

Name:

Enrolment No:



UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

End Semester Examination, July- 2020

Course Name: Underground Coal Mining.

Semester: VI

Programme Name: B. Tech, Mining Engineering

Time: 03 hrs

Course Code: PEMI 3004

Max. Marks: 100

SECTION A (60 Marks)

S. No.		Marks	CO
Q 1	<p><u>Choose the best alternative answer</u></p> <p>i) The Direct haulage can be operated in _____ for a U/G Coal Mine. (surface / underground / surface & underground)</p> <p>ii) Rope splicing is not allowed in _____ . (Direct haulage / Man winding / Both of them)</p> <p>iii) The limiting gradient for a Locomotive is _____ . (1 in 10 / 1 in 15 / 1 in 20)</p> <p>iv) Exhaust conditioner is an important part of _____ locomotive. (Electric battery / Diesel / Trolley wire)</p> <p>v) When a series of belt conveyors are used for loading, the _____ should be started first. (outermost belt / innermost belt / inner- and outer-most belt)</p> <p>vi) The most flexible conveyor for curves is _____ . (Belt conveyor / Scraper chain conveyor / AFC)</p> <p>vii) The Bridge Stage Loader used mainly for _____ from face. (increase loading quantity / increase loading rate / change loading direction)</p> <p>viii) Friction winder does not have _____ . (rope guides / keps / tail rope)</p> <p>ix) For recapping of rope, _____ rope has to be from the capel end. (minimum 2 m / minimum 3 m / minimum 5 m)</p> <p>x) Bending stress is the least for _____ . (Drum winder / Ground-friction winder / Tower-friction winder)</p>	10	CO1
Q 2	<p><u>Put TRUE/FALSE for the following questions:</u></p> <p>i) Main rope length is twice of tail rope in Main & Tail haulage.</p> <p>ii) Run-away switch and Stop-block have to operative always in haulage track.</p> <p>iii) The Co-efficient of friction and Co-efficient of adhesion are different parameters.</p> <p>iv) The main purpose of Snub pulley is to increase the contact between pulley and belt.</p> <p>v) The fleet angle is limited upto 4 degree.</p>	6+4= 10	CO1

	<p>vi) Bell plate is an assembly of the cage fittings.</p> <p><u>B) Match the following column</u></p> <table border="0"> <tr> <td>i) <i>Rope Haulage</i></td> <td><i>Location to be placed</i></td> </tr> <tr> <td>a) Direct haulage</td> <td>Horizontal and wide roadway</td> </tr> <tr> <td>b) Endless haulage</td> <td>Undulating narrow roadways</td> </tr> <tr> <td>c) Main & Tail Rope haulage</td> <td>Lower level of a slope</td> </tr> <tr> <td>d) Tail rope haulage</td> <td>Top of the Incline</td> </tr> </table>	i) <i>Rope Haulage</i>	<i>Location to be placed</i>	a) Direct haulage	Horizontal and wide roadway	b) Endless haulage	Undulating narrow roadways	c) Main & Tail Rope haulage	Lower level of a slope	d) Tail rope haulage	Top of the Incline										
i) <i>Rope Haulage</i>	<i>Location to be placed</i>																				
a) Direct haulage	Horizontal and wide roadway																				
b) Endless haulage	Undulating narrow roadways																				
c) Main & Tail Rope haulage	Lower level of a slope																				
d) Tail rope haulage	Top of the Incline																				
Q 3	<p><u>A) Put TRUE/FALSE for the following questions:</u></p> <p>i) As per CMR, TWO turns of rope should be placed on winder when cage/skip is at the lowest level.</p> <p>ii) As the angle of wrap increases, the power transmitted is reduced.</p> <p><u>B) Match the following column:</u></p> <table border="0"> <tr> <td>i) <i>Haulage safety devices</i></td> <td><i>Description</i></td> </tr> <tr> <td>a) Back catch tub</td> <td>Iron rod with a sharp end fitted at the back of last tub</td> </tr> <tr> <td>b) Back stay</td> <td>Iron plate fixed on track, works as shifting of weight</td> </tr> <tr> <td>c) Jazz rail</td> <td>Steel girder hinged in the roof of lower level of slope to arrest set of tubs going down</td> </tr> <tr> <td>d) Drop warwick</td> <td>A curve -shaped path made on the track to derail an over-speeding set of tubs</td> </tr> <tr> <td>ii) <i>Conveyor belt material</i></td> <td><i>Associated problems</i></td> </tr> <tr> <td>a) Nylon fabric</td> <td>High cost</td> </tr> <tr> <td>b) Cotton Carcass</td> <td>Susceptible to moisutre/ fungus formation</td> </tr> <tr> <td>c) PVC belt</td> <td>Low co-efficient of friction</td> </tr> </table> <p>Rubber coated belt Inclination 1 in 5 without brake</p>	i) <i>Haulage safety devices</i>	<i>Description</i>	a) Back catch tub	Iron rod with a sharp end fitted at the back of last tub	b) Back stay	Iron plate fixed on track, works as shifting of weight	c) Jazz rail	Steel girder hinged in the roof of lower level of slope to arrest set of tubs going down	d) Drop warwick	A curve -shaped path made on the track to derail an over-speeding set of tubs	ii) <i>Conveyor belt material</i>	<i>Associated problems</i>	a) Nylon fabric	High cost	b) Cotton Carcass	Susceptible to moisutre/ fungus formation	c) PVC belt	Low co-efficient of friction	2+8 =10	CO1
i) <i>Haulage safety devices</i>	<i>Description</i>																				
a) Back catch tub	Iron rod with a sharp end fitted at the back of last tub																				
b) Back stay	Iron plate fixed on track, works as shifting of weight																				
c) Jazz rail	Steel girder hinged in the roof of lower level of slope to arrest set of tubs going down																				
d) Drop warwick	A curve -shaped path made on the track to derail an over-speeding set of tubs																				
ii) <i>Conveyor belt material</i>	<i>Associated problems</i>																				
a) Nylon fabric	High cost																				
b) Cotton Carcass	Susceptible to moisutre/ fungus formation																				
c) PVC belt	Low co-efficient of friction																				
Q 4	<p><u>A) Choose the best alternative answer:</u></p> <p>i) In India, which frequency rate is not applicable? _____ (One lakh man-shifts worked / 1000 persons employed / One million man hours worked)</p> <p>ii) The Safety factor of the roof bolt is decided as _____. (Support load by Vertical stress / Support load by Likely rock load / Support load by Failure load of the bolt)</p> <p>iii) Uncollapsed roof over an extensive area is more dangerous for _____. (Roof fall / Air blast / Subsidence at surface)</p> <p>iv) Mine Shelter should be placed at TWO right angle to take precaution from _____ (Blasting fumes / Flyrock / Ground Vibration)</p> <p>v) Severity Index of Accidents is related to _____. (Person died / Man-days lost / Frequency rate)</p>	5+5 =10	CO2																		

