4	88 (57.1%)
4.5	13 (8.4%)
2.5	24 (15.6%)
1.25	29 (18.8%)

Q14. In a 2m long tapered duct the area decreases as A = (0.4 - 0.1z) where z is distance in meters. At a given instant a discharge of 0.48 m^3/sec was flowing in the duct and it was found to increase at a rate of 0.12 m^3/sec. The local acceleration at z = 0 in m/sec^2 is

Copy

29 / 146 correct responses

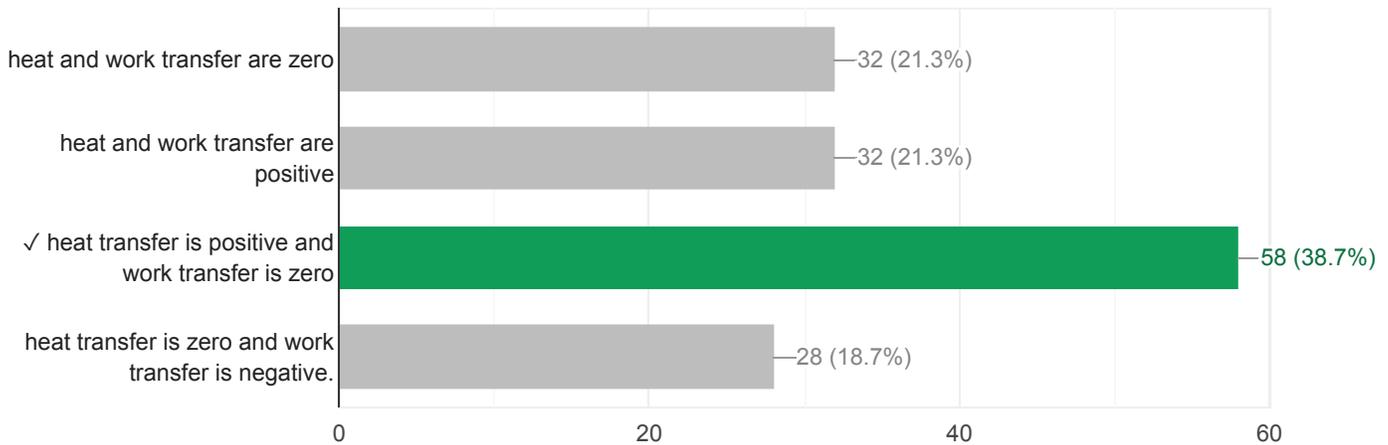| Option	Value
✓ 0.3	29 (19.9%)
3.6	61 (41.8%)
3.9	40 (27.4%)
0.9	16 (11%)

Q15. An insulated rigid vessel contains some gas and an electric resistor. In a certain interval of time, the resistance connected to an external electric power heats the gas. Considering the vessel and it's contents as the system

Copy

58 / 150 correct responses

Option	Value
heat and work transfer are zero	32 (21.3%)
heat and work transfer are positive	32 (21.3%)
✓ heat transfer is positive and work transfer is zero	58 (38.7%)
heat transfer is zero and work transfer is negative.	28 (18.7%)

