QUESTIONSHEET 1

(a) One mark for each of the following
belt brushes against bottom comb
belt becomes charged
charge travels up belt
charge transferred via top comb
to outside of dome 5

(b) A spark jumps across from the dome 1

(c) large charge built up on dome 1
big enough to jump (air) gap 1

TOTAL / 8

QUESTIONSHEET 2

(a) static electricity arises from charges that don't move 1
current electricity arises from moving charges 1

(b) (i) The meter registers a current 1

(ii) negative charges from the dome 1
flow down to earth 1
through the meter 1

TOTAL / 6

QUESTIONSHEET 3

(a) you become charged 1
by friction/rubbing against seat 1
when you touch car body, charge flows/jumps 1

(b) excess charge can flow to car 1
as you become charged 1

(c) charge leaks in cold/damp conditions 1
charge can build up in warm/dry conditions 1

TOTAL / 7

QUESTIONSHEET 4

(a) Any one of the following
- Paint spraying
- Smoke precipitator
- Van de Graaff generator

(b) Photocopying plate charged positive in dark and uncharged in light. Image projected onto plate, dark parts become positively charged. Plate covered with negatively charged black powder so is attracted to dark parts of plate.

(c) Any one of the following
- car shocks
- removing synthetic clothes from tumble drier or over head; clothes become charged. As you try to separate them they discharge themselves leading to crackles/sparks
- lightning arising from large build up of charge on clouds which discharges to ground
- refuelling aircraft where fuel flowing into pipe can build up static charges and hence the possibility of an explosion. Fuel tank is earthed to fuel pipe to allow excess charge to flow to earth.

One mark for each example
One mark for description
One mark for explanation in terms of charge

The question says "describe…" so you can't expect full marks for merely naming an example.
If you can draw a simple diagram, this may help or even replace explanations.

TOTAL / 6

QUESTIONSHEET 5

(a) positive charges on spray drops 1
negative charges on car body 1

(b) one mark for each of the following
spray nozzle connected to positive terminal
spray drops positively charged
drops repelled so spread out
car door connected to negative
drops attracted to car door 5

(c) dust can become charged 1
attracted to paint/door 1

TOTAL / 9

QUESTIONSHEET 6

(a) (i) Gold leaf is deflected/moves out 1

(ii) negative charges repelled to bottom of rod and leaf 1
negative rod repels negative leaf 1

(b) electrons/negative charges attracted to plate 1
positive charge left at bottom 1
positive rod repels positive leaf 1

(c) leaf deflected more 1

TOTAL / 7

QUESTIONSHEET 7

(a) deflects/moves out 1

(b) positive rod – leaf deflects more 1
greater amount of positive charge 1

negative rod – leaf deflects less 1
some electrons flow onto leaf 1

uncharged rod – no change 1

Some laboratory electroscopes have a scale fixed beside the leaf so the amount of deflection (and hence the amount of charge) can be measured.

TOTAL / 6

QUESTIONSHEET 8

(a) smoke particles become negatively charged 1

(b) to attract the negatively charged smoke particles 1

(c) to remove smoke particles 1
from the gases 1
so expelled gases are clean 1
reduces air pollution 1

Remember that the number of marks given to a question gives you some idea of the detail you should give in an answer. Usually, one mark is given to each key point, so you could write your answer in bullet points. Here part (c) has four key points and gets four marks.

TOTAL / 6

QUESTIONSHEET 9

(a) Rub it hard 1
with a cloth 1

(b) suspended strip is repelled/moves away 1
like charges repel 1

(c) suspended strip is attracted/moves near 1
unlike charges attract 1

The rule is: opposite charges attract, like charges repel.
This is very similar to the magnets rule (unlike poles attract, like poles repel)

TOTAL / 6

QUESTIONSHEET 10

(a) electricity that does not move/flow 1
arises from transfer of (electrical) charge/electrons 1

(b) Any four from
electrons are rubbed off
onto a cloth
electrons have negative charge
rod now has fewer electrons
therefore, rod is now positively charged 4

We talk about positive and negative charges in static electricity. Take care to understand that negative charges mean an excess of electrons and positive charges mean regions where there are fewer electrons. The positive charges are <u>not</u> due to the movement of protons. Protons are not free to move in the same way that electrons are.

TOTAL / 6

QUESTIONSHEET 11

(a) (i) paper attracted to comb 1

(ii) one mark for each of the following
comb is charged when Manjinder combs his hair
when comb brought near to paper, paper becomes charged
charge on paper opposite to charge on comb
opposite charges attract
paper is attracted to comb 5

(b) the charge leaks away 1

This is known as "inducing" a charge on a body. Normally, an uncharged body has an even distribution of positive and negative charges. A charged body attracts charges of the opposite sign in the uncharged body.

TOTAL / 7

QUESTIONSHEET 12

(a) positive and negative charges drawn 1
evenly distributed 1

(b) (i) more negative than positive charges near right end 1
more positive than negative charges near left end 1

(ii) charged body attracts negative charges 1
repels positive charges 1

Diagrams often show only one type of charge at one side of the body. This is meant to imply that there is an excess of that type of charge.

TOTAL / 6

QUESTIONSHEET 13

(a) sphere swings back and forth 1
between plates 1

(b) one mark for each of the following
sphere repelled from left side
to right side
now it becomes negatively charged
so sphere repelled form right side to left 4

TOTAL / 6

QUESTIONSHEET 14

(a) electrons/negative charges repelled 1
to opposite side of sphere 1
leaving near side positively charged 1

(b) Electrons flow to earth 1
sphere now has positive charge 1

(c) insulator – charges cannot flow through 1
conductor – charges can flow through 1

TOTAL / 7

QUESTIONSHEET 15

(a) positive charges drawn 1
grouped round top of conductor 1

(b) One mark for each of the following
negative charges/electrons attracted
from base of cloud
and flow to earth
through conductor 4

TOTAL / 6

QUESTIONSHEET 16

(a) (i) it stands on end 1

(ii) charge from the dome moves to the hair 1
individual strands repel each other 1

(b) (i) her hair would not stand on end 1

(ii) the girl is earthed 1
no charge stays on her hair 1

(c) damp the girl's hair 1
make her touch someone else/a metal conductor 1

TOTAL / 8

QUESTIONSHEET 17

(a) The balls move apart 1
similarly charged bodies repel each other 1

(b) the balls cling together 1
oppositely charged bodies attract each other 1

(c) the balls move apart 1
charged ball induces a charge on the other 1

(d) the balls move apart 1
they will still repel each other 1

(e) the balls hang vertically 1
there is no attraction of repulsion 1

TOTAL / 10

QUESTIONSHEET 18

(a) nylon becomes charged with static electricity 1
static electricity attracts dust 1

(b) rubbing in drier makes skirt charged 1
opposite charges produced attract 1

(c) static electricity in phone components 1
could cause spark 1

(d) static electricity could build up on workers/clothes from floor 1
rubber insulation prevents this 1

TOTAL / 8

QUESTIONSHEET 19

(a) (i) Two from
nylon, perspex, rubber 2

(ii) cotton/paper 1

(iii) Two from
steel, copper, carbon 2

(b) water 1

TOTAL / 6

QUESTIONSHEET 20

One mark for each of the following in correct order

rubbing
moving
electrons
positively
neutrons
attract
repel
charge
same
repel
attract

TOTAL / 11