	<p><u>B) Put TRUE/FALSE for the following questions:</u></p> <ul style="list-style-type: none"> i) Main advantage to use Friction winder in deep mines is less rope length ii) In Heinrich safety philosophy, only 2% of accidents are due to natural causes. iii) Unsafe Acts are affecting more than unsafe Conditions for and Accident. iv) Dominos concept helps to identify & remove the cause of accident to prevent accident. v) Accident report has to be submitted by manager within 15 days of a fatal / serious accident. 		
Q 5	<p><u>A) Choose the best alternative answer</u></p> <ul style="list-style-type: none"> i) There is no shock load on the cage/skip for friction winder, as _____ is not present. (over coiling / keps/ tail rope) ii) Use of a Tail rope generally reduces the _____ in winding. (swinging of cage / over-speed / starting torque) iii) The limit of seam extraction in Bord & Pillar depillaring in a single lift is _____. (3 m / 4 m / 4.8 m) iv) The depth of extraction river-bed for Sand Mining is _____. (upto 5 m / upto 3 m / upto 2 m) v) The most negative effect of Thick Seam Mining is _____. (Spontaneous combustion / Reduction of coal grade / Roof fall due to large extraction) <p><u>B) Put TRUE/FALSE for the following questions</u></p> <ul style="list-style-type: none"> i) The distance between the two faces when workers from both faces are removed for blasting is 5 m. ii) Automatic contrivance will be applicable automatically when cage speed is more than 1.5 m/s. iii) At sinking shafts, only Drum winders are preferable. iv) Each Travelling roadway shall be at least 1.5 m high to its entire length . v) In Systematic Timbering, the front row-props are to be set not more than 1 m from face. 	5+5 =10	CO3
Q6	<p><u>A) Put TRUE/FALSE for the following questions</u></p> <ul style="list-style-type: none"> i) Generally, Sand/gravel mining is always done in downstream section of a river. ii) For a sustainable mining, no streams should be diverted for the purpose of sand mining. <p><u>B) Match the following column:</u></p> <ul style="list-style-type: none"> i) <i>Conveyor belt part</i> <i>Purpose</i> 	2+8 =10	CO4

	<p>a) Cushioning Rollers Safety device to stop belt upon any problem detected</p> <p>b) Holdback Provide less wear and tear of belt at collection point</p> <p>c) Loop take-up Provide extra length of belt when necessary</p> <p>d) Pull chord Arrest backward motion of the belt when swtiched off</p>		
	<p>ii) <i>Safety Arrangements in Man Winding</i></p> <p>a) Automatic Contrivance</p> <p>b) Safety catches</p> <p>c) Bell plate</p> <p>d) Detaching Safety Hook platform</p>	<p><i>Location</i></p> <p>Cage suspension gears</p> <p>On Winder</p> <p>At Headgear cage guides</p> <p>On Headgear horizontal platform</p>	

SECTION B (40 Marks)

Q 7	Propose the general approach to Sustainable Sand and Gravel Mining.	10	CO4
Q 8	Differentiate between Belt Conveyor and Direct Haulage transport.	10	CO1
Q 9	Review the Theory of Multiple Causation with an example.	08	CO1
Q 10	Examine the Causes of accidents from Explosives in U/G Coal Mines	12	CO2