

22. *Answer a.* There are two major types of mixture-control systems, the needle type and the back-suction type. Both of these systems control the amount of fuel reaching the main metering jet and therefore control the fuel/air ratio.
23. *Answer b.* As altitude is gained in a climb, the volume of air flowing through the carburettor remains the same, but the weight of air is less due to its lower density. The same weight of fuel is drawn into the airstream, however, which means the fuel/air mixture is now richer with fuel.
24. *Answer c.* Failure to lean the mixture means that the fuel/air ratio will be too rich and this may lead to increased fuel consumption and a loss of power. There will also be a possibility of rough running, but this will not be associated with a rise in rpm as in answer b.
25. *Answer b.* The primary cause of detonation is an excessive temperature of the air passing through the carburettor. Other contributory factors are:
- a time-expired fuel;
  - an overlean mixture at high power settings;
  - excessive manifold pressure; and
  - an overheated engine.
- If detonation is suspected:
- richen the mixture;
  - reduce pressures in the cylinders (throttle back);
  - increase airspeed to help reduce cylinder head temperatures; and
  - ensure the carburettor heat is in the cold position.
26. *Answer a.* The fuel/air ratio is the ratio between the weight of fuel and the weight of air mixed together and entering the cylinders where combustion is to occur. The mixture control directly meters the amount of fuel available to be mixed with this air to obtain the proper fuel/air ratio.
27. *Answer d.* The carburettor heat system usually involves heating the induction air by passing it through a jacket that is heated by the hot exhaust system. The density of this air will be less. The amount of fuel that is added to this air is determined by the volume of air passing through the carburettor not by the mass of air. Therefore, when carburettor heat is applied the same volume of air passes through the carburettor, and the same mass of fuel is added. However, in this hotter air the mass of air has reduced, and will therefore produce a richer mixture.
28. *Answer b.* As altitude increases the density of the air decreases. The amount of fuel that is added to this air is determined by the volume of air passing through the carburettor not by the mass of air. Therefore, as altitude is gained the same volume of air passes through the carburettor, hence the same mass of fuel is added, but the mass of air has reduced producing a richer mixture than is necessary. By leaning the mixture at altitude a more efficient operation and better fuel economy is achieved.
29. *Answer c.* Most aeroplanes have dual, independent ignition systems running in parallel with one another, with the magneto of each ignition system supplying one of the two spark plugs per cylinder.
30. *Answer a.* During start up the battery discharges electrical power, so immediately after start-up the ammeter indication will be quite high until the battery is recharged.