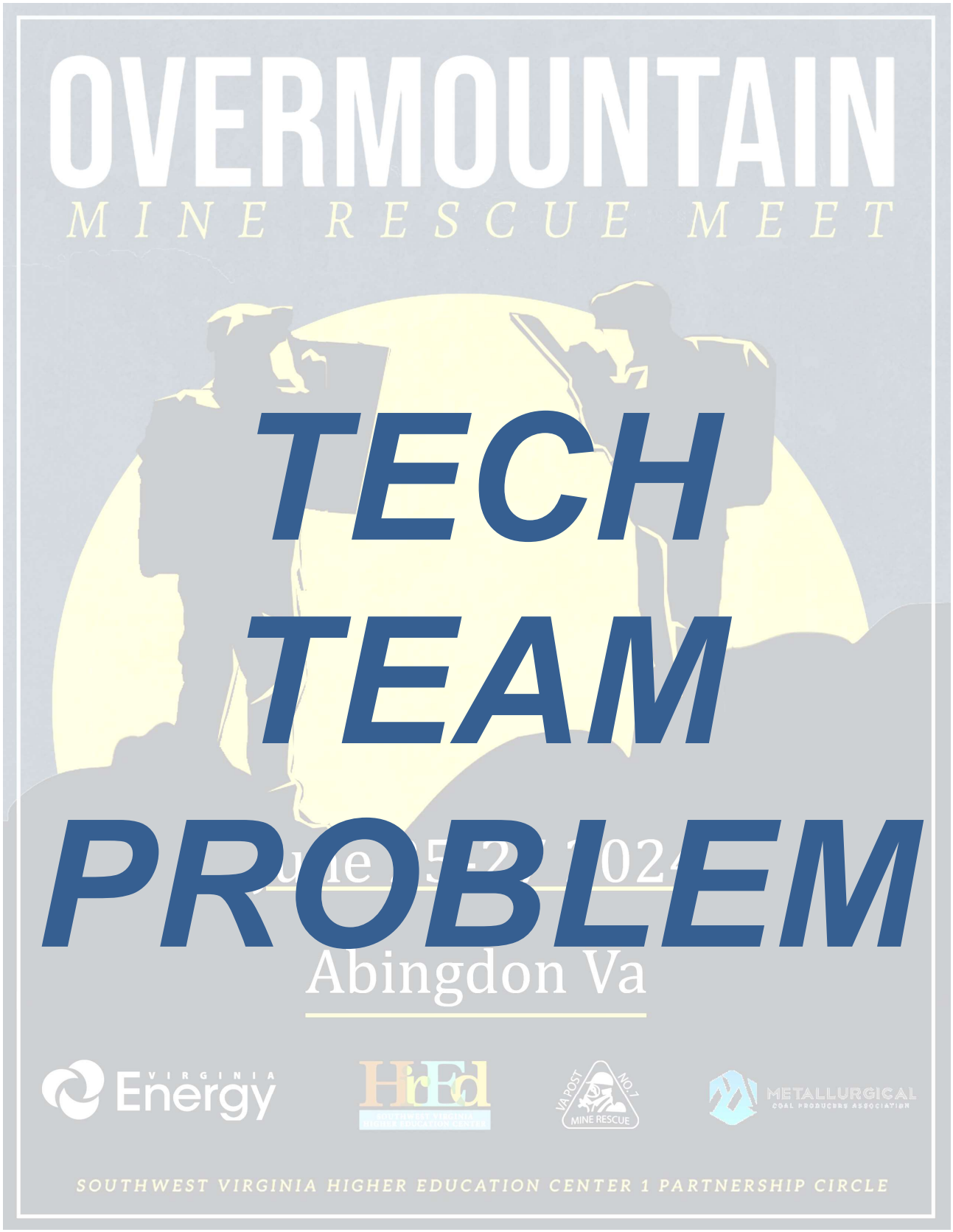
OVERMOUNTAIN
MINE RESCUE MEET
TECH
TEAM
PROBLEM
Abingdon Va
VIRGINIA Energy
HiEd
SOUTHWEST VIRGINIA HIGHER EDUCATION CENTER
VA POST NO 7
MINE RESCUE
METALLURGICAL
COAL PRODUCERS ASSOCIATION
SOUTHWEST VIRGINIA HIGHER EDUCATION CENTER 1 PARTNERSHIP CIRCLE