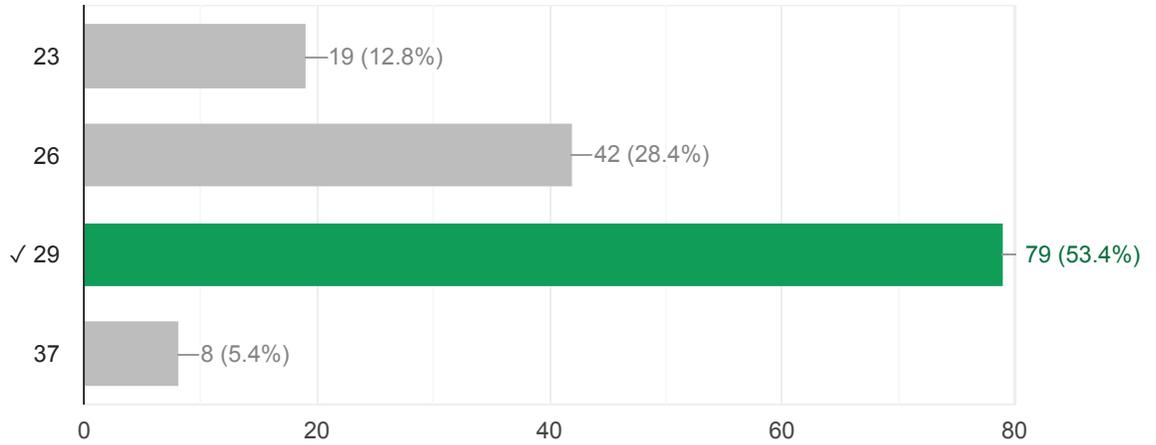## Q16. During the steady flow compression process of a gas with mass flow rate of 2 kg/sec, increased in specific enthalpy is 15 kJ/ kg and decrease in kinetic energy is 2 kJ/kg. If the rate of heat rejection to the environment is 3 kW, the power needed to drive the compressor (in kW) would be
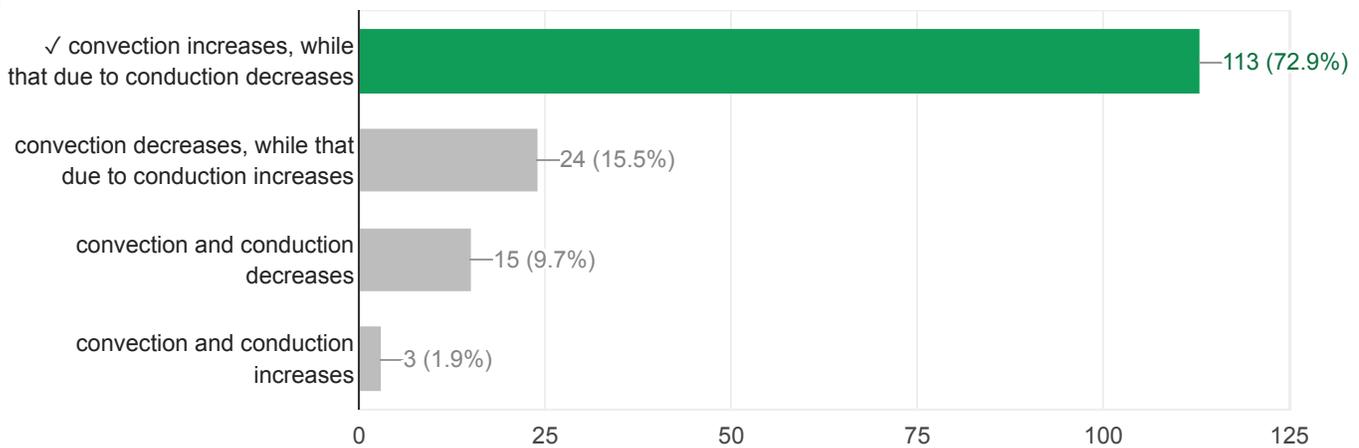
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79 / 148 correct responses

Option	Count
23	19 (12.8%)
26	42 (28.4%)
✓ 29	79 (53.4%)
37	8 (5.4%)

Q17. With increase in the thickness of insulation around a circular pipe, heat loss to surroundings is due to

Copy
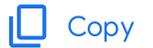
113 / 155 correct responses

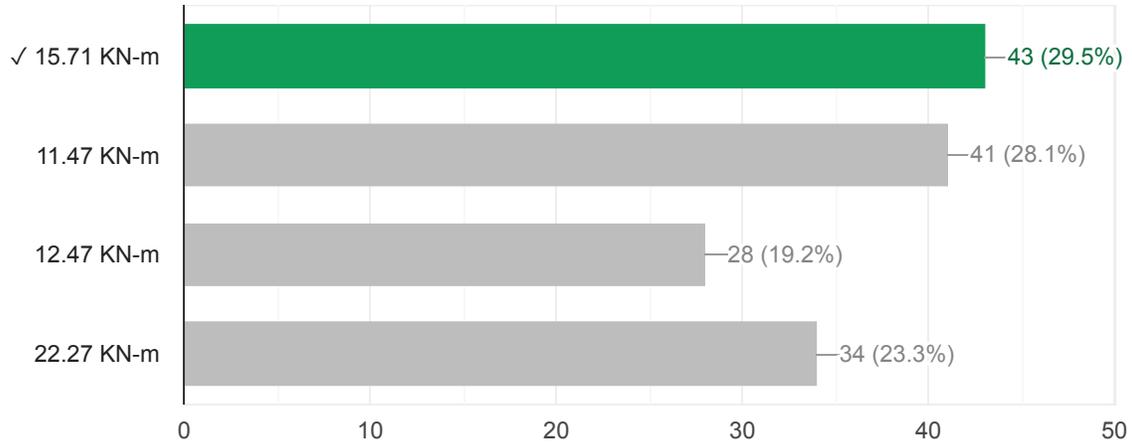| Option	Count
✓ convection increases, while that due to conduction decreases	113 (72.9%)
convection decreases, while that due to conduction increases	24 (15.5%)
convection and conduction decreases	15 (9.7%)
convection and conduction increases	3 (1.9%)

