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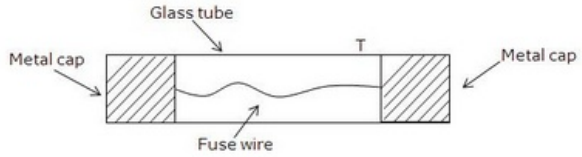
Q1.
Electric fuse.
Q2.
(i) 5A
(ii) 15A.
Q3.

Symbol of an electric fuse used in circuit diagram

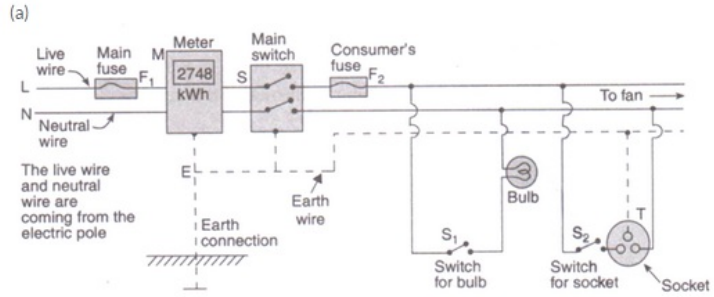
Q4.
(a) False.
(b) False.
Q5.
Earth wire
Q6.
Red wire - Live wire.
Black wire - Neutral wire.
Green wire - Earth wire.
Q7.
Zero volt.
Q8.
P = VI
I = P/V = 180/240 = 0.75A
The fuse wire should be such that it is able to withstand only a little more current than 0.75A. So the fuse of 1A is the most suitable.
Q9.
Short circuit occurs when live wire and neutral wire come in contact with each other.
Q10.
Live wire.
Q11.
In series.
Q12.
Red, black and green.
Q13.
(a) red
(b) black
(c) green
Q14.
To avoid the risk of electric shocks.
Q15.
(i) In case of parallel connection, if one of the appliances is switched off, other appliances keep on operating.
(ii) In case of parallel connection, all the appliances are operated on same voltage i.e., the mains supply voltage.
Q16.
Parallel connection.
Q17.
(a) live
(b) body.
Q18.

(a) The fuse wire is made of tin-plated copper wire because of its low melting point.
(b) Pure copper wire cannot be used as a fuse wire because it has a high melting point due to which it will not melt easily when a short circuit takes place.
Q19.
Cartridge fuse:
It consists of a glass tube T having a thin fuse wire sealed inside it. The glass tube has two metal caps at its two ends. The two ends of the fuse wire are connected to these metal caps. The metal caps are for connecting the fuse in the circuit in a suitably made bracket.



Q20.
Live wire coming in contact with the neutral wire is known as short circuit.
When too many electrical appliances of high power rating are switched on at the same time or are connected to a single socket, they draw extremely large current. This is known as overloading.
Q21.
(a) A fuse cuts off current when the current exceeds a safe value (due to short circuiting or overloading). When the current becomes large, it heats the fuse wire too much. Since the melting point of fuse wire is low, it melts and breaks the circuit. Thus, current in the circuit is cut off.
(b) Let the maximum number of bulbs be y.
Power of y bulbs, P=60y
V=220V, I=5A
We know that
P = VI
60y = 220 x 5
60y = 1100
y=18.33
So, number of bulbs required are 18.
Q22.
(i) A fuse is one of most important protection devices, which is used for avoiding the damages happening due to over load or short circuit.
(ii) An earthing wire is used to save us from the risk of electric shock in case the live wire touches the metal case of the electric appliance.
Q23.
(a) V=230V, P=750 W, t=30/60=0.5hr
(i) Let max current be I
We have P=VI
750 =230xI
I= 3.26 A
(ii) Electric energy consumed, E = Pxt = 0.75kW x 0.5h = 0.375 kWh
No. of units used in 30 min = 0.375
(b) 5 A fuse rating will be suitable for this electric iron as the maximum current for this iron is 3.26 A.
Q24.
When the live wire of a faulty appliance comes in direct contact with its metallic case, which has been earthed, the large current passes directly to the earth without passing through the user's body. Thus, it is necessary to earth the metallic bodies of electrical appliances so as to avoid fatal electric shocks.
Q25.
(a) P = 3kW = 3000W
V = 240V
P = V x I

I = P/V
= 3000/240 = 12.5 A.
(b) A 13A fuse should be used in the geyser circuit.
Q26.
(a) Fuses are fitted in the fuse box of a domestic electricity supply to protect the whole wiring of the house when excessive current flows in the circuit.
(b) MCB.
Q27.
(a)



(b) Two hazards associated with the use of electricity are:
i. If a person happens to touch a live electric wire, he gets a severe electric shock.
ii. Short-circuiting due to damanged wiring or overloading of the circuit can cause electrical fire in a building.
(c) Important precautions which should be observed in the use of electricity are:
(i) Use of good quality wires
(ii) Use of fuse and proper earthing.
(iii) Use of appliances in dry condition only.
(d) If a person comes in contact with a live wire, we will switch off the main switch immediately so as to cut off the electricity supply..
(e) Electric switches should not be operated with wet hands because water is a good conductor of electricity, so the user may get electric shock.
Q38.
Given: P = 3.2kW = 3200 W, Fuse current rating = 10 A, V = 220 V
We have
P = VI
3200 = 220 x I
I = 14.54 A
As the required current for the air-conditioner is 14.54A and the rated current of the fuse is 10A, so the fuse will blow cutting off the power supply.
Q39.
P_1 = 60 W, P_2 = 1200 W, P_3 = 500 W
Fuse rating = 10A
V = 220V
We have, P = VI
Total power = 60+1200+500 = 1760W
Therefore, 1760 = 220 x I
I = 8A
The required current is 8A and fuse rating is 10A. So, all the appliances will work normally and the fuse will not blow.
Q40.
(a) The appropriate value of the fuse to be fitted in the circuit is 2.5A or 3A.
(b) If a 13A fuse is fitted in the circuit, it will not protect the vacuum cleaner against the very high current flowing through it. This may damage the appliance.
Q41.
Circuit A is not dangerous after fuse blows because fuse is fitted in the live wire; but circuit B is dangerous even if fuse blows because the fuse is in the neutral wire.

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Q42.
P_1 = 1200W, P_2 = 1000W
V = 220V
Fuse rating = 9A
We know, P = VI
Total current required,
I = P/V
= $(P_1+P_2)/V$
= (1200+1000)/220
= 10A
If both the appliances are switched on together, the fuse will get burnt. So, both the appliance cannot be used at same time.
Q43.
No earth connection is required for the bulb connection as it does not draw heavy current and we hardly touch it. A socket for using an electric iron has an earth connection because electric iron has a metallic body and draws a large current.
Q44.
(a) It is more dangerous to touch the live wire rather than the neutral wire because live wire has a high potential of 220V, where as neutral wire has zero potential.
(b) Bird's body is not connected to the earth, so no current flows through its body into the earth. So, it is safe for birds to sit on naked power lines fixed atop tall electric poles.
Q45.
Let the maximum number of tube-lights be y.
Power of y tube-lights, P = 36y
V = 230 V, I = 5A
We know that
P = VI
36y = 230 x 5
36y = 1500
y=31.94
So, number of tube-lights required are 31.

********** END **********