POST 7 TECH TEAM WRITTEN TEST

TEAM NAME_____TEAM MEMBER NUMBER_____

WORKING ORDER_____

POST 7 TECH TEAM WRITTEN TEST

TEAM NAME_____

WORKING ORDER_____

1. The Specific Gravity of Sulfur Dioxide is?

a. 2.2836

b. 2.2368

c. 2.2638

2. The Specific Gravity of Nitrogen is?

a. 0.9674

b. 0.9476

c. 0.9764

3. The specific Gravity of Hydrogen is:

a. 0.0695

b. 0.0596

c. 0.0965

4. What is the Specific Gravity Hydrogen Sulfide:

a. 1.1609

b. 1.1906

c. 1.1096

5. What is the Specific Gravity of Sulfur Dioxide:
a. 2.2836

b. 2.2683

c. 2.2638

6. What is the Specific Gravity of Ethane:
a. 1.0493

b. 1.0394

c. 1.0439

7. What is the Specific Gravity of Propane:
a. 1.5526

b. 1.5625

c. 1.5265

8. What is the Specific Gravity of Butane:
a. 2.0100

b. 2.0010

c. 2.0001

9. What is the Specific Gravity of Acetylene:
a. 0.9107

b. 0.9701

c. 0.9170

10. What is the Specific Gravity of Radon:
a. 7.625

b. 7.652

c. 7.526

11. 30 CFR Part 75 Section 75.333 Refers to:
a. Fire Prevention and Control

b. Ventilation controls

c. Belt air course ventilation

12. 30 CFR Part 75 Section 75.350 Refers to:
a. Fire Prevention and Control

b. Ventilation controls

c. Belt air course ventilation

13. 30 CFR Part 57 Subpart C Refers to:

a. Fire prevention and control

b. Air quality, radiation, physical agents, diesel particulate matter

c. Ventilation

14. 30 CFR Part 57 Subpart D Refers to:

a. Fire prevention and control

b. Air quality, radiation, physical agents, diesel particulate matter

c. Ventilation

15. 30 CFR Part 57 Subpart G Refers to:

a. Fire prevention and control

b. Air quality, radiation, physical agents, diesel particulate matter

c. Ventilation

16. Air locks are used by mine rescue teams:

a. To establish a Air Flow.

b. When opening a door or knocking out a stopping/bulkheads behind which conditions are definitely known.

c. Before opening a barricade in bad air behind which trapped miners may be located.

17. Two instruments commonly used to measure velocity of airflow in a mine:

a. Smoke Tube and Regulator.

b. Regulator and CO Detector.

c. Anemometer and Smoke Tube.

18. Temporary stoppings/bulkheads built in a passageway should be placed at least 4 to 6 feet into the passageway in order that:
a. A sufficient amount of space is available to construct a permanent stopping/bulkhead.

b. It will be protected from further explosions.

c. It will not be affected by fire if a fire should spread to that crosscut.

19. "Pogo sticks" are devices that are used:
a. To test the roof and rib.

b. To measure air velocity.

c. As supports on which brattice cloth can be hung.

20. The smoke tube is used to show the direction and velocity of slow-moving air.
a. (below 120 feet per minute).

b. (below 100 feet per minute).

c. (below 110 feet per minute).

