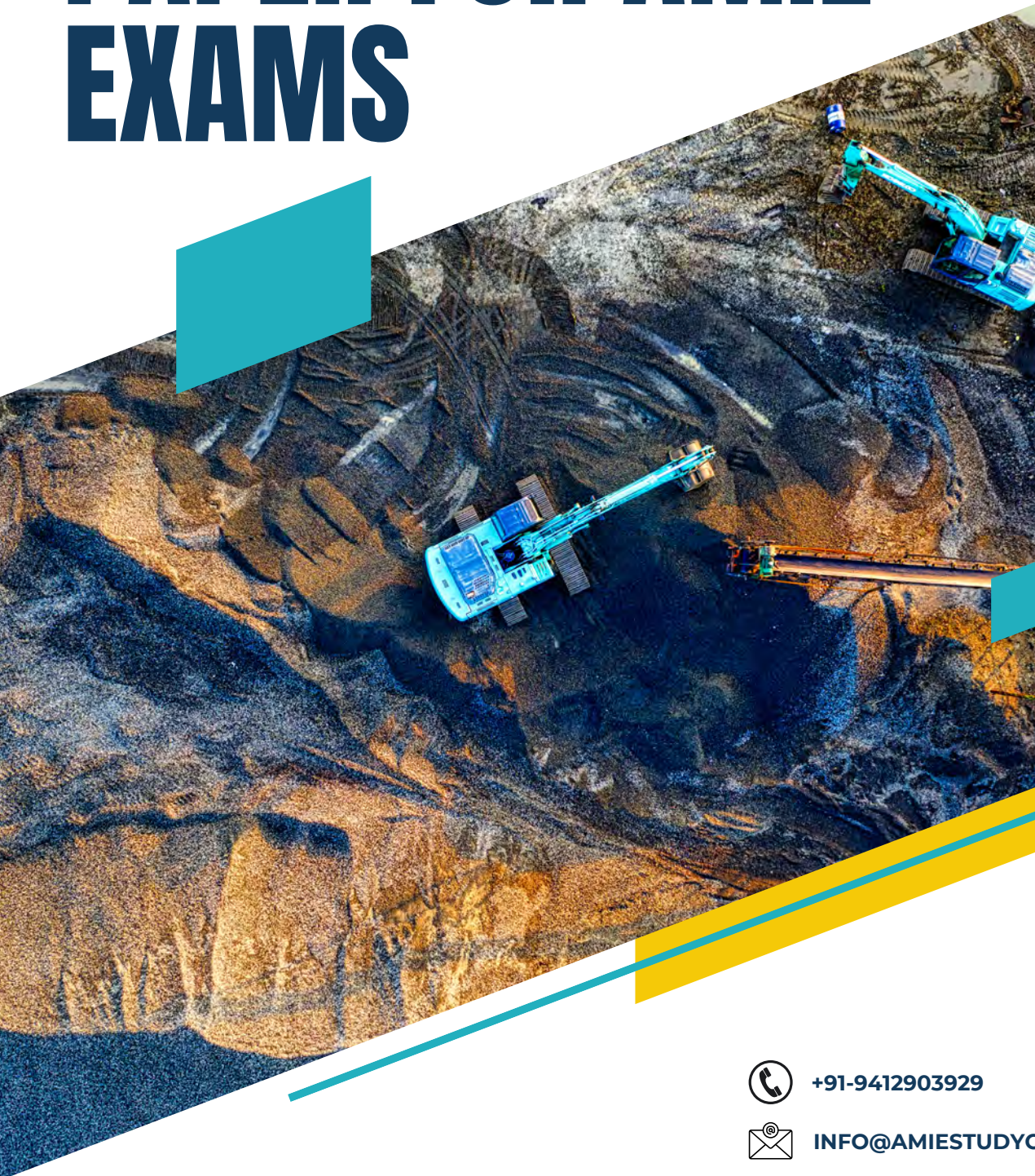


MODEL TEST PAPER FOR AMIE EXAMS



**MINING MACHINERY &
MATERIAL HANDLING**

TEST PAPER 1



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MINING MACHINERY & MATERIAL HANDLING*Time: Three Hours**Maximum Marks: 100*

Answer five questions, taking ANY TWO from Group A, any two from Group B and all from Group C.

All parts of a question (a, b, etc.) should be answered at one place.

Answer should be brief and to-the-point and be supplemented with neat sketches.

Unnecessary long answer may result in loss of marks.

Any missing or wrong data may be assumed suitably giving proper justification.

Figures on the right-hand side margin indicate full marks.

