

Lampiran 27

PERHITUNGAN VALIDITAS SOAL TES SIKLUS I

Nomor siswa	Nomor Item																				Xt	Xt ²
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20		
1	1	1	1	1	1	1	1	1	0	1	0	0	0	1	1	1	1	0	0	0	13	169
2	1	1	1	0	1	0	1	0	0	1	1	1	1	0	1	1	1	1	1	1	15	225
3	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	3	9
4	1	1	0	0	0	0	0	1	0	1	1	1	1	1	1	1	0	1	1	1	13	169
5	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	19	361
6	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	19	361
7	1	0	1	0	1	1	1	0	1	0	1	1	1	0	1	0	1	1	1	1	14	196
8	1	1	1	1	1	1	1	1	0	1	0	1	1	0	1	1	1	0	1	1	16	256
9	0	1	0	0	0	0	0	0	0	0	0	1	1	0	0	1	0	0	1	1	6	36
10	0	0	1	1	1	0	1	1	0	0	1	1	1	1	0	0	1	1	1	1	13	169
11	1	1	1	1	1	1	1	1	0	1	0	0	0	1	1	1	1	0	0	0	13	169
12	0	0	1	1	1	0	1	1	0	0	1	1	1	1	0	0	1	1	1	1	13	169
13	1	1	1	1	1	1	1	1	0	1	0	0	0	1	1	1	1	0	0	0	13	169
14	0	0	1	0	1	0	0	0	0	1	1	0	0	1	0	0	0	0	0	0	5	25
15	0	0	1	1	1	0	1	1	0	0	1	1	1	1	0	0	1	1	1	1	13	169
16	0	1	1	0	0	0	0	0	0	1	0	0	1	0	0	1	0	0	0	1	6	36
17	0	0	1	1	1	0	1	1	0	0	1	1	1	1	0	0	1	1	1	1	13	169
18	1	1	0	0	0	0	0	0	0	1	0	0	1	0	0	1	0	0	0	1	6	36
19	1	1	1	0	1	1	1	0	1	0	1	1	0	1	1	1	1	1	1	0	15	225
20	1	0	0	1	0	1	0	0	1	0	0	0	0	0	1	0	0	0	0	0	5	25
21	1	1	1	1	1	1	1	1	0	1	0	0	0	1	1	1	1	0	0	0	13	169
22	0	1	1	0	1	1	1	1	1	1	1	1	1	0	0	1	1	1	1	1	16	256
23	1	1	1	1	1	1	1	1	0	1	0	0	0	1	1	1	1	0	0	0	13	169
24	1	0	0	0	0	0	1	0	1	0	0	1	0	0	1	0	1	0	1	0	7	49
25	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	19	361
26	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	0	1	1	1	18	324
27	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	19	361
28	1	0	0	0	1	0	1	0	0	0	0	0	0	0	1	0	0	1	0	0	5	25
29	0	0	1	1	1	0	1	1	0	0	1	1	1	1	0	0	1	1	1	1	13	169
30	1	1	1	1	1	1	0	1	1	1	1	1	0	1	1	1	1	1	1	0	17	289
31	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	19	361
32	0	0	1	0	1	0	0	0	1	0	1	0	0	0	0	0	1	1	0	0	6	36
33	0	1	1	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	6	36
34	0	0	0	1	0	1	1	0	1	1	1	0	0	0	0	0	1	1	0	0	8	64

35	1	0	0	0	0	1	0	1	0	0	0	0	1	0	1	0	0	0	1	1	7	49
36	1	1	1	1	1	1	1	1	0	1	0	0	0	1	1	1	1	0	0	0	13	169
37	0	1	0	0	0	1	0	1	0	0	0	0	0	1	0	0	1	0	0	0	5	25
38	0	0	1	1	1	0	1	1	0	0	1	1	1	1	0	0	1	1	1	1	13	169
39	1	0	0	0	0	0	1	1	0	1	0	1	0	0	1	0	0	0	0	0	6	36
40	0	1	0	0	0	0	0	0	0	0	0	1	1	0	0	1	0	0	1	1	6	36
N=	N1 =	N2 =	N3 =	N4 =	N5 =	N6 =	N7 =	N8 =	N9 =	N1 0=	N1 1=	N1 2=	N1 3=	N1 4=	N1 5=	N1 6=	N1 7=	N1 8=	N1 9=	N2 0=	\sum Xt	\sum Xt ²
40	24	24	28	22	27	21	27	23	15	22	21	23	22	22	24	24	27	21	23	22	462	6296
P	0.6	0.6	0.7	0.55	0.68	0.53	0.68	0.58	0.38	0.55	0.53	0.58	0.55	0.55	0.6	0.6	0.68	0.53	0.58	0.55		
q	0.4	0.4	0.3	0.45	0.33	0.48	0.33	0.43	0.63	0.45	0.48	0.43	0.45	0.45	0.4	0.4	0.33	0.48	0.43	0.45		

