B.E. Mining Engineering Fifth Semester

# MN506 - Mine Supports

P. Pages : 3 **GUG/W/18/1656**

Time : Three Hours * 1 3 0 5 * Max. Marks : 80

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Notes : 1. Due credit will be given to neatness and adequate dimensions.
2. Assume suitable data wherever necessary.
3. Diagrams and Chemical equation should be given wherever necessary.
4. Illustrate your answers wherever necessary with the help of neat sketches.
5. Marks have been given against each question.

**1.** a) Differentiate **9**
i) Weak strata and strong strata
ii) Ground Reaction curve and support reaction curve.
iii) Active support and passive support

b) Enlist the parameter considered for Rock mass classification by CMRI. Calculate the total static load on face support of a L/w face of **7**
ht of Extraction = 2.8m
Swelling factor = 1.15
Span = 6m
Length of face – 120m
Density of rock = 2.35T/$m^3$.

**OR**

**2.** a) Explain the mechanism of load coming on L/w face support. **6**

b) Explain the classification of support on action and Reaction. **4**

c) Calculate the total rock load over a gallery of 4m width and upto 10m length of face is to be blasted off solid under following conditions. **6**

| Strata | Thickness | RMR | Density |
|---|---|---|---|
| 1 | 0.3m | 56 | 1.4t/$m^3$ |
| 2 | 0.2m | 61 | 2.6t/$m^3$ |
| 3 | 1.7m | 65 | 2.5t/$m^3$ |

**3.** a) Explain the characteristics of preservatives. **6**

b) Why a timber prop should be directed with lid and wedge. Give dimension of the following **6**
i) lid
ii) wedge
iii) sleeper used for wooden chock

c) Explain the factors governing load bearing capacity of timber prop. **4**

**OR**

**4.** a) Explain the working principle of Friction prop. **4**

b) Enlist the essential component of a self advancing powered support (chock-shield) and explain its function. **6**

c) Explain automated control of powered support. **6**

**5.** a) Enlist the characteristics of a stowing material suitable for hydraulic stowing. **6**

b) Calculate the ht of mixing chamber of sand – stowing plant under following conditions **10**
Production – 600 TPD of coal
% void dwing dev – 25
Stowing efficiency = 95%
Density of stowing material – 2.60 $T/m^3$
Porosity – 30%
Stowing material to water ratio = 1: 3.5
Length of horizontal transport – 1500m
Assume suitable data if required

**OR**

**6.** a) Calculate sand water requirement for a depillaring pannel producing 700 TPD of coal assume suitable data if required. **6**

b) Describe pneumatic stowing with merits and demerits. **6**

c) Define and explain the importance of hydraulic profile and hydraulic gradient. With suitable curve. **4**

**7.** a) Enlist the various type of stress coming on a shaft wall and also write formula for stresses and thickness of concrete lining. **8**

b) Enlist various types of pillars. **4**

c) Explain the method of supporting gate roads of advancing L/w system. **4**

**OR**

**8.** a) With respect to shotcreting / guniting explain following term. **6**
i) Dry shotcrete
ii) Reinforced shotcrete
iii) Set Retarder

b) Calculate the thickness of concrete lining for shaft having. **10**
dia – 5m
depth – 300m
density – 2.4$t/m^3$
internal angle of friction = $30^o$
porosity – 30%
100 m of rock is submerged in water strength of concrete – 225$kg/cm^2$.
Assume any data if required.

**9.** a) Explain the classification of bolt. **6**

b) Calculate the bolt load if bolt is to act in suspension from following data. **10**

| Strata | Thickness | Density | RMR |
|---|---|---|---|
| 1 | 0.3m | 1.4t/$m^3$ | 56 |
| 2 | 0.3m | 2.6t/$m^3$ | 62 |
| 3 | 1.5m | 2.5t/$m^3$ | 65 |

adjustment factor – 0.9
span – 4m
length – 10m
FoS – 2
no of row of bolt – .5
no of bolt in one row – 4
also calculate the interval between two bolt in a row and between two rows.

**OR**

**10.** a) Explain mechanics of bolting. **6**

b) Explain Roof stitching. **6**

c) Write the expression for anchorage capacity for **4**
i) Slot and wedge bolt
ii) Expansion shell bolt

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