

SET 1

Name:	
Enrolment No:	



UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, December 2018

Course: B. Tech (Mining Engineering) B1

Semester: VII

Programme: Material Handling System

Course Code: GSEG 421

Time: 03 hrs.

Max. Marks: 100

Instructions: All questions are compulsory

SECTION A

S. No.		Marks	CO
Q 1	Explain in brief the single rope friction winder with suitable sketch?	4	CO1
Q 2	Describe Pitbottom circuit in brief?	4	CO2
Q 3	Evaluate the belt drive factor for coefficient of sliding friction 0.25 and wrap angles (i) 180 degree (ii) 390 degree respectively?	2 + 2	CO3
Q 4	Describe the construction features of mono-cable ropeway in brief?	4	CO5
Q 5	Comments on selection factors of load haul dumper (LHD)?	4	CO6

SECTION B

Q 6	Describe the power distribution between two pulleys in double pulley belt conveyor system and support your argument with neat sketch?	10	CO3
Q 7	Determine the motor power of shaker conveyor of length 50 mm, if the conveyor is conveying lump coal material of maximum size 210 mm, bulk density 0.8 t/h, stroke frequency 2 Hz, and drive efficiency 80 %.	10	CO4
Q 8	Determine the power requirement in bi-cable ropeway when transporting the material uphill and downhill with ropeway of capacity 130 t/h, station friction power is 3 kW, line length 800 m and difference in level between loading and discharge station is 200 m.	10	CO5
Q 9	Describe in detail the construction features, advantages and disadvantages of load haul dumper (LHD).	10	
Q 10	OR Describe in detail the construction features of shuttle cars and side discharge loader (SDL).	10	CO6

SECTION-C

	A ground mounted friction winder have a hoisting capacity 250 t/h. The drive is		
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Q 11	<p>powered by twin motor directly connected to the friction drum. The following project data are available as:</p> <ul style="list-style-type: none"> (a) Shaft Depth = 920 m, (b) Cage weight = 4.8 t (c) Pay load = 6.0 t (d) Dump car weight = 3 t (e) Friction wheel diameter = 6.44 m (f) Weight of friction wheel = 14.3 t (g) Acceleration = 0.9 m/s² (h) Retardation = 1 m/s² (i) Rope weight = 10.1 kgf/m (j) GD₂ of deflector pulley = 53.87 tm² (k) GD₂ of winder motor = 106 tm² (l) Radius of gyration = 0.67 (m) Maximum rope speed = 16 m/s (n) Deflector pulley diameter = 5 m <p>Find the following using above hoisting capacity and project data</p> <ul style="list-style-type: none"> (i) Motor Capacity (ii) Motor Speed (iii) Total Time (iv) Length of the path transverse at steady speed and (v) Total referred flywheel moment required for a ground mounted friction winder 	4 + 4 + 4+ 4 + 4	CO2
Q 12	<ul style="list-style-type: none"> (a) Explain in detail the three phase speed-time, load-time and power-time diagram in hoisting system. (b) Explain in detail the different types of pit-top mine circuits with suitable sketch. 	10 + 10	
Q 13	<p style="text-align: center;">OR</p> <ul style="list-style-type: none"> (a) Describe in detail the construction features of scraper haulage with neat sketch. (b) A cable belt conveyor is conveying the lump coal material of bulk density 0.8 t/h at the rate of 100 t/h up a drift 1.2 km in length. The total lift is 200 m. The following project data are available as: <ul style="list-style-type: none"> (a) Mass of the belt = 25 kg/m (b) Mass of the wire rope = 5.06 kg/m (c) Equivalent mass of the linestand pulley = 80 kg/m (d) Coefficient of friction = 0.015 (e) Maximum size of lump material = 210 mm (as per CEMA) (f) Drive efficiency = 90 % <p>Determine the motor power to convey the material.</p> 	10 + 10	CO4