Nomor Soal	N	Siswa Jawab Benar	M _p	Mean(M _t)	SDT	p	q				Interpretasi
								$(M_p - M_t) / SDT$	$(p/q)^{1/2}$	Γ_{pbi}	
1	24	311	12.96	11.55	4.961	0.60	0.40	0.28	1.225	0.348	VALID
2	24	312	13.00	11.55	4.961	0.60	0.40	0.29	1.225	0.358	VALID
3	28	385	13.75	11.55	4.961	0.70	0.30	0.44	1.528	0.677	VALID
4	22	299	13.59	11.55	4.961	0.55	0.45	0.41	1.106	0.455	VALID
5	27	378	14.00	11.55	4.961	0.68	0.33	0.49	1.441	0.712	VALID
6	21	278	13.24	11.55	4.961	0.53	0.48	0.34	1.051	0.358	VALID
7	27	365	13.52	11.55	4.961	0.68	0.33	0.40	1.441	0.572	VALID
8	23	305	13.26	11.55	4.961	0.58	0.43	0.34	1.163	0.401	VALID
9	15	207	13.80	11.55	4.961	0.38	0.63	0.45	0.775	0.351	VALID
10	22	293	13.32	11.55	4.961	0.55	0.45	0.36	1.106	0.394	VALID
11	21	300	14.29	11.55	4.961	0.53	0.48	0.55	1.051	0.580	VALID
12	23	310	13.48	11.55	4.961	0.58	0.43	0.39	1.163	0.452	VALID
13	22	290	13.18	11.55	4.961	0.55	0.45	0.33	1.106	0.364	VALID
14	22	293	13.32	11.55	4.961	0.55	0.45	0.36	1.106	0.394	VALID
15	24	311	12.96	11.55	4.961	0.60	0.40	0.28	1.225	0.348	VALID
16	24	310	12.92	11.55	4.961	0.60	0.40	0.28	1.225	0.337	VALID
17	27	370	13.70	11.55	4.961	0.68	0.33	0.43	1.441	0.626	VALID
18	21	300	14.29	11.55	4.961	0.53	0.48	0.55	1.051	0.580	VALID
19	23	317	13.78	11.55	4.961	0.58	0.43	0.45	1.163	0.523	VALID
20	22	290	13.18	11.55	4.961	0.55	0.45	0.33	1.106	0.364	VALID