Q18. The turbine rotor of a ship has a mass of 3500 kg. It has a radius of gyration of 0.35 m and a speed of 3500 rpm clockwise when looking from stern. If the ship is steering to the left on a curve of 100 m radius at a speed of 36 km/h, then the gyroscopic couple is
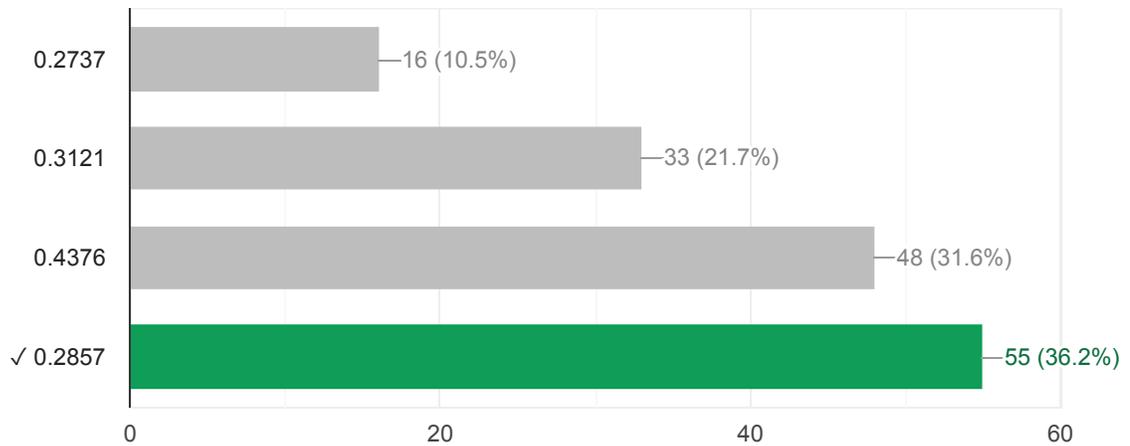
43 / 146 correct responses

Option	Responses
✓ 15.71 KN-m	43 (29.5%)
11.47 KN-m	41 (28.1%)
12.47 KN-m	28 (19.2%)
22.27 KN-m	34 (23.3%)

Q19. A material has modulus of rigidity equal to 0.35 x 10^5 N/mm^2 and bulk modulus equal to 0.7 x 10^5 N/mm^2. The Poisson's ratio is

55 / 152 correct responses

Option	Responses
0.2737	16 (10.5%)
0.3121	33 (21.7%)
0.4376	48 (31.6%)
✓ 0.2857	55 (36.2%)

