

***** EXAMINATION *****

TUNNELS AND SHAFTS IN ROCK

1. **Where rock is unstable, the following may occur:**
 - a) vibration
 - b) raveling
 - c) stable groundwater
 - d) None of the above.

2. **Align-implementation is the responsibility of the:**
 - a) Geologist
 - b) Project engineer
 - c) Environmental engineer
 - d) Hydraulics engineer

3. **Selection of the underground components is made by:**
 - a) hydraulics engineers
 - b) project engineer
 - c) structural engineer
 - d) geologist

4. **Ground support requirements are made by:**
 - a) geotechnical engineers
 - b) hydraulics engineers
 - c) project engineers
 - d) structural engineers

5. **Mapping of the tunnel and selection of the coordinate system are**
 - a) made by geotechnical engineers
 - b) made by structural engineers
 - c) made by civil engineers or surveyors
 - d) None of the above.

6. **The geologic stratigraphy and structure allow classification of:**
 - a) rock types
 - b) geologic boundaries
 - c) hydrologic hazards
 - d) All of the above

7. **The order of hardness from weakest to strongest is:**
- a) gypsum, Diamond, Fluorite, quartz
 - b) gypsum, Fluorite, Quartz, Diamond
 - c) fluorite, Gypsum, Diamond, Quartz
 - d) fluorite, quartz, gypsum, diamond
8. **Rocks type classifications are:**
- a) igneous, sedimentary, and metamorphic
 - b) sandstone, siltstone, mudstone
 - c) basalt, rhyolite, obsidian
 - d) None of the above
9. **Type of metamorphic rocks include:**
- a) Sandstone
 - b) limestone
 - c) gypsum
 - d) gneiss
10. **Sub-classification of the three major rocks types involve:**
- a) mineral composition, grain size, and texture
 - b) porosity
 - c) permeability
 - d) compressibility
11. **Crystal size is dependent on:**
- a) area hydrology
 - b) number of elements
 - c) the rate of cooling
 - d) None of the above
12. **The porosity of a rock effects the:**
- a) conductivity
 - b) permeability and strength
 - c) type of plant life
 - d) None of the above
13. **The properties of rock discontinuities include:**
- a) orientation
 - b) conductivity
 - c) usability
 - d) None of the above
14. **The RQD measure is employed to evaluate:**
- a) hydrology
 - b) orientation
 - c) fallibility
 - d) slope stability

15. **Groundwater barriers are:**
- a) aquitards
 - b) constant
 - c) always man-made
 - d) None of the above
16. **Gases in tunnels occur:**
- a) Sometimes
 - b) Rarely
 - c) Never
 - d) Always
17. **Predictability of gas to be encountered in a drilling project:**
- a) can be determined by the rock type
 - b) is a function of the hydrology
 - c) is best determined by past area history
 - d) None of the above
18. **The most common gas encountered during tunnel excavation is:**
- a) propane
 - b) methane
 - c) butane
 - d) sulfur trioxide
19. **Methane mixed with air explodes at:**
- a) 1% to 3%
 - b) 5% to 15%
 - c) 15% to 25%
 - d) None of the above.
20. **Hydrogen sulfide is encountered when tunneling near:**
- a) mountains
 - b) desert
 - c) lakes
 - d) sewers

GEOGRAPHIC INFORMATION SYSTEMS
 GEOGRAPHIC INFORMATION CENTER
 PO BOX 5839
 MC ALLEN, TEXAS 78502-5839

1-800-522-0139

kh@acnet.net
 Copyright 2012

<p>*** ANSWER SHEET *** U9</p> <p>TUNNELS AND SHAFTS IN ROCK</p>	<p>STATE BOARD</p>	<p>COURSE NO.</p>	<p>VALUE</p>
			<p>8 PDH</p>
<p>Office Use Only</p>			

FILL IN ONE BOX FOR EACH ANSWER.

	A	B	C	D
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				

I hereby certify that I studied the course materials, and the above
 Answers are my own. No other person has helped me to complete this exam.

 Signature

 Date

 Printed or typed name

 Seal or Number

**GEOGRAPHIC INFORMATION SYSTEMS
GEOGRAPHIC INFORMATION CENTER
PO BOX 5839
MC ALLEN, TEXAS 78502-5839**

**1-800-522-0139
kh@acnet.net
Copyright 2012**

Name _____

Company _____

Address _____

City _____ State _____ Zip _____

Telephone _____ E-Mail _____

Fax _____ () 24-Hour Fax

() Yes () No If fax and telephone are the same number, shall we call first?

Mail certificates to above address _____ check address _____ envelope address _____

State + Specialty + PE Registration number (i.e. TX EE 12389) _____

State + Professional Land Surveying registration number _____

NC (North Carolina) + Specialty + PE Registration number _____

NC (North Carolina) + Land Surveying Registration Number _____

Professional Affiliations _____

Return this page with your answer sheet and a check or money order for \$100 per course. Use one check for each registrant (in your company) taking one or more courses. We accept company checks (if they are your employer's). We do not accept third-party checks or checks outside of your city of residence. Using third-party checks that do not include your name or company name may invalidate your professional development hours being reviewed by an audit process. Add \$5 for same day processing and priority shipping.

Make checks or money orders payable to Geographic Information Systems.