Lampiran 28

Perhitungan Realibilitas Soal Tes Siklus II

Nomor siswa	Nomor Item																				Xt	Xt ²
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20		
1	1	1	1	1	1	1	1	1	1	0	1	0	0	1	1	1	1	0	0	0	13	169
2	1	1	1	0	1	0	1	0	0	1	1	1	1	0	1	1	1	1	1	1	15	225
3	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	3	9
4	1	1	0	0	0	0	0	1	0	1	1	1	1	1	1	1	0	1	1	1	13	169
5	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	19	361
6	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	19	361
7	1	0	1	0	1	1	1	0	1	0	1	1	1	0	1	0	1	1	1	1	14	196
8	1	1	1	1	1	1	1	1	0	1	0	1	1	0	1	1	1	0	1	1	16	256
9	0	1	0	0	0	0	0	0	0	0	0	1	1	0	0	1	0	0	1	1	6	36
10	0	0	1	1	1	0	1	1	0	0	1	1	1	1	0	0	1	1	1	1	13	169
11	1	1	1	1	1	1	1	1	0	1	0	0	0	1	1	1	1	0	0	0	13	169
12	0	0	1	1	1	0	1	1	0	0	1	1	1	1	0	0	1	1	1	1	13	169
13	1	1	1	1	1	1	1	1	0	1	0	0	0	1	1	1	1	0	0	0	13	169
14	0	0	1	0	1	0	0	0	0	1	1	0	0	1	0	0	0	0	0	0	5	25
15	0	0	1	1	1	0	1	1	0	0	1	1	1	1	0	0	1	1	1	1	13	169
16	0	1	1	0	0	0	0	0	0	1	0	0	1	0	0	1	0	0	0	1	6	36
17	0	0	1	1	1	0	1	1	0	0	1	1	1	1	0	0	1	1	1	1	13	169
18	1	1	0	0	0	0	0	0	0	1	0	0	1	0	0	1	0	0	0	1	6	36
19	1	1	1	0	1	1	1	0	1	0	1	1	0	1	1	1	1	1	1	0	15	225
20	1	0	0	1	0	1	0	0	1	0	0	0	0	0	1	0	0	0	0	0	5	25
21	1	1	1	1	1	1	1	1	0	1	0	0	0	1	1	1	1	0	0	0	13	169
22	0	1	1	0	1	1	1	1	1	1	1	1	1	0	0	1	1	1	1	1	16	256
23	1	1	1	1	1	1	1	1	0	1	0	0	0	1	1	1	1	0	0	0	13	169
24	1	0	0	0	0	0	1	0	1	0	0	1	0	0	1	0	1	0	1	0	7	49
25	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	19	361
26	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	0	1	1	1	18	324
27	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	19	361
28	1	0	0	0	1	0	1	0	0	0	0	0	0	0	1	0	0	1	0	0	5	25
29	0	0	1	1	1	0	1	1	0	0	1	1	1	1	0	0	1	1	1	1	13	169
30	1	1	1	1	1	1	0	1	1	1	1	1	0	1	1	1	1	1	1	0	17	289
31	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	19	361
32	0	0	1	0	1	0	0	0	1	0	1	0	0	0	0	0	1	1	0	0	6	36
33	0	1	1	0	0	0	0	0	1	0	0	0	0	1	1	1	0	0	0	0	6	36
34	0	0	0	1	0	1	1	0	1	1	1	0	0	0	0	0	1	1	0	0	8	64
35	1	0	0	0	0	1	0	1	0	0	0	0	1	0	1	0	0	0	1	1	7	49

36	1	1	1	1	1	1	1	1	0	1	0	0	0	1	1	1	1	0	0	0	13	169
37	0	1	0	0	0	1	0	1	0	0	0	0	0	1	0	0	1	0	0	0	5	25
38	0	0	1	1	1	0	1	1	0	0	1	1	1	1	0	0	1	1	1	1	13	169
39	1	0	0	0	0	0	1	1	0	1	0	1	0	0	1	0	0	0	0	0	6	36
40	0	1	0	0	0	0	0	0	0	0	0	1	1	0	0	1	0	0	1	1	6	36
N=	N1	N2	N3	N4	N5	N6	N7	N8	N9	N1	N1	N1	N1	N1	N1	N1	N1	N1	N1	N2	\sum	$\sum X_t^2$
	=	=	=	=	=	=	=	=	=	0=	1=	2=	3=	4=	5=	6=	7=	8=	9=	0=	Xt	
40	24	24	28	22	27	21	27	23	15	22	21	23	22	22	24	24	27	21	23	22	462	6296
P	0.6	0.6	0.7	0.55	0.68	0.53	0.68	0.58	0.38	0.55	0.53	0.58	0.55	0.55	0.6	0.6	0.68	0.53	0.58	0.55		
q	0.4	0.4	0.3	0.45	0.33	0.48	0.33	0.43	0.63	0.45	0.48	0.43	0.45	0.45	0.4	0.4	0.33	0.48	0.43	0.45		
pq	0.24	0.24	0.21	0.248	0.219	0.249	0.219	0.244	0.234	0.248	0.249	0.244	0.248	0.248	0.24	0.24	0.219	0.249	0.24	0.248		

Perhitungan Realibilitas Tes Siklus 1

Rumus yang digunakan untuk menghitung realibilitas soal tes siklus 1 yaitu:

$$\Gamma_{11} = \left[\frac{n}{n-1} \right] \left[\frac{St^2 - \Sigma pq}{St^2} \right]$$

St = Standar deviasi dari tes (akar dari varians)

Nilai St^2 :

$$\begin{aligned} St^2 &= \frac{\sum x_i}{N} = \frac{\sum X_i^2 - \frac{(\sum X_i)^2}{N}}{N} \\ &= \frac{6296 - \frac{(462)^2}{40}}{40} \\ &= 23.093 \end{aligned}$$

$$\begin{aligned} \text{Sehingga } KR_{20} &= \Gamma_{11} = \left[\frac{n}{n-1} \right] \left[\frac{S^2 - \Sigma pq}{S^2} \right] \\ &= \left[\frac{20}{20-1} \right] \left[\frac{23.093 - 4.78}{23.093} \right] \\ &= 0.8347 \end{aligned}$$

