G007

p) DETERMINE THE VOLTAGE DROP FOR EACH 3 ϕ SEPARATE FINAL SUB CIRCUIT

PERMISSIBLE VOLTAGE DROP IS 14.2V.

SEPARATE FINAL SUB CIRCUIT	ROUTE LENGTH	CURRENT	TABLE	Vc	$V_d = \frac{V_c \, l \, I}{1000}$	VOLTAGE	CONDITION ACCEPTABLE	CONDITION NOT ACCEPTABLE
(1) 25mm² COPPER V75 TPI CABLE IN CONDUIT	30m	75A	40	1.54	$\frac{1.54 \times 30 \times 75}{1000}$	3.49	✓	
(2) 2.5mm² COPPER V75 SDI CABLE UNENCLOSED & SPACED APART	40m	27A	41	15.6	$\frac{15.6 \times 40 \times 27}{1000}$	16.85		✓
(3) 10mm² COPPER X-HF 110 MULTICORE CABLE ON CABLE TRAY	10m	80A	42	4.3	$\frac{4.3 \times 10 \times 80}{1000}$	3.43	✓	
(4) 10mm² COPPER MULTICORE MIMS	25m	55A	48	3.92	$\frac{3.92 \times 25 \times 55}{1000}$	5.39	✓	
(5) 150mm² COPPER MULTICORE MIMS	3m	400A	48	0.297	$\frac{0.297 \times 3 \times 400}{1000}$	0.35	✓	

SEPARATE FINAL SUB CIRCUIT	ROUTE LENGTH	CURRENT	TABLE	Vc	$V_d = \frac{V_c L I}{1000}$	VOLTAGE	CONDITION ACCEPTABLE	CONDITION NOT ACCEPTABLE
(6) 70 mm^2 ALUMINIUM MULTICORE X-90 CABLE ON TRAY	120 m	180A	45	0.493	$\frac{0.493 \times 120 \times 180}{1000}$	21.45		✓
(7) 2.5 mm^2 COPPER V75 TPS MULTI CORE CABLE IN CONDUIT	15m	16A	40	15.6	$\frac{15.6 \times 15 \times 16}{1000}$	3.74	✓	
(8) 1 mm^2 COPPER V90 TPS MULTI CORE, UG CONDUIT	55m	8A	40	44.7	$\frac{44.7 \times 55 \times 8}{1000}$	19.67		✓
(9) 25 mm^2 ALUMINIUM X-90 TPI CABLE IN CONDUIT	117m	90A	43	2.67	$\frac{2.67 \times 117 \times 90}{1000}$	28.1		✓
(10) 2.5 mm^2 COPPER V90 SDI CABLE ON CABLE TRAY	81m	25A	41	15.6	$\frac{15.6 \times 81 \times 25}{1000}$	31.54		✓

	SEPARATE FINAL SUB CIRCUIT	ROUTE LENGTH	CURRENT	TABLE	Vc	$Vd = \frac{Vc \, I \, L}{1000}$	VOLTAGE	CONDITION	
								ACCEPTABLE	NOT ACCEPTABLE
11	1.5 mm^2 COPPER U 90 SDI ON CABLE TRAY	17m	17A	41	28.6	$\frac{28.6 \times 17 \times 17}{1000}$	8.27	✓	
12	1 mm^2 4 CORE FLEXIBLE CORD	36m	4A	47	39.1	$\frac{39.1 \times 36 \times 4}{1000}$	5.63	✓	
13	6 mm^2 COPPER 4 CORE PVC INSULATED TWISTED AERIAL CABLE	40m	36A	49	6.71	$\frac{6.71 \times 40 \times 36}{1000}$	9.66	✓	
14	25 mm^2 ALUMINIUM PVC INSULATED SINGLE CORE, AERIAL CABLE	13m	100A	50	2.6	$\frac{2.6 \times 13 \times 100}{1000}$	3.38	✓	
15	10 mm^2 R-EP FLEXIBLE CABLE 4 CORE	2m	60A	47	4.38	$\frac{4.38 \times 2 \times 60}{1000}$	0.33	✓	

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USE AS/NZS 3003.1.1 TO DETERMINE THE VOLTAGE DROP IN FOUR FINAL SUB CIRCUITS. COMPLETE THE TABLE BELOW FOR FOUR CIRCUITS DESCRIBED

FOR EACH CIRCUIT A — D GIVE

- ROUTE LENGTH OF THE CIRCUIT
- RATING OF THE CIRCUIT PROTECTION DEVICE
- THE CONDUCTOR SIZE OF THE CIRCUIT CABLES
- THE mV/Am VALUE FOR CONDUCTOR SIZE
- CALCULATION WORKING
- VOLTAGE DROP FOR CABLE.

