

22252

23124

3 Hours / 70 Marks

Seat No.

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- Instructions :**
- (1) All Questions are *compulsory*.
 - (2) Illustrate your answers with neat sketches wherever necessary.
 - (3) Figures to the right indicate full marks.
 - (4) Assume suitable data, if necessary.
 - (5) Use of Non-programmable Electronic Pocket Calculator is permissible.
 - (6) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. Attempt any FIVE of the following :

10

- (a) Define fire damp and white damp.
- (b) Enlist any four safety features of flame safety lamp.
- (c) Define motive column and write its formula.
- (d) Write the classification table of coal mine as per degree of gassiness.
- (e) State the fan laws which govern the passage of air in mines.
- (f) Write the conventional signs on ventilation plan
 - (i) Explosion proof air crossing
 - (ii) Water dam
- (g) Write the formula for cooling power of a mine.



- 2. Attempt any TWO of the following : 12**
- (a) What are the effects of seasonal changes on natural ventilation pressure ?
 - (b) State the standards of ventilation.
 - (c) What is ascensional and descensional ventilation ? Explain with diagram.
- 3. Attempt any TWO of the following : 12**
- (a) Calculate the w.g. produced by a 3 m dia. Fan running at 250 rpm and 6000 m³/min of air, if the blades are : (i) radial (ii) bent backwards at 35°, (iii) bent forward at 35°.
Assume velocity flow = 3m/sec., air density = 1.2 kg/m³.
 - (b) Mean air temp. in a D.C. shaft 400 m deep is 28 °C and in U.C. shaft is 38 °C. Calculate (i) the motive column and (ii) the N.V.P. assuming average barometric pressure in D.C. shaft to be 750 mm of Hg.
 - (c) Differentiate between air screw and centrifugal fan.
- 4. Attempt any TWO of the following : 12**
- (a) Compare Exhaust fan with forcing fan.
 - (b) Explain theoretical depression and effective depression in connection with fan.
 - (c) State the purpose of booster fan and what are the dangers associated with installing of booster fan ?
- 5. Attempt any TWO of the following : 12**
- (a) Explain equivalent orifice and give its formulae.
 - (b) How will you measure relative humidity using whirling hygrometer ?
 - (c) Explain anemometer. How will you measure the air velocity in mine ?

6. Attempt any THREE of the following :**12**

- (a) Three underground roadways in parallel spread out from a point near the bottom of a D.C. shaft and join at a point near the bottom of the U.C. shaft. The parallel roadways have resistance of 9, 16 and 25 kilomurg respectively. The resistance of the fan drift is 1 kilomurg and the D.C. shaft and U.C. shaft 2 kilomurg and 3 kilomurg including the connecting trunk roads. Calculate the combined resistance of the whole mine.

If the w.g. developed by the fan is 153 mm, calculate the quantity of air that passes through whole mine & through each split.

- (b) Draw a neat sketch of air crossing and regulator, explain its working.
- (c) What is the importance of ventilation survey in mines ?
- (d) State the factors causing N.V.P.
- (e) State the difference between GL50 and GL60 FSL.
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