SET 2

Name:	 UPES		
UNIVERSITY OF PETROLEUM AND ENERGY STUDIES End Semester Examination, December 2018			
Course: B. Tech (Mining Engineering) B1	Semester: VII		
Programme: Material Handling System	Course Code: GSEG 421		
Time: 03 hrs.	Max. Marks: 100		
Instructions: All questions are compulsory			
SECTION A			
S. No.		Marks	CO
Q 1	List advantages and disadvantages of multirope friction winder?	4	CO1
Q 2	Identify construction features of skip? Give technical specifications.	2+2	CO2
Q 3	Given: Coefficient of sliding friction 0.25 and for angle of contact 230 degree. Calculate drive factor of belt conveyor?	4	CO3
Q 4	What are the applications of vibrating conveyor?	4	CO5
Q 5	Describe the specifications of side discharge loader (SDL) and its applications.	4	CO6
SECTION B			
Q 6	Draw a suitable sketch for a) three-phase speed-time, b) load-time and c) power-time in hoisting system? Explain each of them, separately.	1+2+1+ 6	CO2
Q 7	Given: Maximum effective tension 27.51 kN, Wrap angle 220 degree, Coefficient of sliding friction 0.621 and belt speed 3 m/s. Determine, a) Maximum tight side tension? b) Slack side tension? c) Power transmitted to the belt conveyor?	10	CO3
Q 8	Explain the characteristic features, advantages and disadvantages of cable belt conveyor. OR	10	CO4
Q 9	Consider the material is transported in mines using the bi-cable ropeway. Given data: a) Ropeway of capacity 13 0 t/h, b) Station friction power is 3 kW, c) Line length 800 m and d) Difference in level between loading and discharge station is 200 m.		

	Calculate power requirement in bi-cable ropeway when transporting the material i) uphill and ii) downhill	5 + 5	
Q 10	A LHD machine employed on open stope loading, operating on a zero grade under average haul road conditions. (a) Ore density: 1.9 t/m^3 (b) Bucket Capacity: 3 m^3 (heaped) but allow a 85 % fill factor for conditions (c) Constant speed: 9.5 km/h (d) One-way haul distance: 170 m (e) Acceleration: 0.4 m/s^2 (f) Deceleration: 0.7 m/s^2 (g) Estimated loading time: 30 s (h) Estimated dumping time: 20 s Calculate productivity potential of a LHD machine under above conditions?	10	CO6
SECTION-C			
Q 11	Consider a drum winder is used to hoist the material from underground mines. The following project data are given as: (a) $H = 230 \text{ m}$, (b) Payload(Q) = 4000 kgf , (c) Weight of the skip (Q_0) = 3950 kgf , (d) Weight of the main rope (p) = 3.1 kgf/m , (e) Rope breaking strength (B) = 57200 kgf , (f) Double drum winder diameter = 3 m , (g) Width = 1.5 m ($2 \times 3 \times 1.5$), (h) Gear ratio = 30 , (i) Motor = 200 Kw and (j) $GDm^2 = 120 \text{ kgfm}^2$. Find (i) the factor of safety (ii) the static unbalanced load of the system (iii) maximum tension (iv) equivalent mass of the system (v) dynamic load when a is 1.22 m/s^2 .	4+4+4+4+4	CO2
Q 12	(a) Describe in details the constructional features of Head Gear using neat sketch. (b) Find the static tensions at each point when distance traveled by the cage/skip are given as: $0, 70, 150, 225$ and 300 m , weight of payload is 2000 kgf , winding depth is 300 m , weight of the main rope is 3.24 kgf/m , weight of the tail rope is 0 kgf/m and resistivity force due to friction and windage is 1.2 . Also, compare the static tensions at all these points when weight of the tail rope is 2.4 kgf/m .	10+10	CO5
Q 13	OR	10 + 10	
	(a) Explain in details the constructional features of Bi-cable ropeway (b) Determine the motor power to convey the lump coal material of bulk density 0.8 t/h at the rate of 100 t/h up a drift 1.2 km in length, with a total lift of 200 m . The mass of the belt is 25 kg/m , mass of the wire rope is 5.06 kg/m , equivalent		

	mass of the linestand pulley is 80 kg/m, coefficient of friction is 0.015. Assume maximum size of lump material as 210 mm (as per CEMA) and drive efficiency 90 %.		
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