Name shehriyarkhan
REG.No:_13738______

Shehriyar khan 13738

Question No 1 *(CLO -1)* **20**

A. A 100kVA distribution transformer costs Rs 2,00,000 and has an estimated useful life of 20 years. Find the annual depreciation amount, assuming that the scrap value of the transformer to be Rs 10,000.

B. The average demand of a consumer is 40 A at 230 volts at unity power factor His total energy consumption annually is 10,000 KWh. If the unit rate is Rs 2 per kWh for the first 500hours use of the demand per annum plus Re 1 for each additional units, Calculate the annual bill of the consumer and equivalent flat rate.

Question No 2 *(CLO-2)* **10**

A. A power station has to supply load as follows:

Timings	KW
11 pm to 5 am	500
5 am to 6 am	750
6 am to 7 am	1000
7 am to 9 am	2000
9 am to 12 noon	2500
12 Noon to 1 pm	1500
1 pm to 5 pm	2500
5 pm to 7 pm	2000
7 pm to 9 pm	2500
9 pm to 11 pm	1000

For the given data above draw the load curve. Select the number and size of generator units to supply this load. Find the reserve capacity of the plant required. Calculate the plant capacity factor. Determine the operating schedule of the units in the station. Calculate the plant factor?

Question No 1: (a)

Given that

$p = 200,000$

$S = 10,000$

$N = 20$ years

Depreciation $D = ?$

$D = (P-S)/n$

$$D = \frac{200,000 - 10,000}{20}$$

$D = 9500$ annually.

Question No 1 :- (b)

Solution :-

energy : $E = 10,000$ KWb
current : $I = 40$ A
voltage : $v = 230$ V

The power demand of consumer is $P = VI\cos Q = 230 \times 40 \times 1$
$= 9200$ W or 9.2 KW.

Electricity consumption for the first 500 hours is = 500 x 9.2
= 4600 KWh
Since the cost of electricity is Rs 2 per KWh of for the first 500 hours therefor the consumer has to pay:
5400 x 1 = Rs 5400
Annual bill : 9200 + 5400
= 14,600
The flate rate equivalent =
14600 / 10,000 = 1.46 per KWh

Question No 2 :- (a)

Solution :

Energy generated during 24 hrs

= (500 x 5) + (750 x 1) + (1000 x 1)
+ (2000 x 2) + (2500 x 3) + (1500 x 1)
+ (2500 x 4) + (2000 x 2) + (2500 x 2)
+ (1000 x 2) + (500 x 1)