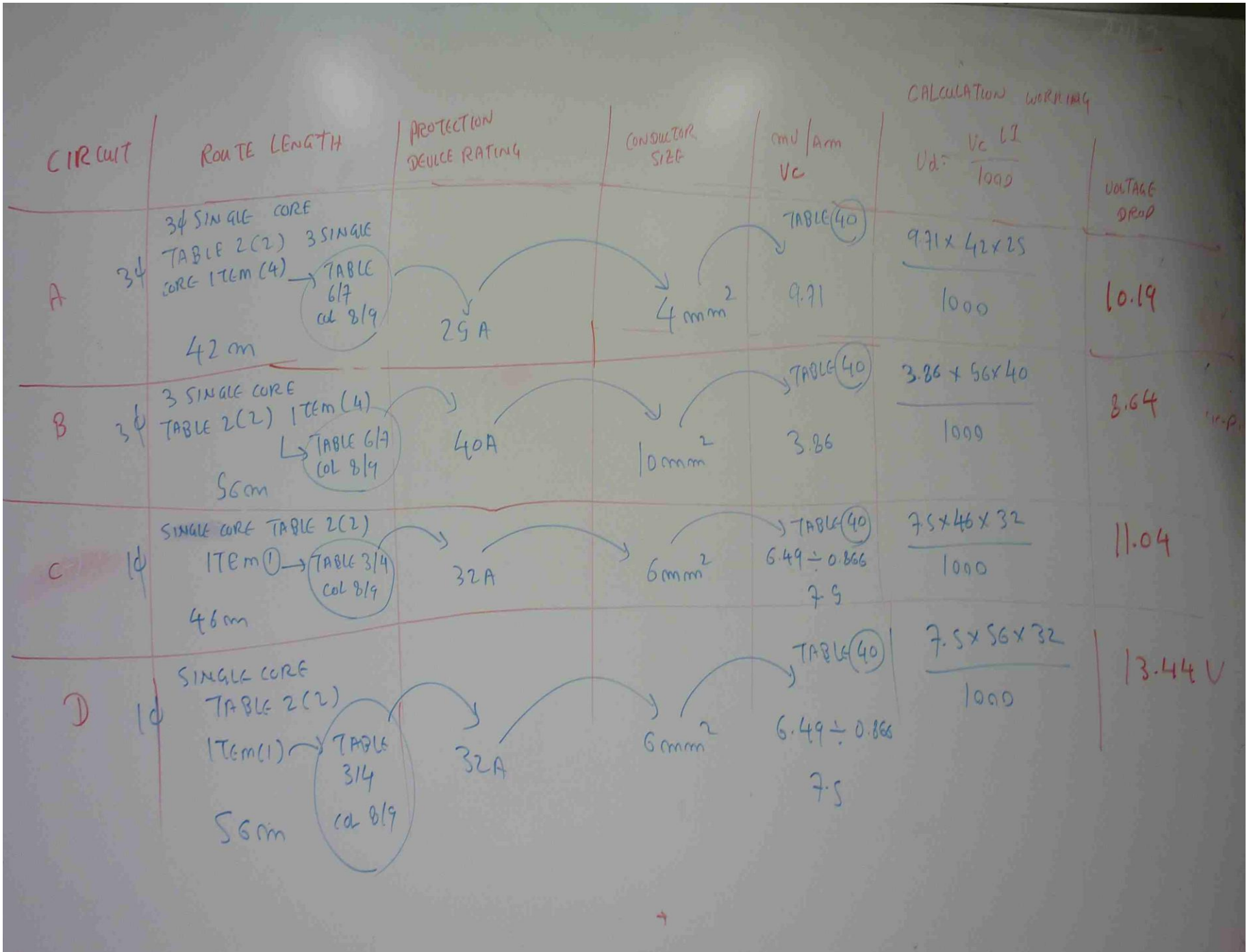
ASSUME ALL CABLES ARE OPERATING AT THEIR NORMAL TEMPERATURE.

(A) - A CIRCUIT IN A FACTORY SUPPLYING TWO 15A 3φ SOCKET OUTLETS ROUTE 42m, PROTECTED BY 25A C.B. V7S TPI CABLES ARE INSTALLED ENCLOSED IN AIR. — TABLE 4D

(B) - A 40A 3φ BOILER IS WIRED USING 10mm, V7S TPI CABLES INSTALLED IN RIGID PVC CONDUIT - THE BOILER IS SITUATED 56m FROM THE SWITCH BOARD

(C) SIX 240V, 1000W FLOOD LIGHTS OUTSIDE A FACTORY ON A CIRCUIT PROTECTED BY A 32A C.B. THE CIRCUIT CABLES ARE V7S TPI INSTALLED ENCLOSED IN AIR, ROUTE LENGTH 46m

(D) TWO SINGLE PHASE SOCKET OUTLETS INSTALLED ON A CIRCUIT WITH ROUTE LENGTH 56m. PROTECTED BY 32A C.B. CABLES ARE V7S TPI INSTALLED ENCLOSED IN AIR NON DOMESTIC INSTALLATION.


CIRCUIT
ROUTE LENGTH
PROTECTION DEVICE RATING
CONDUCTOR SIZE
mV/Amm Vc
CALCULATION WORKING
Vd = Vc L I / 1000
VOLTAGE DROP
A
3φ
3φ SINGLE CORE TABLE 2(2) 3 SINGLE CORE ITEM (4)
TABLE 6/7 col 8/9
42 m
25A
4 mm²
TABLE 40
9.71
9.71 x 42 x 25 / 1000
10.19
B
3φ
3 SINGLE CORE TABLE 2(2) ITEM (4)
TABLE 6/7 COL 8/9
56m
40A
10 mm²
TABLE 40
3.86
3.86 x 56 x 40 / 1000
8.64
C
1φ
SINGLE CORE TABLE 2(2) ITEM (1)
TABLE 3/4 COL 8/9
46 m
32A
6 mm²
TABLE 40
6.49 ÷ 0.866
7.5
7.5 x 46 x 32 / 1000
11.04
D
1φ
SINGLE CORE TABLE 2(2) ITEM (1)
TABLE 3/4 col 8/9
56m
32A
6 mm²
TABLE 40
6.49 ÷ 0.866
7.5
7.5 x 56 x 32 / 1000
13.44 V