21. During a bump test of the MX6 Ibrid, the sensor must reach a gas reading of _____% or greater of the applied gas (calibration) concentration within 0 seconds to pass?

a. 25

b. 30

c. 60

22. If the run time is less than _____ minutes, instrument alerts the user of the impending shut down by showing "Low Battery" on the lower central part of the display.

a. 5

b. 10

c. 15

23. When calibrated using methane concentration less than 5% of volume, reading accuracy of the infrared methane sensor may not be guaranteed to be better than +/- _____%?

a. 5

b. 10

c. 20

24. During calibration, the user has _____ minutes to apply gas before calibration times out?

a. 3

b. 5

c. 7

25. To power on the MX6 Ibrid instrument, press and hold the center of the navigation button for _____ seconds?

a. 2

b. 3

c. 4

26. What are two types of battery packs available for the MX6 Ibrid?

a. NiCad and Lithium ion

b. Alkaline and NiCad

c. Alkaline and Lithium ion

27. What appears on the display of the MX6 Ibrid when the combustible sensor is exposed to more than 5% by volume CH4?

a. FeRR

b. OR

c. 5.0% +

28. Turn the instrument on by pressing and holding the center [Enter] navigation button on the _____ front of the instrument for at least 3 seconds.

a. Upper

b. Middle

c. Lower

29. Visually check the _____ for damage. Visually inspect the LCD display after it stabilizes.

a. MX-6

b. Detector

c. Instrument

30. BATTERY STATUS – Under the main menu [_____] option, select [BATTERY] to view the battery status.

a. CONFIGURE

b. DISPLAY

c. VIEW

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b. Detector

c. Instrument

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a. CONFIGURE

b. DISPLAY

c. VIEW

POST 7 2024 TECH TEAM WRITTEN EXAM ANSWERS

1. C
2. A
3. A
4. B
5. C
6. A
7. B
8. A
9. A
10. C
11. B
12. C
13. A
14. B
15. C
16. C
17. C
18. A
19. C
20. A
21. C
22. B
23. C
24. B
25. B
26. B
27. B
28. C
29. C
30. C

OVERMOUNTAIN

MINE RESCUE MEET

2024 POST 7 MINE RESCUE CONTEST TECH TEAM PROBLEM STATEMENT

Hello and thank you for helping use recover our mine. You are located underground at the Virginia Skills mine on Chris Penn the three entry tail development long wall panel. We need you to help us determine the air currents and velocities on the panel.

On this panel air intakes up the two entry and belt air intakes up the three entry and returns down the one entry.

We need you to get us an anemometer reading in the #2 intake entry and a smoke tube reading in the #3 belt track entry. Also we need you to get us a pressure reading from the port in the permanent stopping between the #2 and #1 entry.

Thank you for your help and accurate reading are very important to helping us understand the conditions in the mine at this time.

June 25-27 2024

Abingdon Va

VIRGINIA Energy

HiEd SOUTHWEST VIRGINIA HIGHER EDUCATION CENTER

VA POST NO 7 MINE RESCUE

METALLURGICAL COAL PRODUCERS ASSOCIATION

SOUTHWEST VIRGINIA HIGHER EDUCATION CENTER 1 PARTNERSHIP CIRCLE

SMOKE TUBE READINGS AND AREA
(THIS PAGE IS TO BE GAVE TO THE TEAM)

Smoke Tube Area

24’ Wide
10’ High

Quadrant 1 time is 13 seconds

Quadrant 2 time is 11 seconds

Quadrant 3 time is 16 seconds

Quadrant 4 time is 14 seconds

SMOKE TUBE READINGS AND AREA CALCULATIONS (For Judging Only)

Avg Width: 24

Avg Height: 10 Area Equals W X H :240

Quadrant 1 time is 13 seconds
Quadrant 2 time is 11 seconds
Quadrant 3 time is 16 seconds
Quadrant 4 time is 14 seconds