Group A

1. (a) Write the factors considered for selection of wire rope. What are the causes of rope deterioration? What are the reasons for ropes becoming fatigue? 10
- (b) Explain the principle of friction winding system. Compare friction winding system with the drum winding system. 10
2. (a) How torque is developed by a winding engine? Differentiate static torque and dynamic torque. 10
- (b) Explain the torque-time and power time diagram of Koepe winder. 10
3. (a) Name various types of rope haulage used underground and describe one type in detail with neat sketches. 10
- (b) Distinguish between (i) IWRC and SSC rope and (ii) locked coil rope and flat rope. 10
4. (a) An endless haulage operates on a roadway 850 m long dipping at 1 in 16 and draws 400 ton of coal in a shaft of effective 5 hr time. The load weighs 1400 kgf each and empties 500 kgf. Rope dia = 28 mm, tub friction = 1/40, rope friction = 1/20, rope speed = 3 kmph. Estimate the requirement of power when loads are pulled up the gradient. 10

- (b) Narrate the basic construction of centrifugal pump and its operation. Why installation of centrifugal pump in underground mining is preferred? 10

Group B

5. (a) On what factors SDL-based mine operation system depend? What are the reasons for poor performance of SDL in Indian underground mines? 10
- (b) Draw a suitable layout of 5 level heading Bord and Pillar district where three SDL's are deployed. The transport system runs on combination of scraper chain and belt conveyors. You are to show different patterns of SDL deployment in the said district and to focus on the best combination where output per SDL can be maximum and thereby idle hours of each machine will be minimum. 10
6. (a) Discuss the constructional features, working and applicability of drill machine used in mines. 10
- (b) Sketch and describe the operation of low height low capacity continuous miner (LHLCCM) used for drivage and cutting of coal from short and medium coal pillar in underground. 10
7. (a) Discuss the recent developments took place in bulk material handling technology. 10
- (b) Discuss constructional features, applications and limitations of a belt conveyor system for haulage of iron ore from mines to crushing plant. 10
8. (a) Sketch and describe at least two different types of high angle conveyor (HAC) for the purpose of bulk material transportation. 10
- (b) A conveyor is 600 m long and carrying coal of bulk density 0.8 ton/m³ up a gradient of 1 in 60 at the rate of 220 ton/hr. If belt width is 0.75 m and cross sectional area of the material is one tenth of square of the belt width, then determine belt speed. 10

Group C

9. Answer the following in brief: 20

- (i) A continuous miner is a
 - (a) cutting-cum-loading equipment.
 - (b) cutting equipment
 - (c) loading equipment.
 - (d) transporting equipment
- (ii) Under which of the following system Zener barriers are associated ?
 - (a) Increased safety
 - (b) Intrinsic safety
 - (c) Flame proof
 - (d) Statistical safety
- (iii) To make a hole through a tough abrasive rock, you will select
 - (a) high rpm rotary electric drill.
 - (b) rotary hydraulic drill.
 - (c) pneumatic rotary percussive drill.
- (iv) To increase the discharge head of a centrifugal pump,
 - (a) reduce the diameter of a delivery pipe.
 - (b) increase the motor power.
 - (c) reduce the diameter of the suction pipe.
 - (d) increase the motor rpm and power.
- (v) The reasons for cavitations in a turbine pump are
 - (a) when the total suction head reaches about 10 m.
 - (b) when water temperature is high.
 - (c) when delivery pipe length is long.
 - (d) when there is leakage in the delivery pipe.
- (vi) The endless rope haulage is adopted in Indian mines because of its
 - (a) applicability to a wide range of mining conditions.
 - (b) flexibility and economy.
 - (c) applicability in steeply inclined seams.
 - (d) high speed performance.
- (vii) If the track gauge of underground haulage is 0.6 m radius of curve 2 m, velocity of train 2 m/s, then the amount of superelevation is.
 - (a) 0.02

- (b) 0.12
 - (c) 0.22
 - (d) 0.32
- (viii) Turbine or centrifugal pump works at its best efficiency while dealing with
- (a) simple volute casing.
 - (b) reduced head.
 - (c) exact head.
 - (d) diffusion channel.
- (ix) Which one of the following haulages is preferred for undulating roadways?
- (a) Direct rope haulage
 - (b) Endless haulage
 - (c) Tail rope haulage
 - (d) Main arid tail rope haulage.
- (x) As per mining regulation, for every shaft exceeding 100 m depth and during hoisting men, the speed should not exceed
- (a) 0.5 m/s
 - (b) 1 m/s
 - (c) 1.5 m/s
 - (d) 5 m/s

(Refer our course material for answers)