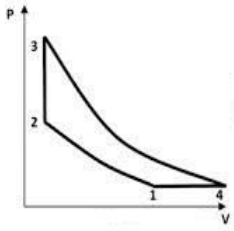
AAROHAN 2017

Ascent of Knowledge

Class 12th - Answer Key and Hints

Q.No	Key	Q.No	Key	Q.No	Key	Q.No	Key
1	**B**	**9**	**C**	**17**	**B**	**25**	**B**
2	**C**	**10**	**C**	**18**	**C**	**26**	**C**
3	**C**	**11**	**A**	**19**	**C**	**27**	**D**
4	**C**	**12**	**B**	**20**	**Bonus**	**28**	**C**
5	**D**	**13**	**A**	**21**	**C**	**29**	**C**
6	**B**	**14**	**B**	**22**	**B**	**30**	**D**
7	**C**	**15**	**A**	**23**	**B**	**31**	**D**
8	**C**	**16**	**A**	**24**	**A**	**32**	**C**

PHYSICS

1) **B)** 

1-2 is adiabatic compression. 2-3 is the spark point, where pressure suddenly rises but volume is same. 3-4 is the expansion (power) stroke. 4-1 is the exhaust stroke.

2) **C)** Diesel engine, since compression ratio is higher - Given in paragraph that diesel engines extract more energy from the gas.

3) **C)** Strength of engine structure - Length of stroke changes to change compression ratio, not to handle it. (Even that is not necessary, since length of combustion cylinder cylinder can be reduced). Size and area would not matter.

4) **C)** Self explanatory

5) **D)** Under-square engine, since lesser stroke length would let the engine rotate faster keeping the same stress on the piston.

6) **B)** No, since we cannot add more fuel than air, otherwise incomplete combustion would occur.

7) **C)** 1.5 - 3000 RPM, so 20 ms per revolution, and hence 10 ms for intake stroke. V_d=100-100/r=90 cc. Hence, 15×10/90=1.66, closest to 1.5.

8) C) 0.039 cc // NO IDEA HOW - ASK TEJAS

CHEMISTRY

9 **(C)** The ideal Otto cycle efficiency is shown as a function of the compression ratio in the question. As the compression ratio increases, η increases, but so does T2. If T2 is too high, the mixture will ignite without a spark (at the wrong location in the cycle).

10 (C) If the engine is operating with richer mixtures the optimum spark timing must be retarded as if the mixture is rich it has its low self-ignition temperature.

11 (A)

From the given P-V graphs, compare the work done. Greater the work, greater is the efficiency of the engine.

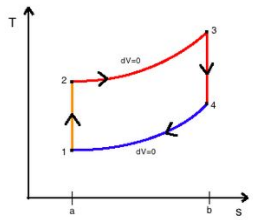
12 (B)

Use the given two conditions to arrive at the answer.

13 (A) An ignition process obeys the law of conservation of energy as energy is only produced there.

14(B)

Visualise the change of entropy and the corresponding temperature as the Pressure changes. From 2→ 3 adb 4-> 1, the change in volume is o, i.e., dV=0.



15 (A)

The thermal efficiency is in direct proportion to the amount of fuel, for a given compression ratio.

16 (A)

The processes need to only be internally reversible. External reversibility is not necessary.

Maths

17. B) 0.104

18. C). 2.50cm, Height raised=5(1-cos60)

19. C)

20. Bonus

21. C) 15500

Use Linear Programming

22. B) 2

23. B) Conical head because they experience lesser air drag

24. A) 840 k

Class 11 and 12 logic section

25. B) Both will get 2 weeks of detention - since both will be worried that if they stay silent, the other will expose them and escape.
26. C) 2 boys go for the prettiest girl among 3 girls, and neither gets her due to the competition - If either boy goes for another girl, the other boy gets the prettier girl without competition, and hence the boy who changed his method is not benefitted.
27. D) 225 - Month began with Thursday, and 3 days A works. Then every weekday A works and on Saturday, B works. So 30+55×3+30=225

28. C) 63

2^n-1 where n is the total number of discs.

29. C 2400

30. D His grandfather's only son's wife is my sister

31. (D)
Analyse the sentences given with respect to their meaning and grammar. Arrive at the solution subsequently.

32. (C)
The correct response is (C). The original argument bases a conclusion that one phenomenon causes another on an observed correlation between the two phenomena. The argument boils down to the following:

Premise: X (beautiful beach) is correlated with Y (crowd of people).
Conclusion: X (beautiful beach) causes Y (crowd of people).

Answer choice (C) demonstrates the same pattern of reasoning:

Premise: X (warm weather) is correlated with Y (fleas).
Conclusion: X (warm weather) causes Y (fleas).