B. Construction Engineering , Part- I, Examination, 2006
(2nd Semester)
Subject: Construction Plants and Equipments

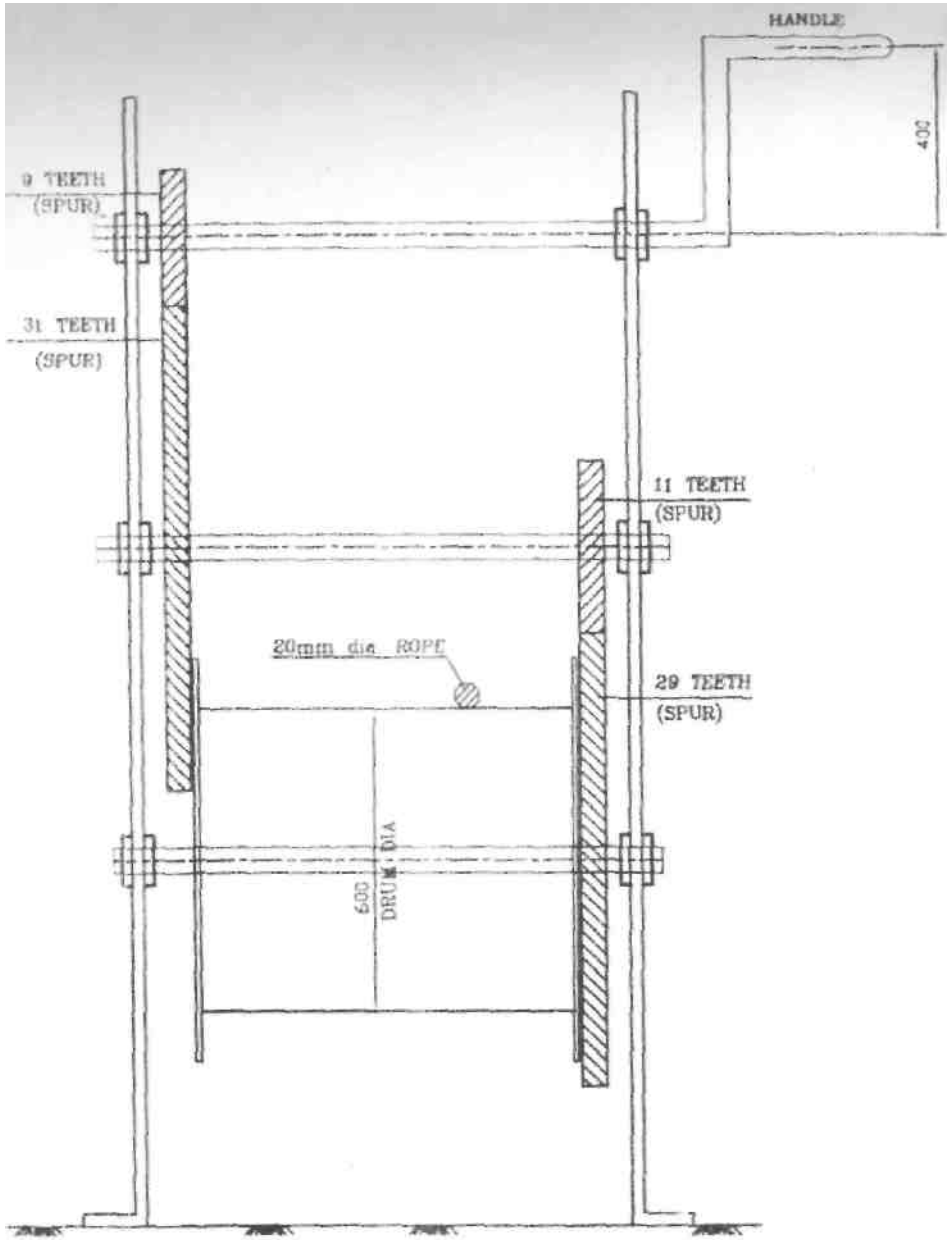
Time: 3 Hours **Full Marks 100**

No. of Questions	PART-I	Marks
	Group A *(Answer question 1 and any two from the rest)*	
1.	A flyovers is designed to have 25 spans resting on pile foundation with 30^M deep 1^M φ cast in situ bored pile. Each pile is to rest upon a group of piles consisting of 8 piles. Each abutment is to rest upon a group of piles consisting of 16 piles	9
a)	Calculate total numbers of piles and aggregate length of cast-in-situ bored piles.	
b)	How many rotary piling rigs are required to complete the piling work within 6 months given the following statistics: Time cycle of a rotary rig .- Placing of piling rig at pile point → 1hr. Driving guide tube point → 1hr Rate of boring point → 2^M/hr Washing bore hole → 1 hr Lowering reinforcement cage → 2 hr Lowering tremmie pipe →2 hr Concreting → 2 hr Working days in a month → 25 Efficiency → 80%	
2.	Fill in blanks :	8
a)	A _____ is perhaps the most useful and versatile equipment for pushing a heap earth or ripping hard soil.	
b)	Fully revolving power shovels are highly versatile as they can be equipped with the following attachments. i) _____ ii) _____ iii) _____ iv) _____	
c)	Main components of shovel are i) _____ ii) _____ iii_____ iv_____ v) _____ vi) _____	
d)	A motor grader contacts grind at three points : i) _____ ii) _____ iii) _____	
e)	_____are primarily used for excavation under water in formation of deep channel.	
f)	A _____ is used for sinking well foundation of a bridge.	
g)	A _____ is used to drill holes in hard rock for blasting the same to produce stone aggregate	