Dari hasil diatas diketahui bahwa reabilitas soal adalah 0.8347 ($r_{11} \geq 0,70$). Sehingga didapat secara keseluruhan tes memiliki realibilitas yang **tinggi (reliable)**

TINGKAT KESUKARAN TES (TES AKHIR SIKLUS I)

Analisis tingkat kesukaran tes (P) pilihan ganda menggunakan rumus:

$$P = \frac{B}{J}$$

Keterangan :

P = Indeks Kesukaran

P = 0.00 – 0.30 = soal kategori sukar

B = Jumlah siswa menjawab benar

P = 0.31 – 0.70 = soal kategori sedang

J = Jumlah peserta tes

P = 0.71 – 1.00 = soal kategori mudah

No Soal	J	B	P	Kategori
1	40	24	0.6	Sedang
2	40	24	0.6	Sedang
3	40	28	0.7	Sedang
4	40	22	0.55	Sedang
5	40	27	0.675	Sedang
6	40	21	0.525	Sedang
7	40	27	0.675	Sedang
8	40	23	0.575	Sedang
9	40	15	0.375	Sedang
10	40	22	0.55	Sedang
11	40	21	0.525	Sedang
12	40	23	0.575	Sedang
13	40	22	0.55	Sedang
14	40	22	0.55	Sedang
15	40	24	0.6	Sedang
16	40	24	0.6	Sedang
17	40	27	0.675	Sedang
18	40	21	0.525	Sedang
19	40	23	0.575	Sedang
20	40	22	0.55	Sedang

ANALISIS DAYA BEDA**(Tes Akhir Siklus I)**

Analisis daya beda tes (D) pilihan ganda menggunakan rumus :

$$D = PA - PB$$

Keterangan :

D = Daya pembeda tes

PA = Proporsi kelompok atas

PB = Proporsi kelompok bawah

Klasifikasi daya beda :

0.00 – 0.20 = jelek

0.21 – 0.40 = sedang

0.41 – 0.70 = baik

0.71 – 1.00 = baik sekali

No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Xt	Xt ²	
1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	19	361
2	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	19	361
3	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	19	361
4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	19	361
5	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	19	361
6	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	0	1	1	1	1	18	324
7	1	1	1	1	1	1	0	1	1	1	1	1	0	1	1	1	1	1	1	0	1	17	289
8	1	1	1	1	1	1	1	1	0	1	0	1	1	0	1	1	1	0	1	1	1	16	256
9	0	1	1	0	1	1	1	1	1	1	1	1	1	0	0	1	1	1	1	1	1	16	256
10	1	1	1	0	1	0	1	0	0	1	1	1	1	0	1	1	1	1	1	1	1	15	225
Batas Atas	9	10	10	7	10	8	9	7	8	10	9	10	9	6	8	10	9	9	10	9			

No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Xt	Xt ²	
31	0	1	0	0	0	0	0	0	0	0	0	1	1	0	0	1	0	0	1	1	6	36	
32	0	1	1	0	0	0	0	0	0	1	0	0	1	0	0	1	0	0	0	0	1	6	36
33	1	1	0	0	0	0	0	0	0	1	0	0	1	0	0	1	0	0	0	0	1	6	36
34	0	0	1	0	1	0	0	0	1	0	1	0	0	0	0	0	1	1	0	0	6	36	
35	0	1	1	0	0	0	0	0	1	0	0	0	0	1	1	1	0	0	0	0	6	36	
36	0	0	1	0	1	0	0	0	0	1	1	0	0	1	0	0	0	0	0	0	5	25	
37	1	0	0	1	0	1	0	0	1	0	0	0	0	0	1	0	0	0	0	0	5	25	
38	1	0	0	0	1	0	1	0	0	0	0	0	0	0	1	0	0	1	0	0	5	25	
39	0	1	0	0	0	1	0	1	0	0	0	0	0	1	0	0	1	0	0	0	5	25	
40	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	3	9	
Batas Bawah	3	5	4	1	3	3	1	1	3	3	2	1	3	3	3	5	2	2	1	3			

0.6	Baik
0.9	Baik sekali
0.7	Baik
0.7	Baik
0.5	Baik
0.5	Baik
0.3	Sedang
0.6	Baik
0.9	Baik sekali
0.7	Baik
0.7	Baik
0.5	Baik
0.6	Baik
0.8	Baik sekali
0.5	Baik
0.7	Baik
0.6	Baik
0.6	Baik
0.5	Baik
0.6	Baik
0.5	Baik
0.6	Baik
D	Ket.