

11. Give the French for—How many times? several times; this time; next time; twice; last time; once only; many times.
12. Translate into French (using *pleurer* and *arriver*)—
- She had wept.
  - Is she not weeping?
  - Would he not have arrived?
  - He has arrived.
  - Let her not weep.
13. Give the present and past participles of *requérir*, *vivre*, *mourir*, *lire*, *écrire*, *manger*, *percer*, *croître*, *croire*, *moudre*.
14. Give the feminine corresponding to—*Ce garçon; un coq; mon bon fils; le bouc; leur oncle; quel homme!*
15. Write down the dative of *toi, tu, il, elles, vous, l'un, qui* (with antecedent *celui*), *qui* (with antecedent *ce*).
16. Write down, in their proper order, the French names for—
- The days of the week.
  - The months of the year.
  - The four seasons.

[N.B.—The following Questions are not to be answered by Candidates for the Junior Civil Service.]

17. Which participles in the following sentences are correct, and which ought to agree? Give full reasons in each case:—*Ils ont donné à leurs enfants toute l'éducation que leur a permis leur fortune. Les obstacles que j'ai eu à vaincre étaient terribles. Tous ces événements se sont succédé de la façon que je l'avais pensé.*
18. Explain the etymological origin—
- Of the inserted *t* in *parla-t-il*;
  - Of the peculiar form of the adjective in *grand'-mère*;
  - Of the twofold gender of *amour*.

*Physics.—Optional for Class D and Junior and Senior Civil Service. Time allowed: 3 hours.*

- Describe a method of determining the coefficient of linear expansion of a metal bar. Show that the coefficient of cubical expansion is very nearly three times the linear coefficient.
- What is meant by the specific heat of a substance?  
A pound of small shot heated to the temperature of 100° C. is quickly thrown into two pounds of water at 10° C., and the temperature of the water is thereby raised to 11.38° C.: hence calculate, on the supposition that the loss of heat during the operation is negligible, the specific heat of lead.
- Define the dew-point. State the conditions which are favourable to the deposition of dew. Describe an instrument by which the dew-point may be directly determined.
- Describe the siren, and explain its use.  
A siren, having 15 holes, makes 400 revolutions per minute when it is in unison with an open organ-pipe: determine the length of the pipe, taking the velocity of sound as 1,100ft. per second.
- What is the law of the decrease of luminous intensity with increase of distance? How would you verify this law by means of a photometer?
- A luminous point is placed in the axis of a double-convex lens, at a distance from the lens (1) equal to half the focal length of the lens, (2) equal to the focal length, (3) equal to twice the focal length. Draw diagrams showing in each case the course of the rays which pass through the lens.
- What is meant by the term "magnetic field"? How may the direction of the lines of force in a magnetic field be ascertained? How is the intensity of the field measured, and how is it conventionally represented?
- A stick of sealing-wax is rubbed with fur and brought near a pith ball suspended by a lint thread from a retort-stand: explain the action that takes place. Will it make any difference if the lint thread is replaced by one of dry silk?
- Enumerate the effects which may be produced by an electric current. Give conspicuous instances in which these effects are utilised.
- Describe Grove's voltaic cell, and explain its action.  
What is the E.M.F. of a cell which sends a current of 49 milliampères through a circuit of 40 ohms resistance?

*Mechanics.—Optional for Class D and Junior and Senior Civil Service. Time allowed: 3 hours.*

- What particulars must be ascertained with respect to a force before it can be regarded as a known force?  
Show that a straight line may represent a force in respect of each of these particulars. Define the resultant of two or more forces.
- How is a variable velocity measured?  
Enunciate the proposition called the parallelogram of velocities.  
A ball travelling at the rate of 30ft. a second is struck in such a way that after the blow it is travelling at right angles to its former direction with a velocity of 40ft. a second. What were the magnitude and direction of the velocity communicated by the blow?