Add all 4 together Total= 54
Total 54 Divided by 4 is 13.5 average seconds

10 feet Divided by average seconds(13.5) is .74 FPS

FPS (.74)X 60 = 44.4 FPM

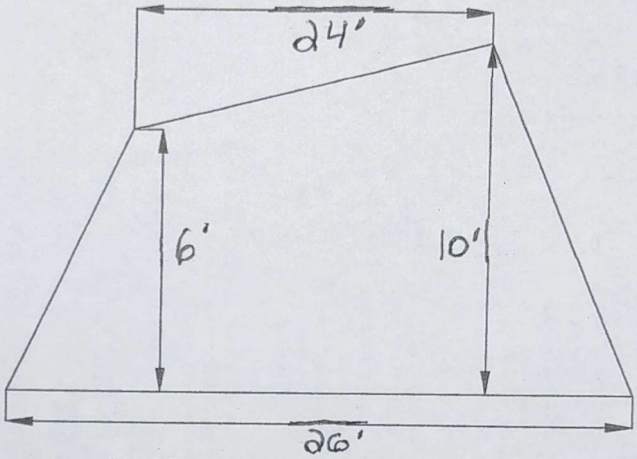
Area 240 X 44.4 FPM = 10,656 is CFM

ANEMOMETER PARAMETERTS, CORRECTION CHART, AND PICTURE OF ANEMOMETER (TO BE GIVEN TO THE TEAM AFTER MEASURING AREA AND TAKING AIR READING). THE NEXT TWO PAGES SHALL BE GIVEN TO THE TEAM.

ANEMOMETER PARAMETERS

PICTURE OF AREA MEASURMENTS AND CORRECTION FACTOR (GIVE THIS TO THE TEAM).

ANEMOMETER PARAMETERS

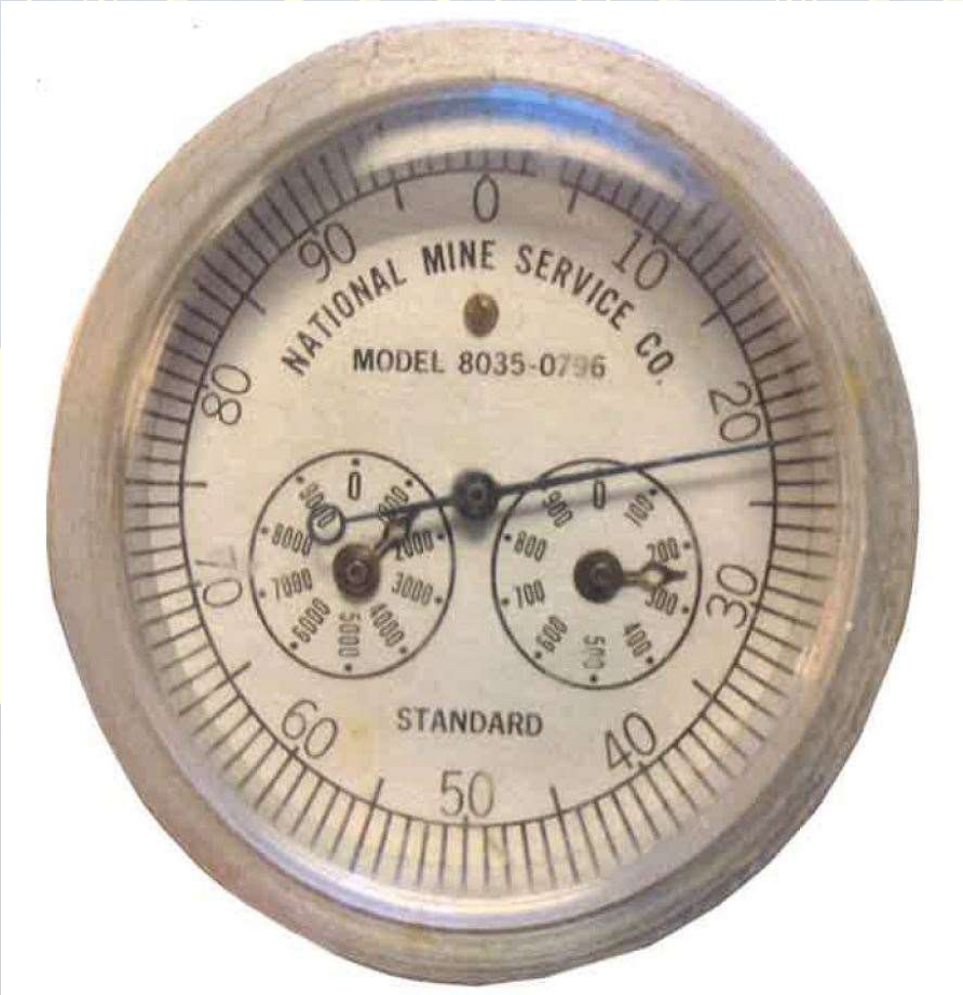


Air Measurement Station

Reading (fpm)	Correction	Reading (fpm)	Correction
50	+15	500	-5
75	+15	550	-8
100	+14	600	-10
125	+14	700	-15
150	+14	800	-20
175	+13	900	-25
200	+12	1000	-30
250	+11	1200	-35
300	+10	1400	-45
350	+5	1600	-50
400	0	1800	-60
450	-2	2000	-65