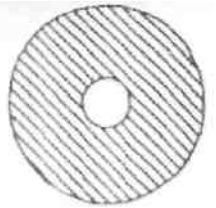
h) A _____ perform aerial transport of concrete for construction of a dam.

No. of Questions		Marks
3.	i) Broadly speaking, a project manager should have certain qualities to ensure best performance. Name 7 such qualities. ii) What facilities should a standard maintenance shop have for upkeep of plant and equipments deployed in construction of a dam. State 7 such qualities? iii) What kind of major tools a maintenance shop must be equipped with to ensure repair and maintenance of running equipments at work site? iv) What are the major equipments required to produce course aggregate in mass scale?	08
4.	In a dam total quantity of concrete works out to 6,00,000 M^3 and completion time is 3 years. i) What should be the productivity per day considering 8 working months in a year @ 25 working days a month? ii) How many shovels do you need given the following statistics? Quantity of coarse aggregate required per M of finished concrete = 0.9M . capacity of shovel bucket = $3M^3$ Cycle *Time :* Digging Time = 3 mins Swing Time ==1 mins Unloading into dumper = 1 min Placing of dumper = 1 min. Load Factor = 0.8 Working hrs in a day == 16	08
	Group-B Answer question 5 and any two from the rest.	
5.	Draw a diagram of an automatic concrete batching plant with feeding system of aggregate from various stock piles and label all major components	9
6.	In a major bridge total structural concrete works out to 90,000M^3. time of completion 12 months. Working days in a month 25. a) What should be average productivity per day ? b) What should be the capacity of a concrete batching plant considering night working of 12 ^{hrs} in a day and efficiency 75% ?. c) How many transit mixes shall be required given the following statistics? Capacity of each transit mixes=$6m^3$ Time cycle- positioning below batching plant = 5min Loading Line = l0min Up Journey = 45min Discharging into cone. Pump topper = 30min Dn journey =30min Efficiency = 80%	08
7.	a) What are two types of dean ting adopted for civil engineering foundation works? b) What are two major types of dean ting pumps? c) What do you understand by "Draw Down Curve". Explain with diagram	08

	d) What is a well point? Explain with a diagram. e) What is a deep tubewell? Draw a sketch. What main equipments / accessories do the well point system consist of?	
8.	a) What do you understand by the term "Commercial Explosive"? b) What are the uses of "Commercial Explosive" in Civil Engineering projects? c) What arc the main constituents of "low explosive"? d) What are the main constituents of "high explosive"? e) What are various kinds of high explosive and how are these used? f) What is the cheapest form of explosive used for coarse aggregate production? g) What docs a detonator consist of and what are their kinds? h) Draw a sketch showing loading pattern of explosive inside a drill hole with double detonating system.	8
	PART-II Answer Question No 13 and any two from the rest. Two marks for Neatness.	
9.	Explain the purpose of a bearing and bush. What is the difference between the two?	4
	Explain with purpose of use:- a) Ball Bearing b) Roller Bearing c) Taper Roller bearing	3x4=12
10.	Explain in details the working of- a) Petrol Engine. b) Diesel Engine	2x8=16
11.	What is the purpose of using a clutch, explain in details. Explain the types of clutches and compare them for various use on power /wear/ capacity/ operation.	16
12.	What are the methods of power transmission from driving shaft to driven shaft?	4
	Write short notes on power transmission by- a) Pulley and belt b) Chain and Sprocket c) Gear Boxes.	3×2=6
	Can you write a comparison chart? If yes please make.	6
13.	Please refer to the sketches enclosed. a) Find out the corresponding Rope pull in kg. b) What maximum power the clutch can transmit	8 8



Sketch for Question – 13 (a)



Sketch for Question – 13 (b)

PRESSURE PLATE OF CLUTCH

Pressure plate Outer dia = 40cm
Pressure plate Inner dia = 10cm
Co-efficient of Friction = 0.25
Uniform Pressure on plate = 3kg/sqcm
Rotation/Revolution per minute = 1000 rpm

DETAILS OF DOUBLE STAGE WINCH

Effort on Handle – 25kg
Leaver arm. radious for Handle = 40cm
Diameter of the Rope Drum = 60cm
Dia. of Pulling Rope = 20mm (2cm)