Q20. Solar thermal water pumps work on

Copy

127 / 156 correct responses

Answer	Count
Otto Cycle	7 (4.5%)
Carnot Cycle	9 (5.8%)
✓ Rankine cycle	127 (81.4%)
Diesel cycle	13 (8.3%)
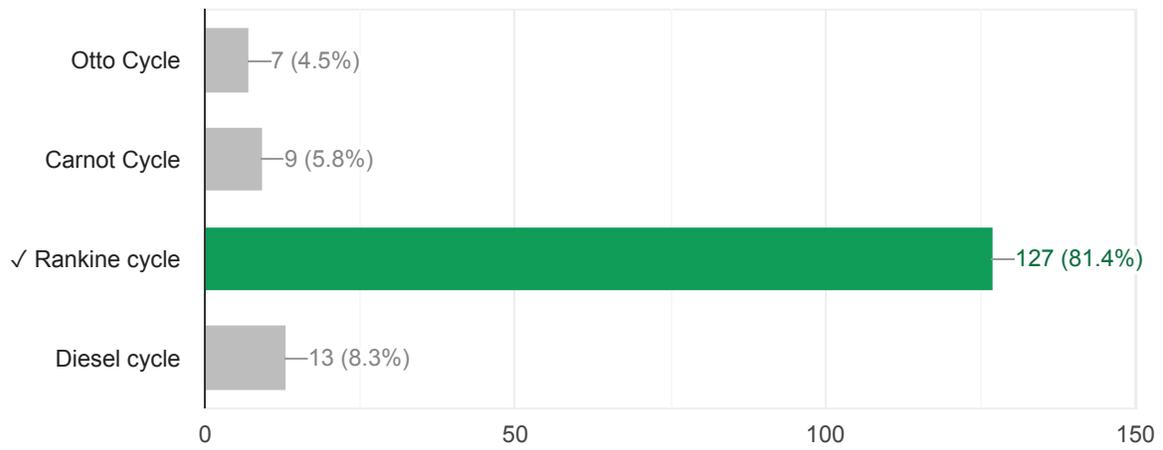
Mechanical Engineering (MCQ Test)

Post : Guest Lecturer
Government Polytechnic Katihar
Department of Science and Technology, Patna (Bihar)
Date- 31-05-2022
Time- (11:00 am to 11:30 am) 30 min
Full Marks : 20
Attempt all the questions
No Negative Marking
Website : www.gpkatihar.ac.in

1. Email *

   _____

2. Full Name *

   _____

3. Father's name *

   _____

4. Category *

   Mark only one oval.

   ( ) General

   ( ) BC

   ( ) EBC

   ( ) SC

   ( ) ST

   ( ) EWS

5. Date of Birth *

_____

Example: January 7, 2019

6. Gender *

Mark only one oval.

◯ Male

◯ Female

◯ Other

7. Name of the college applied for *

Mark only one oval.

◯ Government Polytechnic Katihar

◯ Government Polytechnic Khagaria

◯ Government Polytechnic Bhagalpur

8. Q1. In which of the following, the criticality of the items is most important than the cost factor of the item?

Mark only one oval.

◯ ABC analysis

◯ HML analysis

◯ SDE analysis

◯ VED analysis

9. Q2. Consider sand casting of a cube of edge length a. A cylinder riser is placed at the top of the casting. Assume solidification time, Ts ∝ V/A, where V is the volume and A is total surface area dissipating heat. If the top of the riser is insulated, which of the following radius/radii of the riser is/are acceptable?

Mark only one oval.

- ( ) a/3
- ( ) a/4
- ( ) a/5
- ( ) a/6

10. Q3. A cubical casting of 65 mm size will undergoes volumetric solidification shrinkage of 3% and volumetric solid contraction of 7%. There is no riser is used and pattern making allowances is not consider. What is the final size of casting.

Mark only one oval.

- ( ) 48.31
- ( ) 55.67
- ( ) 23.73
- ( ) 62.81

11. Q4. A triangular plate in the form of an isosceles triangle ABC has a base BC = 10 cm and altitude = 12 cm. From this plate, a portion in the shape of an isosceles triangle OBC is removed. If O is the mid point of altitude of triangle ABC, then distance of CG of the remainder section from the base is

Mark only one oval.

- ( ) 3.5 cm
- ( ) 4.8 cm
- ( ) 6 cm
- ( ) 8cm

12. Q5. Which one of the following is formed due to large friction and stronger adhesion between chips and tool face?

Mark only one oval.

○ Continuous chip

○ Continuous chip with built-up edge

○ Discontinuous chip

○ Discontinuous chip with built-up edge

13. Q6. A 44 N block is thrust up a 30 degree inclined plane with an initial speed of 5 m/s. It travels a distance of 1.5 m before it come to rest. The frictional force acting upon it be

Mark only one oval.

○ 9.5 N

○ 15.3 N

○ 12.6 N

○ 18.7 N

14. Q7. In general, annealing is carried out to

Mark only one oval.