Correction chart to be used for contest

PICTURE OF ANEMOMETER READING (GIVE THIS TO THE TEAM).



OVERMOUNTAIN

MINE RESCUE MEET

Abingdon Va

SOUTHWEST VIRGINIA HIGHER EDUCATION CENTER 1 PARTNERSHIP CIRCLE

ANEMOMETER CALCULATIONS

For Judging Purposes Only

Avg Height: 8

Avg Width: 25

W 25 X H 8 = AREA 200

ANEMOMETER READING 1,222

CORRECTION FACTOR -35 = 1187 FPM

AREA 200 X VELOCITY 1187 =

CFM 237,400

MANEHELIC PRESSURE GUAGE READING (GIVE THIS TO THE TEAM).

OVERMOUNTAIN

MINE RESCUE MEET

MANEHELIC PRESSURE GUAGE READING

POSITIVE / NEGATIVE: Negative

PRESSURE READING: -6

June 25-27 2024

Abingdon Va

SOUTHWEST VIRGINIA HIGHER EDUCATION CENTER 1 PARTNERSHIP CIRCLE

Air Calculation Worksheet

A worksheet will be provided and is to be completed by each contestant to document final air readings for the anemometer, smoke tube and magnehelic portions of the contest.

The completed worksheet will be returned to the judge(s) at the completion of the problem.

Smoke Tube Reading

Pull 10 foot out on the tape measure in the entry and observe the time it takes for a puff of smoke to travel the length of the 10 foot tape measure in each of four quadrants;

1st quadrant____seconds *Space for calculations*

2nd quadrant____seconds

3rd quadrant____seconds

4th quadrant____seconds

Total____/4 = average time

Distance in Feet (10)/Average time = _____feet per second (FPS).

FPS x 60 (seconds/minute) =_____FPM

Entry width_____x Entry height _____= _____SF (area in square feet)

Area_____x FPM velocity _____= _____CFM

Anemometer Reading

Entry width_____x Entry height _____= _____SF (area in square feet)

FPM reading _____+ or – correction factor = _____corrected FPM

Area _____x (corrected) FPM velocity _____= _____CFM

Space for calculations

Magnehelic gauge

Record dial reading _____ Positive_____ Negative_____

Air Calculation Worksheet Complete (For Judges Purposes Only)

Air Calculation Worksheet

A worksheet will be provided and is to be completed by each contestant to document final air readings for the anemometer, smoke tube and magnehelic portions of the contest.

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Smoke Tube Reading

Pull 10 foot out on the tape measure in the entry and observe the time it takes for a puff of smoke to travel the length of the 10 foot tape measure in each of four quadrants;

1st quadrant 13 seconds *Space for calculations*

2nd quadrant 11 seconds

3rd quadrant 16 seconds

4th quadrant 14 seconds

Total 13.5/4 = average time

Distance in Feet (10)/Average time = .74 feet per second (FPS).

.74
FPS x 60 (seconds/minute) = 44.4 FPM

Entry width 24 x Entry height 10 = 240 SF (area in square feet)

Area 240 x FPM velocity 44.4 = 10656 CFM

Anemometer Reading

AUG AUG
Entry width 25 x Entry height 8 = 200 SF (area in square feet)

-35
FPM reading 1222 + or - correction factor = 1187 corrected FPM

Area 200 x (corrected) FPM velocity 1187 = 237400 CFM

Space for calculations

Magnehelic gauge

Record dial reading -6 Positive _____ Negative ✓

Filed Set Up Diagram