UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, December 2019

Programme: B. Tech (Mining Engineering)   Semester: VII
Course: Material Handling System   Time: 03 hrs.
Course Code: GSEG 421   Max. Marks: 100
Instructions: All questions are compulsory

	SECTION A		
S. No.		**Marks**	**CO**
Q 1	Describe the cylindrical drum winder in brief with neat sketch?	**4**	**CO1**
Q 2	Write a short notes on the following a) Rigid Guide b) Flexible Guides	**2+2**	**CO2**
Q 3	Determine the drive factor of belt conveyor for the coefficient of sliding friction 0.25 and angle of contact 230 degree.	**4**	**CO3**
Q 4	Describe the general characteristics of chain conveyor.	**4**	**CO5**
Q 5	Write the advantages and disadvantages of the load haul dumper (LHD) used in the mines.	**4**	**CO6**
	SECTION B		
Q 6	Describe the different types of pit-bottom mine circuits in detail and draw the suitable sketches.	**10**	**CO2**
Q 7	Assume a belt conveyor of maximum effective tension 28 kN, wrap angle 240 degree, coefficient of sliding friction 0.621 and belt speed 3.5 m/s is used to transport the material at the inclined mine. Determine the following using the above data of the conveyor. i) Maximum tight side tension? ii) Slack side tension? and iii) Power transmitted to the belt conveyor?	**3+3+4**	**CO3**
Q 8	Describe the constructional features of Head Gear in details with neat sketch. OR	**10**	**CO4**
Q 9	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/m^3, the stroke frequency is 2 Hz, and drive efficiency is 80 %.	**10**	
Q 10	A LHD machine employed on open stope loading, operating on a zero grade under average haul road conditions. (a) Ore density: 2 t/m^3 (b) Bucket Capacity: 3.5 m^3 (heaped) but allow a 90 % fill factor for conditions (c) Constant speed: 10 km/h (d) One-way haul distance: 175 m	**10**	**CO6**

	(e) Acceleration: 0.5 m/s^2 (f) Deceleration: 0.9 m/s^2 (g) Estimated loading time: 25 s (h) Estimated dumping time: 20 s Calculate LHD vehicle if the total ownership and operating cost are Rs. 1500/h?		
	SECTION-C		
Q 11	Consider a drum winder is used to hoist the material from underground mines. The following project data are given as: H = 230 m, Payload(Q) = 4000 kgf, Weight of the skip (Q_0) = 3950 kgf, Weight of the main rope (p) = 3.1 kgf/m, Rope breaking strength (B) = 57200 kgf, Double drum winder diameter = 3 m, Width = 1.5 m (2 x 3 x 1.5), Gear ratio = 30, Motor = 200 Kw and GDm^2 = 120 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) Explain the characteristic features, advantages and disadvantages of Side discharge Loader (SDL) used in the mines. (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. OR	**10+10**	**CO5**
Q 13	(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 %.	**10 + 10**	