○ increase softness

○ decrease ductility

○ increase stresses

○ decrease toughness

15. Q8. For a 99.65 wt% Fe, 0.45 wt% C alloy at a temperature just below eutectoid fractions of the pro eutectoid ferrite and pearlite are respectively

Mark only one oval.

○ 0.45 and 0.55

○ 0.044 and 0.056

○ 0.56 and 0.44

○ 0.056 and 0.044

16. Q9. Which one of the following is the angle between the planes of end flank immediately below the end cutting edge and line perpendicular to the base and right angle to the axis?

Mark only one oval.

○ Side relief angle

○ Side rake angle

○ Back rake angle

○ End relief angle

17. Q10. A steel rod of 3 cm diameter and 5 m long is fitted between two grips and is maintained at 90°C temperature. When the temperature falls to 30°C and the ends allowed to yield by 0.15 cm, the pull (in kgf) exerted on the rod will be.....Take: E = 2×10^6 kgf/cm^2 and coefficient of linear thermal expansion = 12×10^-6/°C.

Mark only one oval.

○ 4240

○ 7205

○ 8230

○ 5937

18. Q11. A symmetrical beam of depth 20 cm and made of a material of modulus of elasticity 20 × 10^6 N/cm^2 has been bent. If maximum stress is not be exceed 8000 N/cm^2, what would be radius of curvature in meter

Mark only one oval.

- ○ 10
- ○ 25
- ○ 40
- ○ 60

19. Q12. A fixed gear having 100 teeth is in mesh with another gear having 50 teeth. The two gears are connected by an arm. The number of turn made by the smaller gear for one revolution of arm about the center of bigger gear is

Mark only one oval.

- ○ 3
- ○ 4
- ○ 5
- ○ 6

20. Q13. An object weighing 100 N in air was found to weigh 75 N when fully submerged in water, the relative density of the object is

Mark only one oval.

- ○ 4
- ○ 4.5
- ○ 2.5
- ○ 1.25

21. Q14. In a 2m long tapered duct the area decreases as A = (0.4 - 0.1z) where z is distance in meters. At a given instant a discharge of 0.48 m^3/sec was flowing in the duct and it was found to increase at a rate of 0.12 m^3/sec. The local acceleration at z = 0 in m/sec^2 is

Mark only one oval.

○ 0.3

○ 3.6

○ 3.9

○ 0.9

22. Q15. An insulated rigid vessel contains some gas and an electric resistor. In a certain interval of time, the resistance connected to an external electric power heats the gas. Considering the vessel and it's contents as the system

Mark only one oval.

○ heat and work transfer are zero

○ heat and work transfer are positive

○ heat transfer is positive and work transfer is zero

○ heat transfer is zero and work transfer is negative.

23. Q16. During the steady flow compression process of a gas with mass flow rate of 2 kg/sec, increased in specific enthalpy is 15 kJ/ kg and decrease in kinetic energy is 2 kJ/kg. If the rate of heat rejection to the environment is 3 kW, the power needed to drive the compressor (in kW) would be

Mark only one oval.

○ 23

○ 26

○ 29

○ 37

24. Q17. With increase in the thickness of insulation around a circular pipe, heat loss to surroundings is due to

Mark only one oval.

- ○ convection increases, while that due to conduction decreases
- ○ convection decreases, while that due to conduction increases
- ○ convection and conduction decreases
- ○ convection and conduction increases

25. Q18. The turbine rotor of a ship has a mass of 3500 kg. It has a radius of gyration of 0.35 m and a speed of 3500 rpm clockwise when looking from stern. If the ship is steering to the left on a curve of 100 m radius at a speed of 36 km/h, then the gyroscopic couple is

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- ○ 15.71 KN-m
- ○ 11.47 KN-m
- ○ 12.47 KN-m
- ○ 22.27 KN-m

26. Q19. A material has modulus of rigidity equal to 0.35 x 10^5 N/mm^2 and bulk modulus equal to 0.7 x 10^5 N/mm^2. The Poisson's ratio is

Mark only one oval.

- ○ 0.2737
- ○ 0.3121
- ○ 0.4376
- ○ 0.2857

27.   Q20. Solar thermal water pumps work on

Mark only one oval.

( ) Otto Cycle

( ) Carnot Cycle

( ) Rankine cycle

( ) Diesel cycle

Google Forms