

ENVIRONMENTAL Emergencies ANSWER KEY

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1. QUESTIONS

- Entire Right Leg, Entire Left Arm, Half of Head
- Answer: $18+9+4.5 = 31.5\%$
- Entire Back, Half of Right Arm & Left Leg, Entire Left Arm
- Answer: $18+4.5+9+9 = 40.5\%$
- Entire abdomen (not chest) + Genitalia
- Answer: $9+1 = 10\%$
- Entire burn to all Anterior surfaces of body (except genitalia)
- Answer: $4.5(\text{face})+18(\text{torso})+4.5 \times 2(\text{arms})+9 \times 2(\text{legs})=49.5\%$

**What is the Total
Burn Percentage in
each ADULT case...**

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2. QUESTIONS

- Half of Head, Entire chest/abdomen, Entire Right Leg
- Answer: $9+18+14 = 41\%$
- Half of Left Arm, Head, Left Leg and Entire Chest
- Answer: $4.5+9+14+9 = 36.5\%$
- Posterior aspect (1/2) of Bilateral Legs
- Answer: $7+7 = 14\%$
- Bilateral Anterior Hands, Left Anterior leg, Lower Half of Face
- Answer: $1+1+7+4.5 = 13.5\%$

**What is the Total
Burn Percentage in
each PEDS case...**

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3. Burn Classifications



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4. How much fluid...???

- ADULT (90 kg) with 30% Total BSA Burned
- Answer: $4 \times 90 \times 30 = 10,800 \text{ ml}$
- ADULT (75 kg) with 45% Total BSA Burned
- Answer: $4 \times 75 \times 45 = 13,500 \text{ ml}$
- CHILD (20 kg) with 15% Total BSA Burned
- Answer: $3 \times 20 \times 15 = 900 \text{ ml}$
- CHILD (35 kg) with 65% Total BSA Burned
- Answer: $3 \times 35 \times 65 = 6,825 \text{ ml}$

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5. Mechanisms of dissipating heat: MATCHING

1. Radiation
 2. Conduction
 3. Convection
 4. Evaporation
- Heat loss by vaporization of water (or sweat)
- Heat transfer by air/liquid moving across the surface of an object
- Heat transfer by electromagnetic waves from warmer to colder objects
- Heat exchange between two surfaces in direct contact

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6. MATCH the Heat Illness with it's definition

1. Temp >40 C, confusion, no sweating
2. Temp normal to mild increase & sweating
3. Temp <40 C, orthostatic hypotension, N/V, HA

Heat cramps
Heat Stress
Heat Stroke

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7. What is this rash?



Miliaria rubra (prickly heat)

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8. QUESTION



What is the diagnosis?

Trench Foot

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9. QUESTION

What is the diagnosis?



CHILBLAINS/PERNIO

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10. QUESTIONS



CLASSIFY THE FROSTBITE

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11. Staging of Hypothermia:

Fill in the Blanks

MILD (I): Temp 32-35 C; Symptoms shivering

MODERATE (II): Temp 28-32 C; Symptoms +/- Shivering & AMS

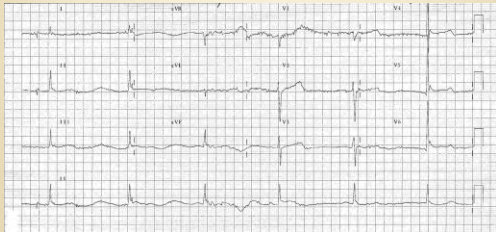
SEVERE (III): Temp <28 C; Symptoms unconscious

ARREST (IV): Temp <32 C; Symptoms no vitals

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12. QUESTION

What findings are on this EKG?



Osborne J Waves
usually <32 C

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13. QUESTIONS

- ACID BURNS cause → _____ Necrosis
 - Coagulation
- ALKALI BURNS cause → _____ Necrosis
 - Liquefaction (and saponification of lipids)
- Do ACID or ALKALI burns cause more damage?
 - Alkali

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14. QUESTIONS

CHEMICAL

Systemic Toxicity

- | | |
|------------------------|---|
| 1. Hydrofluoric Acid | A. Hepatic necrosis & nephrotoxicity |
| 2. Chromic/Formic Acid | B. Met hgb, hemolysis, organ failure |
| 3. Phenol (carbolic) | C. HypoCA, hypoMAG, hyperK, arrhythmias, sudden death |
| 4. Sodium nitrate | D. Severe Met hgb w/ refractory cyanosis |
| 5. Dichromate | E. Liver & renal failure, death despite dialysis |
| 6. Gasoline | F. Severe pulm, neuro, renal, hepatic issues |
| 7. Cresol (solvent) | G. Cardiovascular & CNS toxicity |

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15. QUESTION

How do you treat hydrofluoric Burns?

- Copious irrigation + calcium gluconate gel (commercial or use 25 ml's Ca gluconate + 75 ml's water soluble lubricant)
- Consider dermal injection, arterial infusion, and IV MAG/CALCIUM
- Burns to hands, digits, feet, nails require Tox and Plastic consults. Ocular burns require Ophthalmology consult.
- Major Burns: Immediately start IV Calcium and Magnesium

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16. QUESTIONS

- What is HIGH voltage vs a LOW voltage injury?
 - Answer: HIGH >1,000 V (consider >600 V), LOW <1,000 V
- What type of electricity does a typical household use?
 - Answer: AC (Alternating Current)
- What type of electricity do batteries and lightning use?
 - Answer: DC (Direct Current)
- What tissue types have the highest to lowest resistance?
 - Answer: BONE (Highest) and Nerves/vascular (Lowest)

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17. QUESTIONS

What vessel can be injured?
What is the potential complication from this injury?



Answer: Labial Artery injury and risk of bleeding when the eschar separates 5 to 14 days after injury.

Source: J.E. Tintinalli, J.S. Stapczynski, O.J. Ma, D. Yealy, G.D. Meckler, D.M. Cline: Tintinalli's Emergency Medicine: A Comprehensive Study Guide, 9th Edition: Copyright © McGraw-Hill Education. All rights reserved.

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18. QUESTION



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19. QUESTION

- What physiologic changes occur with the DIVING REFLEX?
- Answer: bradycardia, apnea, peripheral vasoconstriction, and central shunting of blood flow

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