= 38,750 KW

Maximum demand = 2500 KW

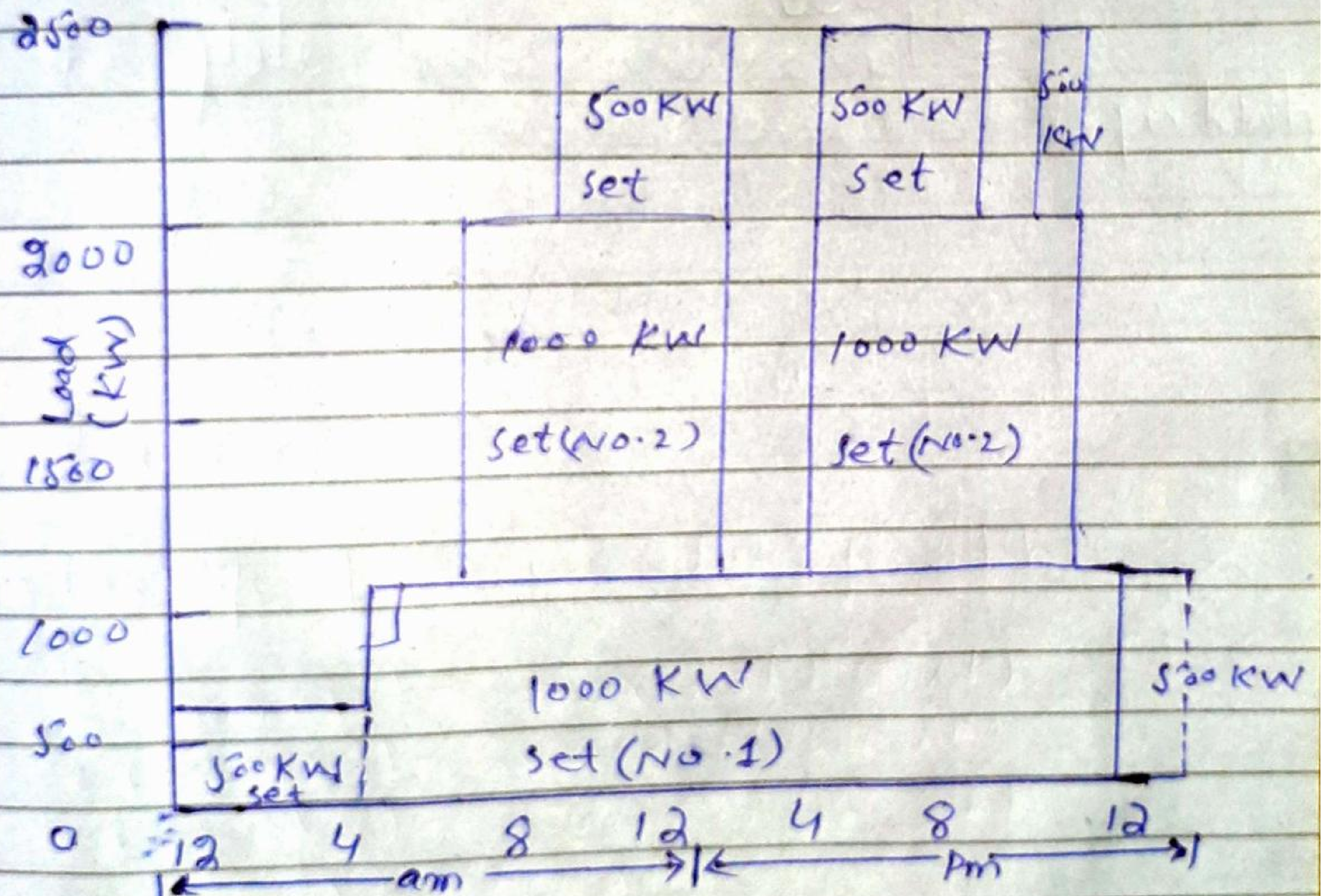
load factor

$$= \frac{\text{Energy generated during 24 hrs}}{\text{Maximum demand} \times 24 \text{ hrs}}$$

$$= 38,750 / 2500 \times 24$$

$$= 64.7 \%$$

Question No 2: (b)



plant capacity factor :-

$$= \frac{\text{Energy produced during 24 hrs (KWh)}}{\text{Installed capacity (KW)} \times 24 \text{ hrs}}$$

Two sets each of 1000 KW
one set of 500 KW
n this case a set of 1000 KW
will have to be brought and
kept as ~~resour~~ reserve.

The total installed capacity of
the solution is

$= 1000 + 1000 + 500 + 1000$ (reserve)

$= 3500$ KW.

plant capacity factor

$= 38,750 / 3500 \times 24$

$= 0.46$ or 46%

With the operating sheduled fixed
as above the energy that could have
been generated by the capacity of
plant actually running for the
scheduled time would be
$(500\times6) + (1000\times2) + (2000\times2) + (2500\times3) +$
$(1500\times1) + (2500\times4) + (2000\times2) + (2500\times2)$
$+ (1000\times2) = 39000$ KWh

Energy actually produced $= 38,750$ KWh

plant use factor:

$$= \frac{\text{Energy produced (KWh)}}{\text{capacity of plant (KW)} \times \text{number of hrs plant has been in operation}}$$

$= 38750 / 39,000$

$= 0.994$ or 99.4% —